





TEST REPORT IEC 62471 Photobiological safety of lamps and lamp systems	
Report Reference No.	4790645738.1
Date of issue	2022-11-28
Total number of pages	26 including attachments
Name of Testing Laboratory preparing the Report UL International Italia S.r.l.	
Applicant's name	NERI S.p.A.
Address	SS Emilia, 1622 – Longiano (FC) 47020 - Italy
Test specification: Standard IEC 62471:2006 Test procedure Informative Non-standard test method N/A	
Test Report Form No.	IEC62471B
TRF Originator	VDE Testing and Certification Institute
Master TRF	Dated 2018-08-16
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Test item description..... :	LED Luminaire	
Trade Mark..... :	NERI	
Manufacturer	NERI S.p.A. SS Emilia, 1622 – Longiano (FC) 47020 - Italy	
Model/Type reference..... :	Light 803 LU80300 32	
Ratings	220-240 V ~ 50/60 Hz 89 W Class II IP66 t_a -25°C/+35°C	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
<input checked="" type="checkbox"/> Testing Laboratory:	UL International Italia S.r.l.	
Testing location/ address	Via delle Industrie 5 & 6 – 20061 Carugate (MI) – Italy	
Tested by (name, function, signature).....	Giovanni Di Martino Project Handler	
Approved by (name, function, signature) ..	Luca Nobile Reviewer	
<input type="checkbox"/> Testing procedure: CTF Stage 1:		
Testing location/ address		
Tested by (name, function, signature).....		
Approved by (name, function, signature) ..		
<input type="checkbox"/> Testing procedure: CTF Stage 2:		
Testing location/ address		
Tested by (name + signature)		
Witnessed by (name, function, signature) .		
Approved by (name, function, signature) ..		
<input type="checkbox"/> Testing procedure: CTF Stage 3:		
<input type="checkbox"/> Testing procedure: CTF Stage 4:		
Testing location/ address		
Tested by (name, function, signature).....		
Witnessed by (name, function, signature) .		
Approved by (name, function, signature) ..		
Supervised by (name, function, signature)		

List of Attachments (including a total number of pages in each attachment):				
European Group Differences		(Enclosure 1): 1 page		
Components List		(Enclosure 2): 1 page		
Measured wavelength curves		(Enclosure 3): 2 pages		
Labelling according to IEC/TR 62471-2		(Enclosure 4): 4 pages		
Photographs		(Enclosure 5): 2 pages		
Summary of testing:				
Tests performed (name of test and test clause):				Testing location:
5.2.1	Irradiance measurement	Applicable	Pass	UL International Italia S.r.l. Via delle Industrie 5 & 6 20061 Carugate (MI) Italy
5.2.2	Radiance measurement	Applicable	Pass	
The lamp system has been classified “Risk Group Exempt”				
The measurement uncertainties stated in this Test Report are estimated according to the Quality Procedure 23-CL-G0025.				
If requested, UL International Italia S.r.l. will be able to estimate the uncertainty contribution for all the quantities stated in this Test Report.				
Where not otherwise specified or communicated in writing, statements of conformity (e.g. Pass/Fail) are established according to the following decision rule: Considering that the applied test standards take measurement uncertainty into account, acceptance limit equals the tolerance limit (Accuracy Method). This leads to a maximum 50% of false accept or false reject when the measured value equals the tolerance limit. See ILAC-G8:09/2019 for further details.				
Summary of compliance with National Differences:				
List of countries addressed:				
<ul style="list-style-type: none"> All countries member of CENELEC (Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom) (see Enclosure 1) 				
<input checked="" type="checkbox"/> The product fulfils the requirements of EN 62471:2008 (based on EU Directive 2006/25/EC)				

Copy of marking plate:

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.

NERI LU80300 32**Made in Italy LU8030000S000001**

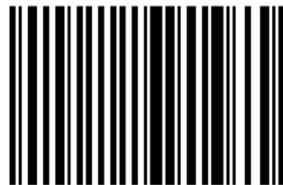
Batch: 0001

Date: 44/22

Serial: 00001

220V-240V~ 50/60Hz 89W Ta -25°C/+35°C IP66 IK09

Type V-A 10500lm 32 LED 730



2200001



Neri S.p.A. Via Emilia, 1622
47020 Longiano (FC) Italy

Test item particulars	
Tested lamp	<input checked="" type="checkbox"/> continuous wave lamps <input type="checkbox"/> pulsed lamps
Tested lamp system	see "Component List" in Enclosure 2
Lamp classification group.....	<input checked="" type="checkbox"/> exempt <input type="checkbox"/> risk 1 <input type="checkbox"/> risk 2 <input type="checkbox"/> risk 3
Lamp cap	LED
Bulb	—
Rated of the lamp	—
Furthermore marking on the lamp.....	—
Seasoning of lamps according IEC standard	N/A – LED
Used measurement instrument.....	see Instrument's List recorded into UL database Aurora number 1001762801.
Temperature by measurement.....	25 °C
Information for safety use	—
Possible test case verdicts:	
– 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)	
Testing:	
Date of receipt of test item	2022-11-14
Date (s) of performance of tests.....	2022-11-25
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.	
Throughout this report a <input checked="" type="checkbox"/> comma / <input type="checkbox"/> point is used as the decimal separator.	

General product information and other remarks:

Fixed luminaire provided with an integral LED module as light source intended for installation on a pole.

The luminaire optical part is composed by an aluminium heatsink, closed with a tempered flat glass, which is also the fixing means of LED driver.

The product tested has 3000 K CCT and the results can be extended to variants with lower CCT.

Irradiance and radiance measurements have been performed at 500 lux distance in the direction of maximum light output and with secondary optics in place.

Lamp Classification Group of the luminaire according to IEC/EN 62471 is Risk Group Exempt.

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
4	EXPOSURE LIMITS		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
	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

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Clause	Requirement + Test	Result – Remark	Verdict
	$L_B \cdot t = \sum_{300}^{700} \sum_t L_\lambda(\lambda, t) \cdot B(\lambda) \cdot \Delta\lambda \cdot \Delta t \leq 10^6 \quad \text{J} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	for $t \leq 10^4 \text{ s}$ $t_{\max} = \frac{10^6}{L_B}$	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 $t > 10^4 \text{ s}$	P
4.3.4	Retinal blue light hazard exposure limit - small source		N/A
	Thus the spectral irradiance at the eye E_λ , weighted against the blue-light hazard function $B(\lambda)$ shall not exceed the levels defined by:	see table 4.2	N/A
	$E_B \cdot t = \sum_{300}^{700} \sum_t E_\lambda(\lambda, t) \cdot B(\lambda) \cdot \Delta\lambda \cdot \Delta t \leq 100 \quad \text{J} \cdot \text{m}^{-2}$	for $t \leq 100 \text{ s}$	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 $t > 100 \text{ s}$	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_λ , 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
	$L_R = \sum_{380}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{50\,000}{\alpha \cdot t^{0,25}} \quad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	$(10 \mu\text{s} \leq t \leq 10 \text{ s})$	P
4.3.6	Retinal thermal hazard exposure limit – weak visual stimulus		N/A
	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/A
	$L_{IR} = \sum_{780}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{6\,000}{\alpha} \quad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	$t > 10 \text{ s}$	N/A
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
	$E_{IR} = \sum_{780}^{3000} E_\lambda \cdot \Delta\lambda \leq 18\,000 \cdot t^{-0,75} \quad \text{W} \cdot \text{m}^{-2}$	$t \leq 1000 \text{ s}$	N/A
	For times greater than 1000 s the limit becomes:		P
	$E_{IR} = \sum_{780}^{3000} E_\lambda \cdot \Delta\lambda \leq 100 \quad \text{W} \cdot \text{m}^{-2}$	$t > 1000 \text{ s}$	P

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Clause	Requirement + Test	Result – Remark	Verdict
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
	$E_H \cdot t = \sum_{380}^{3000} \sum_t E_{\lambda}(\lambda, t) \cdot \Delta\lambda \cdot \Delta t \leq 20\,000 \cdot t^{0.25} \quad \text{J} \cdot \text{m}^{-2}$	1,53E+00	P
5	MEASUREMENT OF LAMPS AND LAMP SYSTEMS		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)		N/A
	Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard.	LED source	N/A
5.1.2	Test environment		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.	Dark room	P
5.1.4	Lamp operation		N/A
	Operation of the test lamp shall be provided in accordance with:		N/A
	– the appropriate IEC lamp standard, or		N/A
	– the manufacturer's recommendation		N/A
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
	Minimum aperture diameter 7 mm.		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

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Clause	Requirement + Test	Result – Remark	Verdict
	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.	11 mrad FOV	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 α , the angle subtended by a source, requires the determination of the 50% emission points of the source.	Source dimensions: 174,22 x 143,54 mm ($\alpha = 49,6$ mrad)	P
5.2.4	Pulse width measurement for pulsed sources		N/A
	The determination of Δt , 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.		P
6	LAMP CLASSIFICATION		P
	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	3200 mm	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	Exempt Group		P

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Clause	Requirement + Test	Result – Remark	Verdict
	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
	– 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

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Clause	Requirement + Test	Result – Remark	Verdict
	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

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Clause	Requirement + Test	Result – Remark	Verdict

Table 4.1		Spectral weighting function for assessing ultraviolet hazards for skin and eye		P
Wavelength ¹ λ , nm	UV hazard function $S_{uv}(\lambda)$	Wavelength λ , 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	
¹ 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 (λ)	Burn hazard function R (λ)	
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	

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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	≤ 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	≤ 100 > 100	< 0,011	100/t 1,0
Eye IR	$E_{IR} = \sum E_\lambda \cdot \Delta\lambda$	780 – 3000	≤ 1000 > 1000	1,4 (80)	18000/t ^{0,75} 100
Skin thermal	$E_H = \sum E_\lambda \cdot \Delta\lambda$	380 – 3000	< 10	2π sr	20000/t ^{0,75}

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 ≥ 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

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Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1		Emission limits for risk groups of continuous wave lamps							P
Risk	Action spectrum	Symbol	Units	Emission Measurement					
				Exempt		Low risk		Mod risk	
				Limit	Result	Limit	Result	Limit	Result
Actinic UV	$S_{UV}(\lambda)$	E_s	$W \cdot m^{-2}$	0,001	5,4E-05	0,003	—	0,03	—
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	5,05E-05	33	—	100	—
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	22,8145	10000	—	4000000	—
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	1,0*	0E+00	1,0	—	400	—
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	$\frac{28000}{\alpha} = \frac{1573702,6}{3}$	2,33E+03	$28000/\alpha$	—	$71000/\alpha$	—
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	$6000/\alpha$	n/a	$6000/\alpha$	—	$6000/\alpha$	—
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	0,0042	570	—	3200	—
* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.									
** Involves evaluation of non-GLS source									

	ENCLOSURE 1: European Group Differences	
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IEC62471B - ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict

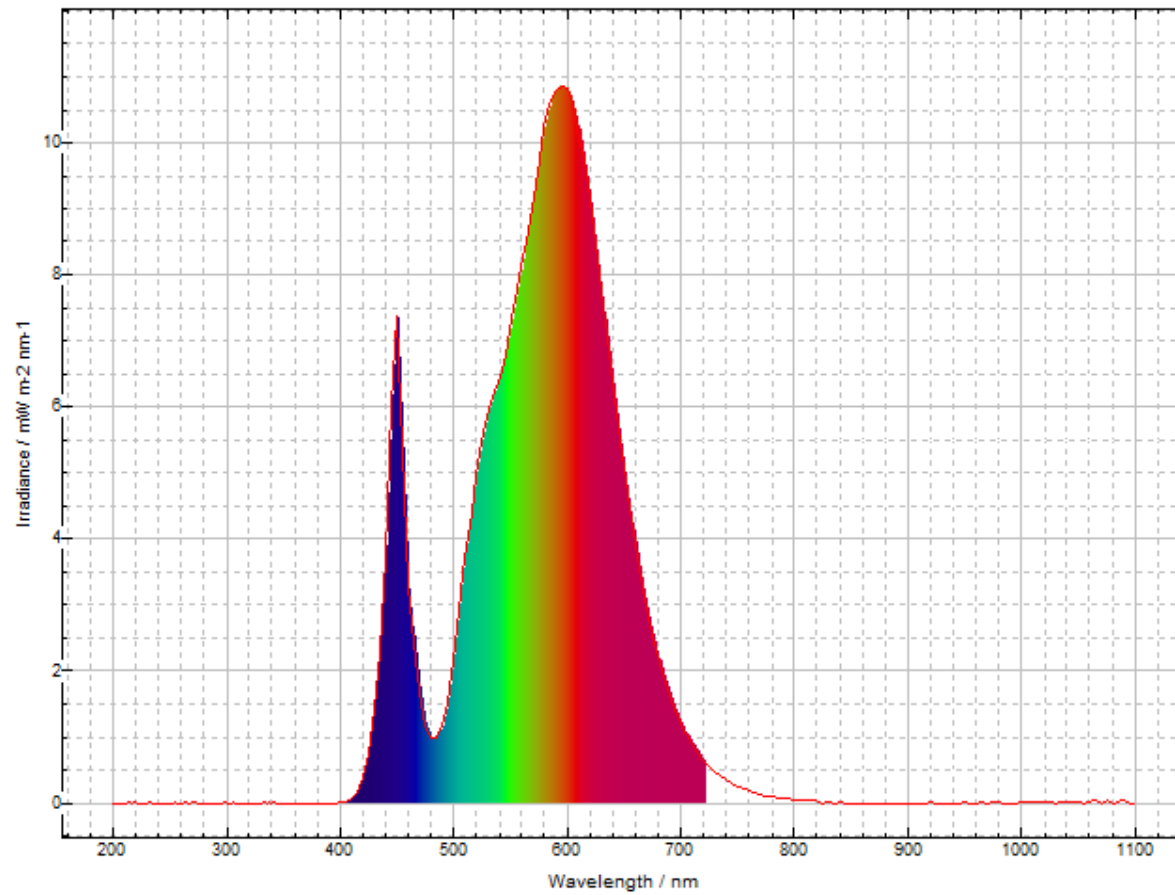
IEC62471B ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT IEC 62471 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES Photobiological safety of lamps and lamps systems			
Differences according to: EN 62471:2008			
TRF template used: IEC62471-2:2020, Ed. 1.1			
Attachment Form No.: EU_GD_IEC62471B			
Attachment Originator: OVE			
Master Attachment: Dated 2021-04-29			
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	CENELEC COMMON MODIFICATIONS (EN)		P
4	EXPOSURE LIMITS		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
	The original Clause 4 of IEC 62471:2006 contains provisions governing limiting values for the exposure of persons falling within the area of the health and safety of workers. Within Europe those limiting values are already covered by the Artificial Optical Radiation Directive (2006/25/EC). Thus, the limits of the directive have to be applied instead of those fixed in IEC 62471:2006.		P
	There are no differences in EN 62471:2008 regarding the classification of lamps according Clause 6 of IEC 62471:2006.		—
4.1	General		P
	Delete the first paragraph.		—

	ENCLOSURE 2: Components List	
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object/part No.	manufacturer/ trademark	type/model	Ratings / technical data
LED Control gear	Philips	Xi FP 110W 0.3-1.0A SNLDAE 230V C133sXt	220-240Vac 50/60Hz 110W
LED Chip	Lumileds	L150- 30705006000S0	I LED in tested luminaire 490 mA CCT in tested luminaire 3000 K
Optic	LEDIL	C14164_STRADA- 2X2-ME-WIDE1	Plastic Material

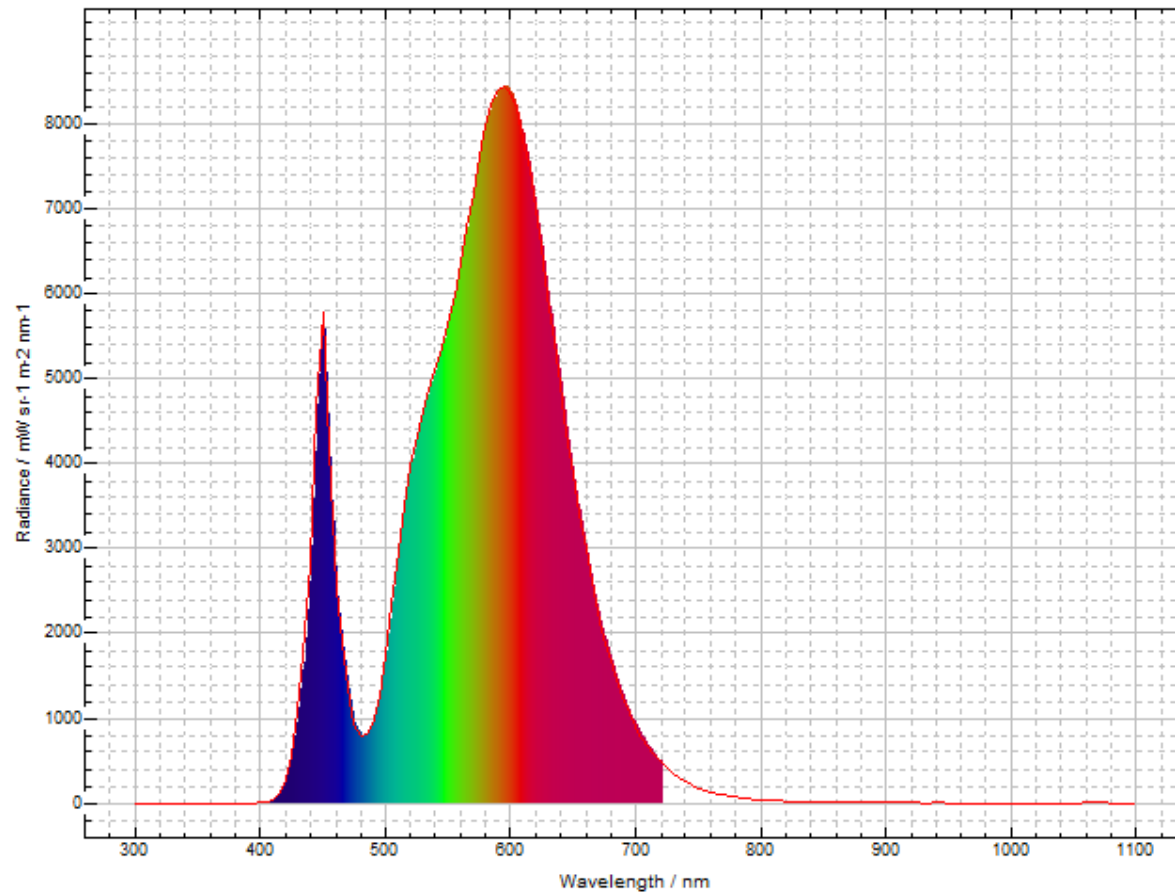
ENCLOSURE 3: Measured wavelength curves	
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IRRADIANCE at 500 lux distance:



ENCLOSURE 3: Measured wavelength curves	
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RADIANCE with 11 mrad FOV at 500 lux distance:



	ENCLOSURE 4: Labelling according to IEC/TR 62471-2	
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Clause	Requirement + Test	Result – Remark	Verdict
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5.4	Labelling		—
	Not Required		
	Lamp systems shall be marked by the manufacturer in accordance with the requirements of Table 1		N/A
	Except for an Exempt Risk Group and a Risk Group 1 lamp system emitting only in the wavelength range 400 nm to 780 nm, the risk group shall be marked on the product.		N/A
	If the size or design of the product makes labelling impractical, the label shall be included in the packaging and included in the user manual.		N/A
	Warning symbols should be in accordance with IEC 60417-1.		N/A
	Labels on the housing shall be permanently fixed, legible, and clearly visible during maintenance and service.		N/A
	Labels shall be positioned so that they can be read without the necessity for human exposure to optical radiation in excess of the applicable ELVs		N/A
	Text and borders shall be black on a yellow background.		N/A
	The label size shall be adapted to the size of the product.		N/A
	Reproductions of all required labels shall be included in the user manual.		N/A
5.5	Other information provisions		—
	For lamps and lamp systems in excess of the Exempt Risk Group the following information should be provided in the user information:		—
	a) a clear statement that the lamp or lamp system is in excess of the Exempt Group and that the viewer-related risk is dependent upon how the users install and use the product		N/A

	ENCLOSURE 4: Labelling according to IEC/TR 62471-2	
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Clause	Requirement + Test	Result – Remark	Verdict
	b) the most restrictive optical radiation hazard and other optical radiation hazards in excess of Exempt Group (see Table 1)		N/A
	c) exposure hazard values (EHVs) and the hazard distances with optional graphical presentation of distant-dependent EHV		N/A
	d) Hazard distances (HD) for all relevant viewer-related risk groups below the assigned one (for relevance see Tables 1 and 2);		N/A
	e) adequate instructions for proper assembly, installation, maintenance and safe use, including clear warnings concerning precautions to avoid possible exposure to hazardous optical radiation;		N/A
	f) advice on safe operating procedures and warnings concerning reasonably foreseeable malpractices, malfunctions and hazardous failure modes. Where maintenance procedures are detailed, they should, wherever possible, include explicit instructions on safe procedures to be followed		N/A

	ENCLOSURE 4: Labelling according to IEC/TR 62471-2	
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Clause	Requirement + Test	Result – Remark	Verdict
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Table 1 – Hazard-related risk group labelling of lamps systems

Hazard	Exempt Risk Group	Risk Group 1	Risk Group 2	Risk Group 3
Ultraviolet hazard 200-400 nm	<input checked="" type="checkbox"/> Not required	<input type="checkbox"/> NOTICE UV emitted from this product	<input type="checkbox"/> CAUTION UV emitted from this product	<input type="checkbox"/> WARNING UV emitted from this product
Retinal blue light hazard 300-400 nm	<input checked="" type="checkbox"/> Not required	<input type="checkbox"/> Not required	<input type="checkbox"/> CAUTION Possibly hazard- ous optical radia- tion emitted from this product	<input type="checkbox"/> WARNING Possibly hazard- ous optical radia- tion emitted from this product
Retinal blue light or thermal hazard 400-780 nm	<input checked="" type="checkbox"/> Not required	<input type="checkbox"/> Not required	<input type="checkbox"/> CAUTION Possibly hazard- ous optical radia- tion emitted from this product	<input type="checkbox"/> WARNING Possibly hazard- ous optical radia- tion emitted from this product
Cornea/Lens infra- red hazard 780-3000 nm	<input checked="" type="checkbox"/> Not required	<input type="checkbox"/> NOTICE IR emitted from this product	<input type="checkbox"/> CAUTION IR emitted from this product	<input type="checkbox"/> WARNING IR emitted from this product
Retinal/thermal hazard, weak vis- ual stimulus 780-1400 nm	<input checked="" type="checkbox"/> Not required	<input type="checkbox"/> WARNING IR emitted from this product	<input type="checkbox"/> WARNING IR emitted from this product	<input type="checkbox"/> WARNING IR emitted from this product

	ENCLOSURE 4: Labelling according to IEC/TR 62471-2	
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Clause	Requirement + Test	Result – Remark	Verdict
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Table 2 – Explanation of labelling information and guidance on control measures				
Hazard	Exempt Risk Group	Risk Group 1	Risk Group 2	Risk Group 3
Ultraviolet hazard 200-400 nm	<input checked="" type="checkbox"/> Not required	<input type="checkbox"/> Minimise exposure to eyes or skin. Use appropriate shielding	<input type="checkbox"/> Eye or skin irritation may result from exposure. Use appropriate shielding	<input type="checkbox"/> Avoid eye and skin exposure to unshielded product
Retinal blue light hazard 300-400 nm	<input checked="" type="checkbox"/> Not required	<input type="checkbox"/> Not required	<input type="checkbox"/> Do not stare at operating lamp. May be harmful to the eye	<input type="checkbox"/> Do not look at operating lamp. Eye injury may result
Retinal blue light or thermal hazard 400-780 nm	<input checked="" type="checkbox"/> Not required	<input type="checkbox"/> Not required	<input type="checkbox"/> Do not stare at operating lamp. May be harmful to the eye	<input type="checkbox"/> Do not look at operating lamp. Eye injury may result
Cornea/Lens infrared hazard 780-3000 nm	<input checked="" type="checkbox"/> Not required	<input type="checkbox"/> Use appropriate shielding or eye protection	<input type="checkbox"/> Avoid eye exposure. Use appropriate shielding or eye protection	<input type="checkbox"/> Avoid eye exposure. Use appropriate shielding or eye protection
Retinal/thermal hazard, weak visual stimulus 780-1400 nm	<input checked="" type="checkbox"/> Not required	<input type="checkbox"/> Do not stare at operating lamp	<input type="checkbox"/> Do not stare at operating lamp	<input type="checkbox"/> Do not look at operating lamp

ENCLOSURE 5: Photographs	
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Photograph No. 1. General view of the luminaire



Photograph No. 2. LED module and optics



ENCLOSURE 5: Photographs	
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Photograph No. 3. Electrical enclosure



Photograph No. 4. LED controlgear

