

# **Test Report**

Report No.: AGC05443221125SS01

PRODUCT DESIGNATION	:	Sunset Projection lamp
BRAND NAME	:	N/A
MODEL NAME	:	M06766
CLIENT	:	MID OCEAN BRANDS B.V
DATE OF ISSUE	:	Nov. 29, 2022
STANDARD(S)	:	EN 62471:2008
<b>REPORT VERSION</b>	:	V1.0







	TEST REPORT EN 62471				
Photobiological safety of lamps and lamp systems					
Report reference No					
Tested by (+ signature):	Mody Mo	Mody Mo Phil my			
Reviewed by (+ signature):	Phil Zhang	Phil 22			
Approved by (+ signature):	(Authorized officer )	mette He			
Date of issue:	Nov. 29, 2022				
Contents	Total 17 pages				
Testing laboratory					
Name	Attestation of Global C	ompliance (Shenzhen) Co., Ltd.			
Address	Heping Community, Fuhai Street, Bao 'an District, Shenzhen, Guangdong, China				
Test location	Same as above				
Applicant					
Name	MID OCEAN BRANDS	S B.V			
Address	7/F, Kings Tower, 111 Kowloon, Hong Kong	King Lam Street, Cheung Sha Wan,			
Manufacturer					
Name	MID OCEAN BRANDS	B.V			
Address	7/F, Kings Tower, 111 Kowloon, Hong Kong	King Lam Street, Cheung Sha Wan,			
Factory					
Name	MID OCEAN BRANDS	B.V			
Address	7/F, Kings Tower, 111 Kowloon, Hong Kong	King Lam Street, Cheung Sha Wan,			
Test specification					
Standard	EN 62471:2008				
Test procedure	Type test				
Non-standard test method	N/A				



Test Report Form No	Test Report Form/bla	ink test report						
Master TRF.       Dated 2009-06         Test item       Product designation         Product designation       Sunset Projection lamp         Brand name       N/A         Test model       MO6766         Series models       N/A         Rating(s)       5VDC         Test item Particulars       Description         Tested lamp       SVDC         Testel lamp       Imposed lamp         Lamp classification group       Secrempt       pulsed lamp         Lamp cap       N/A         Bulb       N/A         Bulb       N/A         Bulb       N/A         Bulb       N/A         Used measurement instrument       SPECTRORADIOMETER         Temperature by measurement       24.5°C         Information for safety use       N/A         Test case verdicts       N(A)         Test item does net the requirement       P(ass)         Test item does not meet the requirement       F(ail)         Testing       Nov. 25, 2022         Date of receipt of test item       Nov. 26, 2022         AttachmentA       Photos of product         General remarks       Photos of product         This report shall not be reproduced	Test Report Form No.		: AGC62471A1					
Test item         Product designation       Sunset Projection lamp         Brand name       N/A         Test model       MO6766         Series models       N/A         Rating(s)       5VDC         Test item Particulars       Continuous wave lamps       pulsed lamp         Lamp classification group       N/A       Date of the state o	TRF originator		: AGC	AGC				
Product designation       :       Sunset Projection lamp         Brand name       :       N/A         Test model       :       MO6766         Series models       :       N/A         Rating(s)       :       5VDC         Test filem Particulars       :       isotopolic         Tested lamp       :       :       continuous wave lamps       pulsed lamp         Lamp classification group       :       :       :       isst 2       risk 3         Lamp cap       :       N/A       :       :       :       :         Bub       :       N/A       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       :       : <td>Master TTRF</td> <td></td> <td>: Dated 2009</td> <td>9-06</td> <td></td> <td></td>	Master TTRF		: Dated 2009	9-06				
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Test model       M06766         Series models       N/A         Rating(s)       5VDC         Test item Particulars       Icontinuous wave lamps       pulsed lamp         Lamp classification group       Icontinuous wave lamps       Tisk 2       Tisk 3         Lamp classification group       N/A       VA       Value       Value       Value         Test class does not apply to the test object       N/A       N/A       Value       Value       Test class does not meet the requirement       P(ass)         Testing       Date of	Product designation		: Sunset Pro	jectior	lamp			
Series models       Image: N/A         Rating(s)       5VDC         Test item Particulars	Brand name		: N/A					
Rating(s)       :       5VDC         Test and particulars         Test de lamp       :       ⊠continuous wave lamps       □ pulsed lamp         Lamp classification group       ::       ⊠exempt       □ risk 1       □ risk 2       □ risk 3         Lamp cap       :       N/A       Bulb       N/A         Bulb       :       N/A         Used measurement instrument       :       SPECTRORADIOMETER         Temperature by measurement       :       24.5°C         Information for safety use       :       N/A         Test case verdicts         Test case does not apply to the test object       :       N/A         Test item does meet the requirement       :       P(ass)         Testing       Date of receipt of test item       Nov. 25, 2022         Date(s) of performance of test       :       Nov. 28, 2022         Attachment A       :       Photos of product         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 Annex 4)" refers to a remark appended to the report.         "(see Annex 4)" refers to a remark appended to the report.	Test model		: MO6766					
Test item Particulars         Tested lamp       gcontinuous wave lamps       pulsed lamp         Lamp classification group       Sexempt       frisk 1       frisk 2       frisk 3         Lamp cap       N/A       N/A         Bulb       N/A       SPECTRORADIOMETER         Temperature by measurement       24.5°C         Information for safety use       N/A         Test case verdicts       N/A         Test case verdicts       Test case does not apply to the test object         Test tiem does meet the requirement       P(ass)         Test item does no meet the requirement       F(ail)         Testing       Date of receipt of test item         Date of receipt of test item       Nov. 25, 2022         Date(s) of performance of test       Nov. 28, 2022         Attachments       Photos of product         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 Annex H)" refers to a namex appended to the report.         "(see Annex H)" refers to a namex appended to the report.       Throughout this report a comma is used as the decimal separator.         Report Revise Record:       Report Version       Notes	Series models		: N/A					
Tested lamp       image:	Rating(s)		: 5VDC					
Lamp classification group       Image:	Test item Particulars							
Lamp cap       N/A         Bulb       N/A         Used measurement instrument       SPECTRORADIOMETER         Temperature by measurement       24.5°C         Information for safety use       N/A         Test case verdicts         Test case does not apply to the test object       N/A         Test item does meet the requirement       P(ass)         Testing       Pate of receipt of test item         Date of receipt of test item       Nov. 25, 2022         Date(s) of performance of test       Nov. 28, 2022         Attachments       Attachment A         Attachment A       Photos of product         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 an annex appended to the report.         "(see remark #)" refers to an annex appended to the report.       Throughout this report a comma is used as the decimal separator.         Report Version       Revise Time       Issued Date       Valid Version       Notes	Tested lamp		: 🛛 continuo	us wa	ve lamps 🛛 🗌 pulse	d lamp		
Bulb       N/A         Used measurement instrument       SPECTRORADIOMETER         Temperature by measurement       24.5°C         Information for safety use       N/A         Test case verdicts         Test case does not apply to the test object       N/A         Test item does meet the requirement       P(ass)         Test item does not meet the requirement       F(ail)         Testing       Nov. 25, 2022         Date of receipt of test item       Nov. 25, 2022         Date(s) of performance of test       Nov. 28, 2022         Attachments       Attachments         Attachment A       Photos of product         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 a remark appended to the report.       "(see Annex #)" refers to a nannex appended to the report.         "(see Annex #)" refers to a comma is used as the decimal separator.       Report Revise Record:         Report Version       Revise Time       Issued Date       Valid Version       Notes	Lamp classification gro	oup	: 🛛 exempt	<b>_</b> 1	isk 1	3		
Used measurement instrument       SPECTRORADIOMETER         Temperature by measurement       24.5°C         Information for safety use       N/A         Test case verdicts         Test case does not apply to the test object       N/A         Test item does meet the requirement       P(ass)         Test item does not meet the requirement       F(ail)         Testing         Date of receipt of test item       Nov. 25, 2022         Date(s) of performance of test       Nov. 28, 2022         Attachments       Attachment A         Attachment A       Photos of product         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 a nanex appended to the report.         "(see Annex #)" refers to a nanex appended to the report.         "(see Annex #)" refers to a nanex appended to the report.         "(see Record:         Report Nevise Record:         Report Version       Revise Time	Lamp cap		: N/A					
Temperature by measurement	Bulb N/A							
Information for safety use	Used measurement in	strument	: SPECTRO	RADIO	OMETER			
Test case verdicts         Test case does not apply to the test object: N(/A)         Test item does meet the requirement: P(ass)         Test item does not meet the requirement: P(ail)         Testing         Date of receipt of test item	Temperature by meas	urement	: 24.5°C					
Test case does not apply to the test object: N(/A)         Test item does meet the requirement: P(ass)         Test item does not meet the requirement: F(ail)         Testing         Date of receipt of test item	Information for safety	use	: N/A					
Test item does meet the requirement: P(ass)         Test item does not meet the requirement: F(ail)         Testing         Date of receipt of test item	Test case verdicts							
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Date(s) of performance of test	Testing							
Attachments         Attachment A         Attachment A         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.         Report Revise Record:         Report Version       Revise Time         Issued Date       Valid Version	Date of receipt of test	item	: Nov. 25, 20	)22				
Attachment A	Date(s) of performanc	e of test	: Nov. 28, 20	)22				
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.         Report Revise Record:         Report Version       Revise Time         Issued Date       Valid Version	Attachments							
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			Issued Date	Э	Valid Version	Notes		
V1.0 / Nov. 29, 2022 Valid Initial release	V1.0	/	Nov. 29, 202	22	Valid	Initial release		



Ge	General product information						
Т	The LED package specification as follows:						
	Model Manufacturer Vf(V)						
	3535 Shenzhen New baina I/E Co.,Ltd 5						



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Clause	Requirement – Test	Result	Verdict	
4	Exposure Limits		Р	
4.1	General		Р	
	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		Р	
	Detailed spectral data of a light source are generally required only if the luminance of the source exceeds 10 <sup>4</sup> cd <sup>-2</sup>	see clause 4.3	Р	
4.3	Hazard exposure limits		Р	
4.3.1	Actinic UV hazard exposure limit for the skin and eye		Р	
	The exposure limit for effective radiant exposure is 30 J <sup>·</sup> m <sup>-2</sup> within any 8-hour period		Р	
	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:		Р	
	$E_{\rm s} \cdot t = \sum_{200}^{400} \sum_{t} E_{\lambda}(\lambda, t) \cdot S_{\rm UV}(\lambda) \cdot \Delta t \cdot \Delta \lambda \le 30 \qquad \qquad J \cdot {\rm m}^{-2}$		Р	
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye or skin shall be computed by:		Р	
	$t_{\max} = \frac{30}{E_{s}}  s$		Р	
4.3.2	Near-UV hazard exposure limit for eye		Р	
	For the spectral region 315 nm to 400 nm (UV-A) the total radiant exposure to the eye shall not exceed $10000 \text{ Jm}^{-2}$ 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 W m <sup>-2</sup> .		Р	
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye for time less than 1000 s, shall be computed by:		N	
	$t_{\max} \le \frac{10000}{E_{UVA}}$ s		Ν	
4.3.3	Retinal blue light hazard exposure limit		N	



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	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:		N
	$L_{B} \cdot t = \sum_{300}^{700} \sum_{t} L_{\lambda}(\lambda, t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta \lambda \le 10^6  J \cdot m^{-2} \cdot sr^{-1}$		N
	$L_{\rm B} = \sum_{300}^{700} L_{\lambda} \cdot B(\lambda) \cdot \Delta \lambda \le 100  {\rm W} \cdot {\rm m}^{-2} \cdot {\rm sr}^{-1}$		N
4.3.4	Retinal blue light hazard exposure limit - small source		Ν
	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:		N
	$E_{B} \cdot t = \sum_{300}^{700} \sum_{t} E_{\lambda}(\lambda, t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta \lambda \le 100 \text{ J} \cdot \text{m}^{-2}$		N
	$E_{\rm B} = \sum_{300}^{700} E_{\lambda} \cdot B(\lambda) \cdot \Delta \lambda \le 1  {\rm W} \cdot {\rm m}^{-2}$		N
4.3.5	Retinal thermal hazard exposure limit		Р
	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:		Ρ
	$L_{R} = \sum_{380}^{1400} L_{\lambda} \cdot \mathbf{R}(\lambda) \cdot \Delta \lambda \le \frac{50000}{\alpha \cdot t^{0.25}} \qquad W \cdot m^{-2} \cdot sr^{-1}$	(10 µs ≤ t ≤ 10 s)	Р
4.3.6	Retinal thermal hazard exposure limit – weak visual stim	ulus	N
	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:		N
	$L_{\rm IR} = \sum_{780}^{1400} L_{\lambda} \cdot R(\lambda) \cdot \Delta \lambda \le \frac{6000}{\alpha}  \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	t > 10 s	N
4.3.7	Infrared radiation hazard exposure limits for the eye		Р
	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:		Ν



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	$E_{\rm IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta \lambda \le 18000 \cdot t^{-0.75} \text{ W} \cdot \text{m}^{-2}$	t ≤ 1000 s	Ν	
	For times greater than 1000 s the limit becomes:		Р	
	$E_{\rm IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta \lambda \le 100 \qquad \rm W \cdot m^{-2}$	t > 1000 s	Р	
4.3.8	Thermal hazard exposure limit for the skin		Р	
	Visible and infrared radiant exposure (380 nm to 3000 nm) of the skin shall be limited to:		Р	
	$E_{\mathrm{H}} \cdot t = \sum_{380}^{3000} \sum_{t} E_{\lambda}(\lambda, t) \cdot \Delta t \cdot \Delta \lambda \leq 20000 \cdot t^{0,25}  \mathrm{J} \cdot \mathrm{m}^{-2}$		Р	

5	MEASUREMENT OF LAMPS AND LAMP SYSTEMS	Р
5.1	Measurement conditions	Р
	Measurement conditions shall be reported as part of the evaluation against the exposure limits and the assignment of risk classification.	Ρ
5.1.1	Lamp ageing (seasoning)	Р
	Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard.	Ν
5.1.2	Test environment	Р
	For specific test conditions, see the appropriate IEC lamp standard or in absence of such standards, the appropriate national standards or manufacturer's recommendations.	Ρ
5.1.3	Extraneous radiation	Р
	Careful checks should be made to ensure that extraneous sources of radiation and reflections do not add significantly to the measurement results.	Ρ
5.1.4	Lamp operation	Р
	Operation of the test lamp shall be provided in accordance with:	Р
	the appropriate EN lamp standard, or	Ν
	the manufacturer's recommendation	Р
5.1.5	Lamp system operation	Ν
	The power source for operation of the test lamp shall be provided in accordance with:	Ν
	the appropriate EN standard, or	Ν

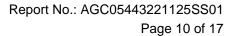


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Clause	Requirement – Test	Result	Verdict	
	the manufacturer's recommendation		N	
5.2	Measurement procedure		Р	
5.2.1	Irradiance measurements		Р	
	Minimum aperture diameter 7mm.		Р	
	Maximum aperture diameter 50 mm.		Р	
	The measurement shall be made in that position of the beam giving the maximum reading.		Р	
	The measurement instrument is adequate calibrated.		Р	
5.2.2	Radiance measurements		Р	
5.2.2.1	Standard method		Р	
	The measurements made with an optical system.		Р	
	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.		Р	
5.2.2.2	Alternative method		N	
	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	
5.2.3	Measurement of source size		Р	
	The determination of $\alpha$ , the angle subtended by a source, requires the determination of the 50% emission points of the source.		Р	
5.2.4	Pulse width measurement for pulsed sources		N	
	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.		Ν	
5.3	Analysis methods		Р	
5.3.1	Weighting curve interpolations		N	
	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	N	
5.3.2	Calculations		Р	
	The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy.		Р	
5.3.3	Measurement uncertainty		Р	



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Clause	Requirement – Test	Result	Verdict		
	The quality of all measurement results must be quantified by an analysis of the uncertainty.	see Annex C in the norm	Р		

6	LAMP CLASSIFICATION		Р
	For the purposes of this standard it was decided that the values shall be reported as follows:	see table 6.1	Р
	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		Ρ
	for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm		Ν
6.1	Continuous wave lamps		Р
6.1.1	Except Group		Р
	In the except group are lamps, which does not pose any photobiological hazard. The requirement is met by any lamp that does not pose:		Р
	<ul> <li>an actinic ultraviolet hazard (E<sub>s</sub>) within 8-hours exposure (30000 s), nor</li> </ul>		Р
	<ul> <li>a near-UV hazard (E<sub>UVA</sub>) within 1000 s, (about 16 min), nor</li> </ul>		Р
	<ul> <li>a retinal blue-light hazard (L<sub>B</sub>) within 10000 s (about 2,8 h), nor</li> </ul>		Р
	- a retinal thermal hazard (L <sub>R</sub> ) within 10 s, nor		Р
	<ul> <li>an infrared radiation hazard for the eye (E<sub>IR</sub>) within 1000 s</li> </ul>		Р
6.1.2	Risk Group 1 (Low-Risk)		N
	In this group are lamps, which exceeds the limits for the except group but that does not pose:		N
	<ul> <li>an actinic ultraviolet hazard (E<sub>s</sub>) within 10000 s, nor</li> </ul>		N
	<ul> <li>a near ultraviolet hazard (E<sub>UVA</sub>) within 300 s, nor</li> </ul>		N
	- a retinal blue-light hazard (L <sub>B</sub> ) within 100 s, nor		N
	- a retinal thermal hazard (L <sub>R</sub> ) within 10 s, nor		N
	<ul> <li>an infrared radiation hazard for the eye (E<sub>IR</sub>) within 100 s</li> </ul>		N
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal		N





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Clause	Requirement – Test	Result	Verdict
	hazard ( $L_{IR}$ ), within 100 s are in Risk Group 1.		
6.1.3	Risk Group 2 (Moderate-Risk)		N
	This requirement is met by any lamp that exceeds the limits for Risk Group 1, but that does not pose:		Ν
	<ul> <li>an actinic ultraviolet hazard (E<sub>s</sub>) within 1000 s exposure, nor</li> </ul>		Ν
	- a near ultraviolet hazard (E <sub>UVA</sub> ) within 100 s, nor		N
	<ul> <li>a retinal blue-light hazard (L<sub>B</sub>) within 0,25 s (aversion response), nor</li> </ul>		Ν
	<ul> <li>a retinal thermal hazard (L<sub>R</sub>) within 0,25 s (aversion response), nor</li> </ul>		N
	– an infrared radiation hazard for the eye ( ${\rm E}_{\rm IR})$ within 10 s		N
	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.		Ν
6.1.4	Risk Group 3 (High-Risk)		N
	Lamps which exceed the limits for Risk Group 2 are in Group 3.		N
6.2	Pulsed lamps		N
	Pulse lamp criteria shall apply to a single pulse and to any group of pulses within 0,25 s.		N
	A pulsed lamp shall be evaluated at the highest nominal energy loading as specified by the manufacturer.		N
	The risk group determination of the lamp being tested shall be made as follows:		N
	<ul> <li>a lamp that exceeds the exposure limit shall be classified as belonging to Risk Group 3 (High-Risk)</li> </ul>		N
	<ul> <li>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</li> </ul>		N
	<ul> <li>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</li> </ul>		N



IEC 62471					
Clause	Requirement – Test	Result	Verdict		

e 4.1	Spectral we	eighting function for assessing (	ultraviolet hazards for sk	in and eye	
Wavelength <sup>1</sup> λ, nm 200		UV hazard function $S_{uv}(\lambda)$	Wavelength λ, nm	UV hazard function S <sub>w</sub> (	
		0,030	313*	0,006	
20	)5	0,051	315	0,003	
21	0	0,075	316	0,0024	
21	5	0,095	317	0,0020	
22	20	0,120	318	0,0016	
22	25	0,150	319	0,0012	
23	30	0,190	320	0,0010	
23	35	0,240	322	0,00067	
24	10	0,300	323	0,00054	
24	15	0,360	325	0,00050	
25	50	0,430	328	0,00044	
25	4*	0,500	330	0,00041	
25	55	0,520	333*	0,00037	
26	60	0,650	335	0,00034	
26	65	0,810	340	0,00028	
27	<b>'</b> 0	1,000	345	0,00024	
27	'5	0,960	350	0,00020	
28	0*	0,880	355	0,00016	
28	35	0,770	360 0,000		
29	90	0,640	365*	0,00011	
29	95	0,540	370	0,000093	
29	7*	0,460	375	0,000077	
30	00	0,300	380	0,000064	
30	3*	0,120	385	0,000053	
30	)5	0,060	390	0,000044	
30		0,026	395	0,000036	
31	0	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.

Table 4.2	Spectral weighting	functions for assessing retinal hazards from b	proadband optical sources P
١	Wavelength nm	Blue-light hazard function B ( $\lambda$ )	Burn hazard function R (λ)
	300	0,01	
	305	0,01	
	310	0,01	
	315	0,01	
	320	0,01	



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		71		
Clause	Requirement – Test		Result	Verdict
	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 10 <sup>[(450-λ)/50]</sup>		1,6
	500-600	10 <sup>[(450-λ)/50]</sup>		1,0
	600-700	0,001		1.0
	700-1050		,	ΙΟ <sup>[(700-λ)/500]</sup>
	1050-1150			0,2
	1150-1200		0,2	0,2 2·10 <sup>0,02(1150-λ)</sup>
	1200-1400			0,02



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IEC 62471						
Clause	Requirement – Test	Result	Verdict			

Table 5.4	Summary of the ELs for the	surface of the s	kin or cornea (	(irradiance bas	sed values)	Р
Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Limiting aperture rad (deg)	EL in terms of irradiane W•m <sup>-2</sup>	ce
Actinic UV skin & eye	$E_{S} = \sum E_{\lambda} \bullet S(\lambda) \bullet \Delta \lambda$	200 – 400	< 30000	1,4 (80)	30/t	
Eye UV-A	$E_{UVA} = \sum E_{\lambda} \bullet \Delta \lambda$	315 – 400	≤1000 >1000	1,4 (80)	10000/ 10	t
Blue-light small source	$E_{B} = \sum E_{\lambda} \bullet B(\lambda) \bullet \Delta \lambda$	300 – 700	≤100 >100	< 0,011	100/t 1,0	
Eye IR	$E_{IR} = \sum E_{\lambda} \bullet \Delta \lambda$	780 –3000	≤1000 >1000	1,4 (80)	18000/t <sup>0</sup> 100	9,75
Skin thermal	$E_{H} = \sum E_{\lambda} \bullet \Delta \lambda$	380 - 3000	< 10	2π sr	20000/t <sup>c</sup>	),75

Table 5.5	Sun	Summary of the ELs for the retina (radiance based values)							
Hazard Name		Relevant equation	Wavelength range nm	Exposure duration sec	Field of view radians	EL in term constant radiance			
Blue light		$L_{B} = \sum L_{\lambda} \bullet B(\lambda) \bullet \Delta \lambda$	300 – 700	0,25 – 10 10-100 100-10000 ≥ 10000	0,011•√(t/10) 0,011 0,0011•√t 0,1	10 <sup>6</sup> /t 10 <sup>6</sup> /t 10 <sup>6</sup> /t 100			
Retinal thermal		$L_{R} = \sum L_{\lambda} \bullet R(\lambda) \bullet \Delta \lambda$	380 – 1400	< 0,25 0,25 – 10	0,0017 0,011•√(t/10)	50000/(α•t 50000/(α•t			
Retinal thermal (weak visual stimulus)		$L_{IR} = \sum L_{\lambda} \bullet R(\lambda) \bullet \Delta \lambda$	780 – 1400	> 10	0,011	6000/c	(		



				IEC 6	2471				
Clause	Requireme	ent – Test			R	esult			Verdict
Table 6.1	Emission limits for risk groups of continuous wave lamps								
	Action				E	Emission Me	asuremer	nt	
Risk	spectru	Symbol	Units	Exe	empt	Low r	isk	Mod	risk
	m			Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	Es	W•m⁻²	0.001		0,003		0,03	
Near UV		E <sub>UVA</sub>	W•m⁻²	10		33		100	
Blue light	Β(λ)	L <sub>B</sub>	W•m <sup>-2</sup> •sr <sup>-</sup>	100		10000		4000000	
Blue light, small source	Β(λ)	E <sub>B</sub>	W•m⁻²	1.0*		1,0		400	
Retinal thermal	R(λ)	L <sub>R</sub>	W•m <sup>-2</sup> •sr <sup>-</sup>	28000/α		28000/α		71000/α	
Retinal thermal, weak visual stimulus**	R(λ)	L <sub>IR</sub>	W•m <sup>-2</sup> •sr <sup>-</sup>	6000/α		6000/α		6000/α	
IR radiation, eye		E <sub>IR</sub>	W•m⁻²	100		570		3200	

\*\* Involves evaluation of non-GLS source



	EN 62471						
	CENELEC COMMON MODIFICATIONS (EN)	Р					
4	EXPOSURE LIMITS	Р					
	Contents of the whole Clause 4 of IEC 62471:2006 moved into a new informative Annex ZB						
	Clause 4 replaced by the following:	Р					
	Limits of the Artificial Optical Radiation Directive (2006/25/EC) have been applied instead of those fixed in IEC 62471:2006	Р					
4.1	General	Р					
	First paragraph deleted						

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)								
					Em	ission Mea	asuremen	t	
Risk	Action spectrum	Symbol	Units	Ex	empt	Low	risk	Mod	risk
	opeenum			Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	Es	W•m⁻²	0.001	0.000E+00	0.003		0.03	
Near UV		E <sub>UVA</sub>	W•m⁻²	0.33	0.000E+00	33		100	
Blue light	Β(λ)	L <sub>B</sub>	W•m <sup>-</sup> <sup>2</sup> •sr <sup>-1</sup>	100	4.194E+00	10000		4000000	
Blue light, small source	Β(λ)	E <sub>B</sub>	W•m <sup>-2</sup>	0.01*		1,0		400	
Retinal thermal	R(λ)	L <sub>R</sub>	W•m <sup>-</sup> <sup>2</sup> •sr <sup>-1</sup>	28000/α	1.883E+03	28000/α		1.614E+0 6	
Retinal thermal, weak visual stimulus**	R(λ)	L <sub>IR</sub>	W∙m <sup>-</sup> <sup>2</sup> •sr <sup>-1</sup>						
IR radiation, eye		E <sub>IR</sub>	W•m <sup>-2</sup>	100		570		3200	
	rce defined a evaluation of			adian. Aver	aging field of v	iew at 1000	0 s is 0,1	radian.	



### Attachment A Photos of product



Fig.1– Overall view of product



Fig.2– Overall view of product

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Fig.3– LED view of product

----- End of Report -----



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3. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

4. In the event of the improper use of the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

5. Samples submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

6. The Company will not be liable for or accept responsibility for any loss or damage however arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

7. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

8. The Company is not responsible for recalling the electronic version of the original report when any revision is made to them. The Client assumes the responsibility to providing the revised version to any interested party who uses them.

9. Subject to the variable length of retention time for test data and report stored hereinto as otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of the test report for a period of six years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after retention period. Under no circumstances shall we be liable for damage of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.