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Applicant: Mid Ocean Brands B.V.

Address: Unit 711-716, 7/F., Tower A, 83 King Lam Street Cheung Sha Wan, Kowloon, Hong Kong

The following sample(s) and sample information was/were submitted and identified by client as:

Sample Name: Torch with emergency hammer

Model: MO6941

Vendor code: 107978

Receiving Date: Jul 28,2025

Test Period: From Jul 28,2025 to Aug 8,2025

Add Information:

Test Summary:

#	Test Item(s)	Conclusion
1	IEC 62471:2006: PHOTOBIOLOGICAL SAFETY OF LAMPS AND LAMP SYSTEMS	PASS





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Result:

1. PHOTOBIOLOGICAL SAFETY OF LAMPS AND LAMP SYSTEMS

IEC 62471:2006

	IEC 62471		
Clause	Requirement + Test	Result – Remark	Verdict
4	EXPOSURE LIMITS		Р
4.1	General		Р
BH1	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 ⁴ cd.m- ²		N/A
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.m ⁻² within any 8-hour period	SHILL	Р
	To protect against injury of the eye or skin from ultraviolet radiation exposure produced by a broadband source, the effective integrated spectral irradiance, Es, of the light source shall not exceed the levels defined by:		Р
	$E_{s} \cdot t = \sum_{200}^{400} \sum_{t} E_{\lambda}(\lambda, t) \cdot S_{UV}(\lambda) \cdot \Delta t \cdot \Delta \lambda \le 30$ J·m ⁻²	P	Р
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye or skin shall be computed by:	- 171	Р
, d	$t_{\text{max}} = \frac{30}{E_{\text{S}}}$ s	91	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 J.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 W.m ⁻² .	BHTL	Р
19	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye for time less than 1000 s, shall be computed by:	- 171	Р



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Clause	Requirement + Test	Result – Remark	Verdict
	$t_{\text{max}} \le \frac{10\ 000}{E_{\text{UVA}}} \qquad \text{s}$		Р
1.3.3	Retinal blue light hazard exposure limit		Р
	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:	BHTL	Р
BH	$L_{B} \cdot t = \sum_{300}^{700} \sum_{t} L_{\lambda}(\lambda, t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta \lambda \le 10^{6} \qquad J \cdot m^{-2} \cdot sr^{-1}$	for t \le 10^4 s $t_{\text{max}} = \frac{10^6}{L_{\text{B}}}$	N/A
	$L_{\rm B} = \sum_{300}^{700} L_{\lambda} \cdot B(\lambda) \cdot \Delta \lambda \le 100 \qquad \qquad W \cdot {\rm m}^{-2} \cdot {\rm sr}^{-1}$	for t > 10 ⁴ s	Р
.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
	$E_{B} \cdot t = \sum_{300}^{700} \sum_{t} E_{\lambda}(\lambda, t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta \lambda \le 100 \qquad J \cdot m^{-2}$	for t ≤ 100 s	N/A
	$E_{\rm B} = \sum_{300}^{700} E_{\lambda} \cdot B(\lambda) \cdot \Delta \lambda \le 1$ W·m ⁻²	for t > 100 s	N/A
.3.5	Retinal thermal hazard exposure limit		Р
	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:	SHITL	P
171	$L_{\rm R} = \sum_{380}^{1400} L_{\lambda} \cdot R(\lambda) \cdot \Delta \lambda \le \frac{50000}{\alpha \cdot t^{0.25}}$ W · m ⁻² · sr ⁻¹	(10 μs ≤ t ≤ 10 s)	N/A
.3.6	Retinal thermal hazard exposure limit – weak visual stimul	us	Р
	For an infrared heat lamp or any near-infrared source where a weak visual stimulus is inadequate to actitude the aversion response, the near infrared (780 nm to 1400 nm) radiance, Lir, as viewed by the eye for exposure times greater than 10 s shall be limited to:		Р



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Clause	Requirement + Test	Result – Remark	Verdict		
	$L_{\rm IR} = \sum_{780}^{1400} L_{\lambda} \cdot R(\lambda) \cdot \Delta \lambda \le \frac{6000}{\alpha} \qquad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$		P		
4.3.7	Infrared radiation hazard exposure limits for the eye				
	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:	BHILL	P		
BH	$E_{\rm IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta \lambda \le 18000 \cdot t^{-0.75}$ W·m ⁻²	t ≤ 1000 s	N/A		
	For times greater than 1000 s the limit becomes:	1917	Р		
	$E_{\rm IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta \lambda \le 100$ W·m ⁻²	t>1000 s	Р		
4.3.8	Thermal hazard exposure limit for the skin	.41	Р		
	Visible and infrared radiant exposure (380 nm to 3000 nm) of the skin shall be limited to:	BH	Р		
	$E_{H} \cdot t = \sum_{380}^{3000} \sum_{t} E_{\lambda}(\lambda, t) \cdot \Delta t \cdot \Delta \lambda \le 20000 \cdot t^{0,25} \qquad J \cdot m^{-2}$		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.		Р		
5.1.1	Lamp ageing (seasoning)	Not lamps	N/A		
	Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard.	91	N/A		
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.	15HTL	Р		
5.1.3	Extraneous radiation		Р		
19	Careful checks should be made to ensure that extraneous sources of radiation and reflections do not add significantly to the measurement results.		Р		



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Clause	Requirement + Test	Result – Remark	Verdict
5.1.4	Lamp operation	, totali	N/A
J. 1. 4	Operation of the test lamp shall be provided in ac-		
TL	cordance with:		N/A
	 the appropriate IEC lamp standard, or 		N/A
	the manufacturer's recommendation		N/A
5.1.5	Lamp system operation	13.	Р
- 5	The power source for operation of the test lamp shall be provided in accordance with:		Р
19/12	the appropriate IEC standard, or		N/A
	the manufacturer's recommendation		Р
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.	19H	Р
	The measurement instrument is adequate calibrated.		Р
5.2.2	Radiance measurements	1	Р
5.2.2.1	Standard method		N/A
	The measurements made with an optical system.		N/A
	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.		N/A
5.2.2.2	Alternative method		N/A
HTL	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 radimeasurements.		N/A
5.2.3	Measurement of source size		Р
	The determination of α , the angle subtended by a source, requires the determination of the 50% emission points of the source.	13	Р
5.2.4	Pulse width measurement for pulsed sources		N/A



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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. 5.3 Analysis methods P To standardize interpolations To standardize interpolated values, use linear interpolation on the log of given values to obtain interpolation on the log of given values desired. 5.3.2 Calculations The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy. 5.3.3 Measurement uncertainty The quality of all measurement results must be quantified by an analysis of the uncertainty. P For the purposes of this standard it was decided that the values shall be reported as either ir radiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm N/A N/A N/A N/A N/A N/A N/A N		IEC 62471				
source, requires the determination of the time during which the emission is > 50% of its peak value. 5.3.1 Weighting curve interpolations To standardize interpolated values, use linear interpolation on the log of given values to obtain interpolation on the log of given values to obtain interpolation on the log of given values to obtain interpolation on the log of given values to obtain interpolation on the log of given values to obtain interpolation on the log of given values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy. 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. The quality of all measurement results must be quantified by an analysis of the uncertainty. P See Annex C in the norm P See Annex C in the norm P See table 6.1 P an actine light sources, including pulsed lamp sources, the hazard values shall be reported at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm Continuous wave lamps P Exempt Group In the exempt group are lamps, which don't pose any photobiological hazard. The requirement is met by any lamp that does not pose: — an actinic ultraviolet hazard (Es) within 8-hours exposure (30000 s), nor — a near-UV hazard (Euw) within 10000 s, (about 16 min), nor — a retinal blue-light hazard (La) within 10000 s	Clause	Requirement + Test	Result – Remark	Verdict		
Weighting curve interpolations To standardize interpolated values, use linear interpolation on the log of given values to obtain intermediate points at the wavelength intervals desired. 5.3.2 Calculations The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy. 5.3.3 Measurement uncertainty The quality of all measurement results must be quantified by an analysis of the uncertainty. See Annex C in the norm Pror the purposes of this standard it was decided that the values shall be reported as follows: - 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 - for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance less than 200 mm Continuous wave lamps Provided in the exempt group are lamps, which don't pose any photobiological hazard. The requirement is met by any lamp that does not pose: - an actinic ultraviolet hazard (Es) within 8-hours exposure (30000 s), nor - a retinal blue-light hazard (Lis) within 1000 s		source, requires the determination of the time during		N/A		
To standardize interpolated values, use linear interpolation on the log of given values to obtain intermediate points at the wavelength intervals desired. 5.3.2 Calculations The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy. 5.3.3 Measurement uncertainty The quality of all measurement results must be quantified by an analysis of the uncertainty. 6 LAMP CLASSIFICATION For the purposes of this standard it was decided that the values shall be reported as follows: - for lamps intended for general lighting service, the hazard values shall be reported as either ir- radiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm - for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance values at a distance walues at a distance walue at a walue	5.3	Analysis methods		Р		
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performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy. 5.3.3 Measurement uncertainty The quality of all measurement results must be quantified by an analysis of the uncertainty. 6 LAMP CLASSIFICATION Por the purposes of this standard it was decided that the values shall be reported as follows: - for lamps intended for general lighting service, the hazard values shall be reported as either ir- radiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm - for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm 6.1 Continuous wave lamps Pol.1.1 Exempt Group In the exempt group are lamps, which don't pose any photobiological hazard. The requirement is met by any lamp that does not pose: - an actinic ultraviolet hazard (Es) within 8-hours exposure (30000 s), nor - a near-UV hazard (Euva) within 1000 s, (about 16 min), nor - a retinal blue-light hazard (Ls) within 10000 s	5.3.2	Calculations		Р		
The quality of all measurement results must be quantified by an analysis of the uncertainty. 6 LAMP CLASSIFICATION Por the purposes of this standard it was decided that the values shall be reported as follows: - for lamps intended for general lighting service, the hazard values shall be reported as either ir- radiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm - for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm 6.1 Continuous wave lamps Pol In the exempt group are lamps, which don't pose any photobiological hazard. The requirement is met by any lamp that does not pose: - an actinic ultraviolet hazard (Es) within 8-hours exposure (30000 s), nor - a near-UV hazard (EuvA) within 1000 s, (about 16 min), nor		performed by weighting the spectral scan by the appropriate function and calculating the total	BHILL	Р		
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For the purposes of this standard it was decided that the values shall be reported as follows: - for lamps intended for general lighting service, the hazard values shall be reported as either ir- radiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm - for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm 6.1 Continuous wave lamps P In the exempt group are lamps, which don't pose any photobiological hazard. The requirement is met by any lamp that does not pose: - an actinic ultraviolet hazard (Es) within 8-hours exposure (30000 s), nor - a near-UV hazard (EuvA) within 1000 s, (about 16 min), nor - a retinal blue-light hazard (LB) within 10000 s	7		See Annex C in the norm	Р		
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hazard values shall be reported as either ir- radiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm - for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm 6.1 Continuous wave lamps P. In the exempt group are lamps, which don't pose any photobiological hazard. The requirement is met by any lamp that does not pose: - an actinic ultraviolet hazard (Es) within 8-hours exposure (30000 s), nor - a near-UV hazard (EuvA) within 1000 s, (about 16 min), nor - a retinal blue-light hazard (Ls) within 10000 s			See table 6.1	Р		
sources, the hazard values shall be reported at a distance of 200 mm 6.1 Continuous wave lamps 6.1.1 Exempt Group In the exempt group are lamps, which don't pose any photobiological hazard. The requirement is met by any lamp that does not pose: - an actinic ultraviolet hazard (Es) within 8-hours exposure (30000 s), nor - a near-UV hazard (Euva) within 1000 s, (about 16 min), nor - a retinal blue-light hazard (LB) within 10000 s		hazard values shall be reported as either ir- radiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than		P		
In the exempt group are lamps, which don't pose any photobiological hazard. The requirement is met by any lamp that does not pose: - an actinic ultraviolet hazard (Es) within 8-hours exposure (30000 s), nor - a near-UV hazard (Euva) within 1000 s, (about 16 min), nor - a retinal blue-light hazard (LB) within 10000 s		sources, the hazard values shall be reported at a		N/A		
In the exempt group are lamps, which don't pose any photobiological hazard. The requirement is met by any lamp that does not pose: - an actinic ultraviolet hazard (Es) within 8-hours exposure (30000 s), nor - a near-UV hazard (Euva) within 1000 s, (about 16 min), nor - a retinal blue-light hazard (LB) within 10000 s	6.1	Continuous wave lamps		Р		
photobiological hazard. The requirement is met by any lamp that does not pose: - an actinic ultraviolet hazard (Es) within 8-hours exposure (30000 s), nor - a near-UV hazard (Euva) within 1000 s, (about 16 min), nor - a retinal blue-light hazard (LB) within 10000 s	6.1.1	Exempt Group		Р		
exposure (30000 s), nor - a near-UV hazard (EuvA) within 1000 s, (about 16 min), nor - a retinal blue-light hazard (LB) within 10000 s		photobiological hazard. The requirement is met by		Р		
nor - a retinal blue-light hazard (L _B) within 10000 s		, ,	BH	Р		
				Р		
	B	, ,	- 174	Р		



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	 a retinal thermal hazard (LR) within 10 s, nor 		Р
71-	 an infrared radiation hazard for the eye (E_{IR}) within 1000 s 		Р
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:	19H7	N/A
	an actinic ultraviolet hazard (Es) within 10000 s, nor		N/A
	 a near ultraviolet hazard (Euva) within 300 s, nor 		N/A
	 a retinal blue-light hazard (L_B) within 100 s, nor 		N/A
	 a retinal thermal hazard (LR) 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 ret- inal hazard (Lirk), within 100 s are in Risk Group 1.		N/A
6.1.3	Risk Group 2 (Moderate-Risk)	131	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 (Es) within 1000 s exposure, nor		N/A
	 a near ultraviolet hazard (Euva) within 100 s, nor 		N/A
	 a retinal blue-light hazard (Lв) within 0,25 s (aversion response), nor 		N/A
	 a retinal thermal hazard (LR) within 0,25 s (aver- sion response), nor 	DUTL	N/A
	 an infrared radiation hazard for the eye (E_{IR}) within 10 s 	3.	N/A
HTL	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared ret- inal hazard (Lirk), 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
13	Pulse lamp criteria shall apply to a single pulse and to any group of pulses within 0,25 s.	-174	N/A



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Clause	Requirement + Test	Result – Remark	Verdict
	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) 	BH.	N/A
BH	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 - Rema	ark Verdict
Table 4.1	Spectral weig	hting function for assessing ultrav	violet hazards for skin and	eye
Wave	elength [,] λ, m	UV hazard function S _w (λ)	Wavelength λ, nm	UV hazard function S _w (λ)
2	200	0,030	313*	0,006
2	205	0,051	315	0,003
2	210	0,075	316	0,0024
2	215	0,095	317	0,0020
2	220	0,120	318	0,0016
2	225	0,150	319	0,0012
2	230	0,190	320	0,0010
2	235	0,240	322	0,00067
2	240	0,300	323	0,00054
245 250		0,360	325	0,00050
		0,430	328	0,00044
2	54*	0,500	330	0,00041
2	255	0,520	333*	0,00037
2	260	0,650	335	0,00034
2	265	0,810	340	0,00028
2	270	1,000	345	0,00024
2	275	0,960	350	0,00020
2	80*	0,880	355	0,00016
2	285	0,770	360	0,00013
2	290	0,640	365*	0,00011
2	295	0,540	370	0,000093
2	97*	0,460	375	0,000077
300		0,300	380	0,000064
3	03*	0,120	385	0,000053
3	305	0,060	390	0,000044
3	308	0,026	395	0,000036
3	310	0,015	400	0,000030

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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Table 4.2	Spectral weighting	functions for assessing retinal haza	ards	from br	oadband optical sources	N/A
1	Wavelength nm	Blue-light hazard funct Β (λ)	tion		Burn hazard functio R (λ)	on
	300	0,01				
	305	0,01				
	310	0,01				
	315	0,01		190		
	320	0,01				
	325	0,01				
0	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		-1-	0,5	
	400	0,10	X_{-1}		1,0	
	405	0,20			2,0	177
	410	0,40			4,0	
	415	0,80			8,0	
	420	0,90			9,0	
	425	0,95			9,5	
	430	0,98		- 45	9,8	
	435	1,00		ALA	10,0	
	440	1,00			10,0	
	445	0,97			9,7	
	450	0,94			9,4	
	455	0,90			9,0	
1	460	0,80			8,0	
	465	0,70			7,0	
	470	0,62			6,2	
	475	0,55		1	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-\)/50]			1,0	



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Table 4.2	Spectral weighting fu	nctions for assessing retina	I hazards from broadband optical sources	N/A	
	600-700	0,001	1,0		
	700-1050		10[(700-λ)/500]		
1050-1150			0,2		
	1150-1200	2)	0,2.10 ^{0,02} (1150-λ)		
	1200-1400		0,02		

Summary of the ELs for the	surface of the skin o	or cornea (irradia	ince based vali	ues) P
Relevant equation	Wavelength range nm	Exposure duration sec	Limiting aperture rad (deg)	EL in terms of con stant irradiance W•m-2
$E_{S} = \sum E_{\lambda} \bullet S(\lambda) \bullet \Delta \lambda$	200 – 400	< 30000	1,4 (80)	30/t
Ευνα = ΣΕλ • Δλ	315 – 400	≤1000 >1000	1,4 (80)	10000/t 10
$E_B = \sum E_\lambda \bullet B(\lambda) \bullet \Delta \lambda$	300 – 700	≤100 >100	< 0,011	100/t 1,0
$E_IR = \sum E_\lambda \bullet \Delta \lambda$	780 –3000	≤1000 >1000	1,4 (80)	18000/t ^{0,75} 100
$E_H = \sum E_\lambda \bullet \Delta \lambda$	380 – 3000	< 10	2π sr	20000/t ^{0,75}
	Relevant equation $E_{S} = \sum E_{\lambda} \cdot S(\lambda) \cdot \Delta \lambda$ $E_{UVA} = \sum E_{\lambda} \cdot \Delta \lambda$ $E_{B} = \sum E_{\lambda} \cdot B(\lambda) \cdot \Delta \lambda$ $E_{IR} = \sum E_{\lambda} \cdot \Delta \lambda$	Relevant equationWavelength range nm $E_S = \sum E_{\lambda} \cdot S(\lambda) \cdot \Delta \lambda$ $200 - 400$ $E_{UVA} = \sum E_{\lambda} \cdot \Delta \lambda$ $315 - 400$ $E_B = \sum E_{\lambda} \cdot B(\lambda) \cdot \Delta \lambda$ $300 - 700$ $E_{IR} = \sum E_{\lambda} \cdot \Delta \lambda$ $780 - 3000$	Relevant equationWavelength range nmExposure duration sec $E_S = \sum E_{\lambda} \cdot S(\lambda) \cdot \Delta \lambda$ $200 - 400$ < 30000 $E_{UVA} = \sum E_{\lambda} \cdot \Delta \lambda$ $315 - 400$ ≤ 1000 >1000 $E_B = \sum E_{\lambda} \cdot B(\lambda) \cdot \Delta \lambda$ $300 - 700$ ≤ 100 >100 $E_{IR} = \sum E_{\lambda} \cdot \Delta \lambda$ $780 - 3000$ ≤ 1000 >1000	Relevant equation range nm duration sec aperture rad (deg) $E_S = \sum E_{\lambda} \cdot S(\lambda) \cdot \Delta \lambda$ $200 - 400$ < 30000 $1,4 (80)$ $E_{UVA} = \sum E_{\lambda} \cdot \Delta \lambda$ $315 - 400$ $\frac{1000}{1000}$ $\frac{1}{1000}$ $E_B = \sum E_{\lambda} \cdot B(\lambda) \cdot \Delta \lambda$ $\frac{1}{1000}$ $\frac{1}{1000}$ $\frac{1}{1000}$ $E_{IR} = \sum E_{\lambda} \cdot \Delta \lambda$ $\frac{1}{1000}$ $\frac{1}{1000}$ $\frac{1}{1000}$ $\frac{1}{1000}$ $\frac{1}{1000}$ $\frac{1}{1000}$ $\frac{1}{1000}$

Table 5.5	Sum	nmary of the ELs for the r	Р				
Hazard Name		Relevant equation	Wavelength range nm	Exposure duration sec	Field of view radians	EL in terms of constant radiance W•m-2•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•√(t/10) 0,011 0,0011•√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•√(t/10)	50000/(α•t ^{0,25}) 50000/(α•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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		NUT	le le	EC 62471					
Clause	Requiremen	nt + Test		Result – Remark					
Table 6.1	Emission limits for risk groups of continuous wave lamps								Р
Risk		Symbol	Units	Emission Measurement					
	Action spectrum			Exempt		Low	Low risk		isk
	oposii aiii			Limit	Result	Limit	Result	Limit	Result
Actinic UV	Sυν(λ)	Es	W•m⁻²	0,001	1.37e-05	0,003	-	0,03	-
Near UV		Euva	W•m⁻²	10	2.69e-03	33	-	100	
Blue light	Β(λ)	L _B	W•m-2•sr-1	100	2.40e+0	1 10000	-	4000000	-
Blue light, small source	Β(λ)	Ев	W•m-2	1,0*	-	1,0	DI-J.	400	-
Retinal thermal	R(\lambda)	LR	W•m-2•sr-1	28000/α	6.16e+0	2 28000/α	-	71000/α	-
Retinal thermal, weak visual stimulus**	R(\lambda)	Lir	W•m ⁻² •sr ⁻¹	6000/α	6.15e-0	2 6000/α	- 1	6000/α	-
IR radia- tion, eye	191	EIR	W•m-2	100	8.05e-04	570	-	3200	-

^{*} Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0.1 radian. ** Involves evaluation of non-GLS source



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100	00 4 T 4 D	
167	ピンハ / 1 日	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: IECEE OD-2020-F2:2020, 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) EXPOSURE LIMITS						
4							
	Contents of the whole Clause 4 of IEC 62471:2006 moved into a new informative Annex ZB	_					
	Clause 4 replaced by the following:	Р					
_	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 Ra- diation 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	N/A					
	Delete the first paragraph.						



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			IEC 62471E	B ATTACHM	ENT	- 1				
Clause	Requireme	nt + Test		Result – Remark					Verdict	
Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC)									
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	Sυv(λ)	Es	W•m⁻²	0,001	1.37e-05	_	-	-	-	
Near UV		Euva	W•m-2	0,33	2.69e-03	-	-	-	-	
Blue light	Β(λ)	Lв	W•m-2•sr-1	100	2.40e+01	10000	-	4000000	-	
Blue light, small source	Β(λ)	Ев	W•m⁻²	0,01	-	1,0	1.5	400	-	
Retinal thermal	R(λ)	LR	W•m-2•sr-1	28000/α	6.16e+02	28000/α	-	71000/α	-	
Retinal thermal,	R(λ)	Lir	W•m-2•sr-1	545000 0,0017≤ α ≤ 0,011	17≤ -				×	
weak visual stimulus**		171-		6000/α 0,011≤ α ≤ 0,1	0.00e+00					
IR radiation, eye		EiR	W•m⁻²	100	8.05e-04	570	-	3200	17-1-	

Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0.1 radian.

NOTE The action functions: see Table 4.1 and Table 4.2 The

applicable aperture diameters: see 4.2.1

The limitations for the angular subtenses: see 4.2.2

The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5. α= 0.0740 radian.

Remark(s):

Possible test case verdicts:

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

test object does meet the requirement P (Pass)

Involves evaluation of non-GLS source



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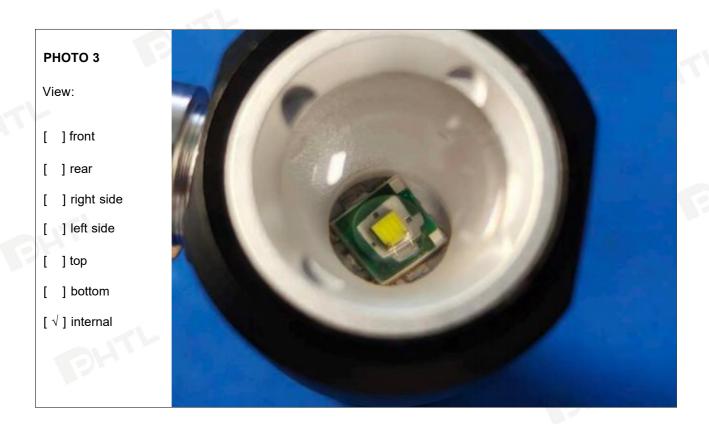
Appendix 1
Photo Documentation







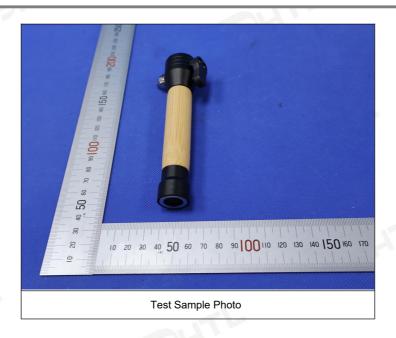
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Photo(s):



<<<< END OF REPORT >>>>>

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