

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST  
CERTIFICATES FOR ELECTRICAL EQUIPMENT  
(IECEE) CB SCHEMESYSTEME CEI D'ACCEPTATION MUTUELLE DE  
CERTIFICATS D'ESSAIS DES EQUIPEMENTS  
ELECTRIQUES (IECEE) METHODE OCCB TEST CERTIFICATE  
CERTIFICAT D'ESSAI OCProduct  
Produit

LED Street Light

Name and address of the applicant  
Nom et adresse du demandeurAOK LED Light Company Limited  
Building 1 St George's Science  
and Technology Industrial Park, Outer Ring Road Bao'an, Shenzhen,  
Guangdong, ChinaName and address of the manufacturer  
Nom et adresse du fabricantAOK LED Light Company Limited  
Building 1 St George's Science  
and Technology Industrial Park, Outer Ring Road Bao'an, Shenzhen,  
Guangdong, ChinaName and address of the factory  
Nom et adresse de l'usineAOK LED Light Company Limited  
Building 1 St George's Science  
and Technology Industrial Park, Outer Ring Road Bao'an, Shenzhen,  
Guangdong, ChinaNote: When more than one factory, please report on page 2  
Note: Lorsque il y a plus d'une usine, veuillez utiliser la 2<sup>ème</sup> pageRatings and principal characteristics  
Valeurs nominales et caractéristiques principalesAC 100-240V; 50/60Hz; Class I; IP66  
1) 40W; 2) 80W; 3) 120W; 4) 160W; 5) 200W; 6) 240WTrade mark (if any)  
Marque de fabrique (si elle existe)

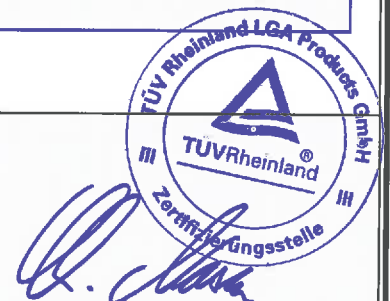
AOK

Model/type Ref.  
Ref. de type1) AOK-30WiL; AOK-40WiL; 2) AOK-60WiL; AOK-80WiL;  
3) AOK-90WiL; AOK-120WiL; 4) AOK-160WiL;  
5) AOK-150WiL; AOK-200WiL; 6) AOK-180WiL; AOK-240WiLAdditional information (if necessary may also be  
reported on page 2)  
Les Information complémentaire (si nécessaire,  
peuvent être indiqués sur la 2<sup>ème</sup> page)-add alternative LED chip;  
-see also test report ref. no. 17044008 002.A sample of the product was tested and found  
to be in conformity with  
Un échantillon de ce produit a été essayé et a été  
considéré conforme à la

<b>PUBLICATION</b>	<b>EDITION</b>
IEC 60598-1:2008 IEC 60598-2-3:2002 + A1	
for national deviations see test report	

As shown in the Test Report Ref. No. which forms part  
of this Certificate  
Comme indiqué dans le Rapport d'essais numéro de  
référence qui constitue une partie de ce Certificat

17044008 002

This CB Test Certificate is issued by the National Certification Body  
Ce Certificat d'essai OC est établi par l'Organisme National de CertificationTÜV Rheinland LGA Products GmbH  
Tillystraße 2 · 90431 Nürnberg, Germany  
Phone + 49 221 806-1371  
Fax + 49 221 806-3935  
Mail: cert-validity@de.tuv.com  
Web: www.tuv.com

Date: 20.05.2016

Signature:

Dipl.-Ing. (FH) C. Nasca

TÜV Rheinland (China) Ltd.  
Member of TÜV Rheinland Group



AOK LED Light Company Limited  
  
Building 1 St George's Science  
and Technology Industrial Park, Outer  
Ring Road Bao'an, Shenzhen, Guangdong,  
China

Date : 2016-05-20  
Our ref. : awa ZD  
Your ref. : 0164061411

**Ref : CB Certificate Germany**

Type of Equipment: LED Street Light  
Model Designation: See Certificate  
Certificate No. : DE 2-018509-M1  
Report No. : 17044008 002

Dear Ladies and Gentlemen,

Thank you very much for your interest in our services.

Please find enclosed your certification documents.

We appreciate your support and would like to offer our assistance in the approval of your future products through our extensive range of technical services. Please feel free to contact us whenever your requirements may be.

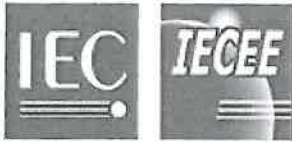
With kind regards,

Certification Body

Dipl.-Ing. (FH) C. Nasca

Enclosure

证书的详细资料请登陆[www.certipedia.com](http://www.certipedia.com)查阅,或拨打我司客服热线800 999 3668 / 400 883 1300咨询



Test Report issued under the responsibility of:



**TÜVRheinland®**

**TEST REPORT**  
**IEC 60598-2-3**  
**Luminaires**  
**Part 2: Particular requirements:**  
**Section Three – Luminaires for road and street lighting**

Report Number..... : 17044008 002

Date of issue ..... : 2016-05-18

Total number of pages ..... 17 pages

Applicant's name ..... : AOK LED Light Company Limited

Address..... : Building 1 St George's Science and Technology Industrial Park,  
Outer Ring Road Bao'an, Shenzhen, Guangdong, China

**Test specification:**

Standard ..... : IEC 60598-2-3(Third Edition):2002 + A1:2011 used in conjunction  
with IEC 60598-1(Seventh Edition):2008

Test procedure..... : CB Scheme

Non-standard test method..... : N/A

Test Report Form No. .... : IEC60598\_2\_3I

Test Report Form(s) Originator.... : Intertek Semko AB

Master TRF ..... : 2013-03

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**This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.**



Test item description..... : LED Street Light


Trade Mark..... : **AOK**

Manufacturer ..... : Same as applicant

Model/Type reference..... : See model list

Ratings..... : Input:100-240VAC, 50/60Hz  
(for detail see general product information)

<b>Testing procedure and testing location:</b>	
<input checked="" type="checkbox"/> <b>CB Testing Laboratory:</b>	TUV Rheinland (Shenzhen) Co., Ltd.
Testing location/ address .....	East of F/1, F/2~F/4, Building 1, Cybio Technology Building, No. 6 Langshan No.2 Road, North Hi-tech Industry Park, 518057 Shenzhen Nanshan District, CHINA
<input type="checkbox"/> <b>Associated CB Laboratory:</b>	
Testing location/ address .....	
Tested by (name + signature) .....	Jack Li 
Approved by (+ signature) .....	James chen 
<hr/>	
<input type="checkbox"/> Testing procedure: TMP	
Testing location/ address .....	
Tested by (name + signature) .....	
Approved by (+ signature) .....	
<hr/>	
<input type="checkbox"/> Testing procedure: WMT	
Testing location/ address .....	
Tested by (name + signature) .....	
Witnessed by (+ signature) .....	
Approved by (+ signature) .....	
<hr/>	
<input type="checkbox"/> Testing procedure: SMT	
Testing location/ address .....	
Tested by (name + signature) .....	
Approved by (+ signature) .....	
Supervised by (+ signature) .....	

List of Attachments (including a total number of pages in each attachment):	
N/A	
<b>Summary of testing:</b>	
<b>Tests performed (name of test and test clause):</b> This report is based on report 17044008 001 for adding alternative LED chip. <ol style="list-style-type: none"> <li>1. Component list, see annex 1.</li> <li>2. Photobiological safety of lamps and lamp systems were according to standard EN 62471: 2008, see annex 2.</li> <li>3. Photo document.</li> </ol>	<b>Testing location:</b>  <b>TUV Rheinland (Shenzhen) Co., Ltd.</b> East of F/1, F/2~F/4, Building 1, Cybio Technology Building, No. 6 Langshan No.2 Road, North Hi-tech Industry Park, 518057 Shenzhen Nanshan District, CHINA
<b>Summary of compliance with National Differences:</b>	
List of countries addressed: DE	
DE=Germany	
<input checked="" type="checkbox"/> The product fulfils the requirements of EN 60598-2-3:2003+A1:2011 used in conjunction with EN 60598-1:2008+A11:2009.	
<b>Copy of marking plate</b>	
The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.	
 <p><b>AOK</b> LED Street Light</p> <p><b>MODE : AOK-240WiL</b></p> <ol style="list-style-type: none"> <li>1 . Power : Max 240W</li> <li>2 . Input Voltage : AC100-240V 50/60Hz</li> <li>3 . Input Current : 2.68A max</li> <li>4 . CCT : 5700K</li> <li>5 . IP66</li> </ol> <p>Quality You Can Trust</p> <p><b>Do not disassemble if non-professional</b></p> <p>www.tuv.com ID 100000000</p> <p><b>TUV Rheinland ZERTIFIZIERT</b> <b>GS</b></p> <p><b>CE</b> <b>MADE IN CHINA</b></p>	
Remark: The rating labels of other models are the same except model name and rating.	

<b>Test item particulars</b> .....	
Classification of installation and use .....	LED street light
Supply Connection .....	Supply cord
.....	
.....	
<b>Possible test case verdicts:</b>	
- test case does not apply to the test object.....	N/A
- test object does meet the requirement.....	P (Pass)
- test object does not meet the requirement.....	F (Fail)
<b>Testing</b> .....	
Date of receipt of test item .....	2016-04-21
Date (s) of performance of tests.....	2016-04-21 to 2016-05-10
<b>General remarks:</b>	
<p>The test results presented in this report relate only to the object tested.  This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.  "(See Enclosure #)" refers to additional information appended to the report.  "(See appended table)" refers to a table appended to the report.</p> <p>Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.</p> <p>Clause numbers between brackets refer to clauses in IEC 60598-1</p> <p>Ref. No. 17044008 001, dated Jan. 13, 2015 (original test report)</p>	
<b>Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60598-1:</b>	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> Not applicable
When differences exist; they shall be identified in the General product information section.	
<b>Name and address of factory (ies)</b> .....	AOK LED Light Company Limited Building 1 St George's Science and Technology Industrial Park, Outer Ring Road Bao'an, Shenzhen, Guangdong, China

**General product information:**

This report is based on report 17044008 001 for adding alternative LED chip.

Product: LED street light, 100-240VAC, 50/60Hz, Class I, IP66, suitable for mounting on normal flammable surface.

1. All models listed below are LED street light with approved LED drivers with SELV output. For detail, see components list.
2. All the models have the similar appearance, and the same mechanical construction and electrical construction, only quantities of LED module and LED driver are different;
3. LED modules enclosed by the same way for all modules have the same LED chip.
4. CCT. 2700-6500K for all models.
5. For models have the same power are only different in model name.

Model list:

Model	Power	Driver	LED quantity	Module quantity	Dimension (mm)
AOK-30WiL	40W	HLG-60H-48A	14	1 Module	495x300x107
AOK-40WiL					
AOK-60WiL	80W	HLG-100H-48A	28	2 Module	576x300x107
AOK-80WiL					
AOK-90WiL	120W	HLG-150H-48A	42	3 Module	657x300x107
AOK-120WiL					
AOK-160WiL	160W	HLG-185H-48A	56	4 Module	738x300x107
AOK-150WiL	200W	HLG-240H-48A	70	5 Module	819x300x107
AOK-200WiL					
AOK-180WiL	240W	HLG-240H-48A	84	6 Module	900x300x107
AOK-240WiL					

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

	<b>ANNEX 1: components</b>	
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object/part No.	code	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
LED chip	C	LUMILEDS	LUXEON 3030 2D	5,8-6,6VDC 2700-6500K White light.	--	Test with appliance

The codes above have the following meaning:

- A - The component is replaceable with another one, also certified, with equivalent characteristics
- B - The component is replaceable if authorised by the test house
- C - Integrated component tested together with the appliance
- D - Alternative component



<b>Annex 2</b>	<b>Photobiological safety of lamps and lamp systems were according to standard EN 62471:2008</b> Exempt group applies for all models	—
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<b>IEC 62471</b>			
Clause	Requirement + Test	Result – Remark	Verdict
<b>4</b>	<b>EXPOSURE LIMITS</b>		P
4.1	General		P
	The exposure limits in this standard is not less than 0,01 ms and not more than any 8-hour period and should be used as guides in the control of exposure		P
	Detailed spectral data of a light source are generally required only if the luminance of the source exceeds $10^4 \text{ cd}\cdot\text{m}^{-2}$	see clause 4.3	P
4.3	Hazard exposure limits		P
4.3.1	Actinic UV hazard exposure limit for the skin and eye		P
	The exposure limit for effective radiant exposure is $30 \text{ J}\cdot\text{m}^{-2}$ within any 8-hour period		P
	To protect against injury of the eye or skin from ultraviolet radiation exposure produced by a broadband source, the effective integrated spectral irradiance, $E_s$ , of the light source shall not exceed the levels defined by:		P
	$E_s \cdot t = \sum_{200}^{400} \sum_t E_\lambda(\lambda, t) \cdot S_{UV}(\lambda) \cdot \Delta t \cdot \Delta \lambda \leq 30 \quad \text{J}\cdot\text{m}^{-2}$		P
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye or skin shall be computed by:		P
	$t_{\max} = \frac{30}{E_s} \quad \text{s}$		P
4.3.2	Near-UV hazard exposure limit for eye		P
	For the spectral region 315 nm to 400 nm (UV-A) the total radiant exposure to the eye shall not exceed $10000 \text{ J}\cdot\text{m}^{-2}$ for exposure times less than 1000 s. For exposure times greater than 1000 s (approximately 16 minutes) the UV-A irradiance for the unprotected eye, $E_{UVA}$ , shall not exceed $10 \text{ W}\cdot\text{m}^{-2}$ .		P
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye for time less than 1000 s, shall be computed by:		P
	$t_{\max} \leq \frac{10\,000}{E_{UVA}} \quad \text{s}$		P
4.3.3	Retinal blue light hazard exposure limit		P

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	To protect against retinal photochemical injury from chronic blue-light exposure, the integrated spectral radiance of the light source weighted against the blue-light hazard function, $B(\lambda)$ , i.e., the blue-light weighted radiance, $L_B$ , shall not exceed the levels defined by:		P
	$L_B \cdot t = \sum_{300}^{700} \sum_t L_\lambda(\lambda, t) \cdot B(\lambda) \cdot \Delta\lambda \leq 10^6 \quad \text{J} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	for $t \leq 10^4$ s $t_{\max} = \frac{10^6}{L_B}$	N/A
	$L_B = \sum_{300}^{700} L_\lambda \cdot B(\lambda) \cdot \Delta\lambda \leq 100 \quad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	for $t > 10^4$ s	P
4.3.4	Retinal blue light hazard exposure limit - small source		N/A
	Thus the spectral irradiance at the eye $E_\lambda$ , weighted against the blue-light hazard function $B(\lambda)$ shall not exceed the levels defined by:	see table 4.2	N/A
	$E_B \cdot t = \sum_{300}^{700} \sum_t E_\lambda(\lambda, t) \cdot B(\lambda) \cdot \Delta\lambda \leq 100 \quad \text{J} \cdot \text{m}^{-2}$	for $t \leq 100$ s	N/A
	$E_B = \sum_{300}^{700} E_\lambda \cdot B(\lambda) \cdot \Delta\lambda \leq 1 \quad \text{W} \cdot \text{m}^{-2}$	for $t > 100$ s	N/A
4.3.5	Retinal thermal hazard exposure limit		P
	To protect against retinal thermal injury, the integrated spectral radiance of the light source, $L_\lambda$ , weighted by the burn hazard weighting function $R(\lambda)$ (from Figure 4.2 and Table 4.2), i.e., the burn hazard weighted radiance, shall not exceed the levels defined by:		P
	$L_R = \sum_{380}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{50\,000}{\alpha \cdot t^{0,25}} \quad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	( $10 \mu\text{s} \leq t \leq 10$ s)	P
4.3.6	Retinal thermal hazard exposure limit – weak visual stimulus		P
	For an infrared heat lamp or any near-infrared source where a weak visual stimulus is inadequate to activate the aversion response, the near infrared (780 nm to 1400 nm) radiance, $L_{IR}$ , as viewed by the eye for exposure times greater than 10 s shall be limited to:		P
	$L_{IR} = \sum_{780}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{6\,000}{\alpha} \quad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	$t > 10$ s	P
4.3.7	Infrared radiation hazard exposure limits for the eye		P
	The avoid thermal injury of the cornea and possible delayed effects upon the lens of the eye (cataractogenesis), ocular exposure to infrared radiation, $E_{IR}$ , over the wavelength range 780 nm to 3000 nm, for times less than 1000 s, shall not exceed:		P
	$E_{IR} = \sum_{780}^{3000} E_\lambda \cdot \Delta\lambda \leq 18\,000 \cdot t^{-0,75} \quad \text{W} \cdot \text{m}^{-2}$	$t \leq 1000$ s	P

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	For times greater than 1000 s the limit becomes:		P
	$E_{IR} = \sum_{380}^{3000} E_{\lambda} \cdot \Delta\lambda \leq 100 \quad W \cdot m^{-2}$	t > 1000 s	N/A
4.3.8	Thermal hazard exposure limit for the skin		P
	Visible and infrared radiant exposure (380 nm to 3000 nm) of the skin shall be limited to:		P
	$E_{H \cdot t} = \sum_{380}^{3000} \sum_t E_{\lambda}(\lambda, t) \cdot \Delta t \cdot \Delta\lambda \leq 20\,000 \cdot t^{0,25} \quad J \cdot m^{-2}$		P
<b>5</b>	<b>MEASUREMENT OF LAMPS AND LAMP SYSTEMS</b>		P
5.1	Measurement conditions		P
	Measurement conditions shall be reported as part of the evaluation against the exposure limits and the assignment of risk classification.		P
5.1.1	Lamp ageing (seasoning)	Sample was stable after being operated with 1 hour.	P
	Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard.		P
5.1.2	Test environment	(See appended test data)	P
	For specific test conditions, see the appropriate IEC lamp standard or in absence of such standards, the appropriate national standards or manufacturer's recommendations.		P
5.1.3	Extraneous radiation		P
	Careful checks should be made to ensure that extraneous sources of radiation and reflections do not add significantly to the measurement results.		P
5.1.4	Lamp operation		P
	Operation of the test lamp shall be provided in accordance with:		P
	– the appropriate IEC lamp standard, or		N/A
	– the manufacturer' s recommendation		P
5.1.5	Lamp system operation		P
	The power source for operation of the test lamp shall be provided in accordance with:		P
	– the appropriate IEC standard, or		N/A
	– the manufacturer' s recommendation		P
5.2	Measurement procedure		P
5.2.1	Irradiance measurements		P

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	Minimum aperture diameter 7mm.	7mm	P
	Maximum aperture diameter 50 mm.		P
	The measurement shall be made in that position of the beam giving the maximum reading.		P
	The measurement instrument is adequate calibrated.		P
5.2.2	Radiance measurements		P
5.2.2.1	Standard method		P
	The measurements made with an optical system.		P
	The instrument shall be calibrated to read in absolute radiant power per unit receiving area and per unit solid angle to acceptance averaged over the field of view of the instrument.		P
5.2.2.2	Alternative method		N/A
	Alternatively to an imaging radiance set-up, an irradiance measurement set-up with a circular field stop placed at the source can be used to perform radiance measurements.		N/A
5.2.3	Measurement of source size		P
	The determination of $\alpha$ , the angle subtended by a source, requires the determination of the 50% emission points of the source.		P
5.2.4	Pulse width measurement for pulsed sources		N/A
	The determination of $\Delta t$ , the nominal pulse duration of a source, requires the determination of the time during which the emission is > 50% of its peak value.		N/A
5.3	Analysis methods		P
5.3.1	Weighting curve interpolations		P
	To standardize interpolated values, use linear interpolation on the log of given values to obtain intermediate points at the wavelength intervals desired.	see table 4.1	P
5.3.2	Calculations		P
	The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy.		P
5.3.3	Measurement uncertainty		P
	The quality of all measurement results must be quantified by an analysis of the uncertainty.	see Annex C	P
<b>6</b>	<b>LAMP CLASSIFICATION</b>		<b>P</b>

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	For the purposes of this standard it was decided that the values shall be reported as follows:	See table 6.1	P
	– for lamps intended for general lighting service, the hazard values shall be reported as either irradiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm	4,37m	P
	– for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm		N/A
6.1	Continuous wave lamps		P
6.1.1	Except Group		P
	In the except group are lamps, which does not pose any photobiological hazard. The requirement is met by any lamp that does not pose:		P
	– an actinic ultraviolet hazard ( $E_S$ ) within 8-hours exposure (30000 s), nor		P
	– a near-UV hazard ( $E_{UVA}$ ) within 1000 s, (about 16 min), nor		P
	– a retinal blue-light hazard ( $L_B$ ) within 10000 s (about 2,8 h), nor		P
	– a retinal thermal hazard ( $L_R$ ) within 10 s, nor		P
	– an infrared radiation hazard for the eye ( $E_{IR}$ ) within 1000 s		P
6.1.2	Risk Group 1 (Low-Risk)		N/A
	In this group are lamps, which exceeds the limits for the except group but that does not pose:		N/A
	– an actinic ultraviolet hazard ( $E_S$ ) within 10000 s, nor		N/A
	– a near ultraviolet hazard ( $E_{UVA}$ ) within 300 s, nor		N/A
	– a retinal blue-light hazard ( $L_B$ ) within 100 s, nor		N/A
	– a retinal thermal hazard ( $L_R$ ) within 10 s, nor		N/A
	– an infrared radiation hazard for the eye ( $E_{IR}$ ) within 100 s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard ( $L_{IR}$ ), within 100 s are in Risk Group 1.		N/A
6.1.3	Risk Group 2 (Moderate-Risk)		N/A
	This requirement is met by any lamp that exceeds the limits for Risk Group 1, but that does not pose:		N/A
	– an actinic ultraviolet hazard ( $E_S$ ) within 1000 s exposure, nor		N/A

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	– a near ultraviolet hazard ( $E_{UVA}$ ) within 100 s, nor		N/A
	– a retinal blue-light hazard ( $L_B$ ) within 0,25 s (aversion response), nor		N/A
	– a retinal thermal hazard ( $L_R$ ) within 0,25 s (aversion response), nor		N/A
	– an infrared radiation hazard for the eye ( $E_{IR}$ ) within 10 s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard ( $L_{IR}$ ), within 10 s are in Risk Group 2.		N/A
6.1.4	Risk Group 3 (High-Risk)		N/A
	Lamps which exceed the limits for Risk Group 2 are in Group 3.		N/A
6.2	Pulsed lamps		N/A
	Pulse lamp criteria shall apply to a single pulse and to any group of pulses within 0,25 s.		N/A
	A pulsed lamp shall be evaluated at the highest nominal energy loading as specified by the manufacturer.		N/A
	The risk group determination of the lamp being tested shall be made as follows:		N/A
	– a lamp that exceeds the exposure limit shall be classified as belonging to Risk Group 3 (High-Risk)		N/A
	– for single pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance does is below the EL shall be classified as belonging to the Exempt Group		N/A
	– for repetitively pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance dose is below the EL, shall be evaluated using the continuous wave risk criteria discussed in clause 6.1, using time averaged values of the pulsed emission		N/A

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 4.1		Spectral weighting function for assessing ultraviolet hazards for skin and eye		P
Wavelength <sup>1</sup> $\lambda$ , nm	UV hazard function $S_{uv}(\lambda)$	Wavelength $\lambda$ , nm	UV hazard function $S_{uv}(\lambda)$	
200	0,030	313*	0,006	
205	0,051	315	0,003	
210	0,075	316	0,0024	
215	0,095	317	0,0020	
220	0,120	318	0,0016	
225	0,150	319	0,0012	
230	0,190	320	0,0010	
235	0,240	322	0,00067	
240	0,300	323	0,00054	
245	0,360	325	0,00050	
250	0,430	328	0,00044	
254*	0,500	330	0,00041	
255	0,520	333*	0,00037	
260	0,650	335	0,00034	
265	0,810	340	0,00028	
270	1,000	345	0,00024	
275	0,960	350	0,00020	
280*	0,880	355	0,00016	
285	0,770	360	0,00013	
290	0,640	365*	0,00011	
295	0,540	370	0,000093	
297*	0,460	375	0,000077	
300	0,300	380	0,000064	
303*	0,120	385	0,000053	
305	0,060	390	0,000044	
308	0,026	395	0,000036	
310	0,015	400	0,000030	

<sup>1</sup> Wavelengths chosen are representative: other values should be obtained by logarithmic interpolation at intermediate wavelengths.  
\* Emission lines of a mercury discharge spectrum.

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Clause	Requirement + Test	Result – Remark	Verdict

Table 4.2	Spectral weighting functions for assessing retinal hazards from broadband optical sources	P
Wavelength nm	Blue-light hazard function B ( $\lambda$ )	Burn hazard function R ( $\lambda$ )
300	0,01	
305	0,01	
310	0,01	
315	0,01	
320	0,01	
325	0,01	
330	0,01	
335	0,01	
340	0,01	
345	0,01	
350	0,01	
355	0,01	
360	0,01	
365	0,01	
370	0,01	
375	0,01	
380	0,01	0,1
385	0,013	0,13
390	0,025	0,25
395	0,05	0,5
400	0,10	1,0
405	0,20	2,0
410	0,40	4,0
415	0,80	8,0
420	0,90	9,0
425	0,95	9,5
430	0,98	9,8
435	1,00	10,0
440	1,00	10,0
445	0,97	9,7
450	0,94	9,4
455	0,90	9,0
460	0,80	8,0
465	0,70	7,0
470	0,62	6,2
475	0,55	5,5
480	0,45	4,5
485	0,40	4,0
490	0,22	2,2
495	0,16	1,6
500-600	$10^{[(450-\lambda)/50]}$	1,0
600-700	0,001	1,0
700-1050		$10^{[(700-\lambda)/500]}$
1050-1150		0,2
1150-1200		$0,2 \cdot 10^{0,02(1150-\lambda)}$
1200-1400		0,02



IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 5.4 Summary of the ELs for the surface of the skin or cornea (irradiance based values)					P
Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Limiting aperture rad (deg)	EL in terms of constant irradiance $W \cdot m^{-2}$
Actinic UV skin & eye	$E_S = \sum E_\lambda \cdot S(\lambda) \cdot \Delta\lambda$	200 – 400	< 30000	1,4 (80)	30/t
Eye UV-A	$E_{UVA} = \sum E_\lambda \cdot \Delta\lambda$	315 – 400	$\leq 1000$ >1000	1,4 (80)	10000/t 10
Blue-light small source	$E_B = \sum E_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	$\leq 100$ >100	< 0,011	100/t 1,0
Eye IR	$E_{IR} = \sum E_\lambda \cdot \Delta\lambda$	780 – 3000	$\leq 1000$ >1000	1,4 (80)	18000/t <sup>0,75</sup> 100
Skin thermal	$E_H = \sum E_\lambda \cdot \Delta\lambda$	380 – 3000	< 10	2π sr	20000/t <sup>0,75</sup>

Table 5.5 Summary of the ELs for the retina (radiance based values)					P
Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Field of view radians	EL in terms of constant radiance $W \cdot m^{-2} \cdot sr^{-1}$
Blue light	$L_B = \sum L_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	0,25 – 10 10-100 100-10000 $\geq 10000$	$0,011 \cdot \sqrt{(t/10)}$ 0,011 $0,0011 \cdot \sqrt{t}$ 0,1	$10^6/t$ $10^6/t$ $10^6/t$ 100
Retinal thermal	$L_R = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$	380 – 1400	< 0,25 0,25 – 10	0,0017 $0,011 \cdot \sqrt{(t/10)}$	$50000/(\alpha \cdot t^{0,25})$ $50000/(\alpha \cdot t^{0,25})$
Retinal thermal (weak visual stimulus)	$L_{IR} = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$	780 – 1400	> 10	0,011	6000/α

<b>ATTACHMENT TO TEST REPORT IEC 62471</b> <b>EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES</b> Photobiological safety of lamps and lamps systems	
<b>Differences according to</b> .....	EN 62471:2008
<b>Attachment Form No.</b> .....	EU_GD_IEC62471A
<b>Attachment Originator</b> .....	IMQ S.p.A.
<b>Master Attachment</b> .....	2009-07
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	<b>CENELEC COMMON MODIFICATIONS (EN)</b>	P
<b>4</b>	<b>EXPOSURE LIMITS</b>	P
	Contents of the whole Clause 4 of IEC 62471:2006 moved into a new informative Annex ZB	—
	Clause 4 replaced by the following:	P
	Limits of the Artificial Optical Radiation Directive (2006/25/EC) have been applied instead of those fixed in IEC 62471:2006	P
4.1	General	P
	First paragraph deleted	—

Exempt Group for model AOK-240WiL with colour temperature 6500K, and this classification apply to all models.

( $\alpha = 0,0724\text{rad}$ )

Optical hazard	Test result	Used hazard exposure limit		Ref.
1. $E_S$	$4,5E-05 \text{ W/m}^2$	$0,001 \text{ W/m}^2$	200-400 nm	P
2. $E_{UVA}$	$1,8E-05 \text{ W/m}^2$	$0,33 \text{ W/m}^2$	315-400 nm	P
3. $L_B$	$1,6E+01 \text{ W/m}^2$	$100 \text{ W/m}^2$	300-700 nm	P
4. $E_B$ (small source)	--	--	300-700 nm	N/A
5. $L_R$	$1,8E+03 \text{ W/m}^2\text{sr}^{-1}$	$28000/\alpha \text{ W/m}^2\text{sr}^{-1}$	380-1400 nm	P
6. $L_{IR}$	$0,0E+00 \text{ W/m}^2\text{sr}^{-1}$	$6000/\alpha \text{ W/m}^2\text{sr}^{-1}$	780-1400 nm	P
7. $E_{IR}$	$0,0E+00 \text{ W/m}^2$	$100 \text{ W/m}^2$	780-3000 nm	P
8. $E_H$	$0,0E+00 \text{ W/m}^2$	$3556,56 \text{ W/m}^2$	380-3000 nm	P

Photo:



Picture 1: Overview of AOK-240WiL (with new LED chip)