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| TEST REPORT IEC 62471 Photobiological safety of lamps and lamp systems | |
| Report Reference No. : | GZES180900006131 |
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| Total number of pages : | 23 |
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| Test specification: | |
| Standard : | <input type="checkbox"/> IEC 62471: 2006 (First Edition) <input checked="" type="checkbox"/> EN 62471: 2008 |
| Test procedure : | SGS-CSTC / Test report |
| Non- 2 52 6 > 6 9 5 | N/A |
| Test Report Form No. : | IEC62471A |
| TRF Originator : | VDE Testing and Certification Institute |
| Master TRF : | Dated 2009-05 |
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| Test item description : | LED |
| Trade Mark : | |
| Manufacturer : | Same as applicant |
| Model/Type reference : | TX-R3A140, TX-G3A14, TX-B3A140, TX-Y3A140, TX-W3A140 |
| Ratings : | DC 600 mA |



| | |
|---|--|
| Testing procedure and testing location: | |
| <input checked="" type="checkbox"/> Testing Laboratory: Testing location/ address : <input type="checkbox"/> Associated CB Laboratory: Testing location/ address : Tested by (name + signature)..... : Approved by (+ signature) : | SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch 198 Kezhu Road, Science City, Economic & Technology Development Area, Guangzhou, Guangdong, China N/A Simon Chen Alex Tan |
| <input type="checkbox"/> Testing procedure: TMP Tested by (name + signature)..... : Approved by (+ signature) : Testing location/ address : | N/A |
| <input type="checkbox"/> Testing procedure: WMT Tested by (name + signature)..... : Witnessed by (+ signature)..... : Approved by (+ signature) : Testing location/ address : | N/A |
| <input type="checkbox"/> Testing procedure: SMT Tested by (name + signature)..... : Approved by (+ signature) : Supervised by (+ signature)..... : Testing location/ address : | N/A |
| <input type="checkbox"/> Testing procedure: RMT Tested by (name + signature)..... : Approved by (+ signature) : Supervised by (+ signature)..... : Testing location/ address : | N/A |



Summary of testing:

The tests were conducted under 600 mA powered by DC current source.

Models TX-R3A140, TX-G3A14, TX-Y3A140 were tested and found to meet the requirement of Exempt Group according to EN 62471: 2008

Models TX-B3A140, TX-W3A140 were tested and found to meet the requirement of Risk Group 1 according to EN 62471: 2008

The test data is based on report GZES141201504431.

Tests performed (name of test and test clause):

All applicable test items.

Testing location:

198 Kezhu Road, Science City, Economic & Technology Development Area, Guangzhou, Guangdong, China

Summary of compliance with National Differences:

European Group Differences and National Differences for EN 62471: 2008 were taken into account.

Copy of marking plate:

Test item particulars..... :

Tested lamp..... : continuous wave lamps pulsed lamps

Tested lamp system :

Lamp classification group : For models TX-R3A140, TX-G3A14, TX-Y3A140
 exempt
For models TX-B3A140, TX-W3A140
 risk 1

Lamp cap :

Bulb :

Rated of the lamp :

Furthermore marking on the lamp..... :

Seasoning of lamps according IEC standard :

Used measurement instrument :

Temperature by measurement : 25 ± 5 °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..... : 2014-12-23

Date (s) of performance of tests : 2014-12-23 to 2014-12-29

General remarks:

The test results presented in this report relate only to the object tested.
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"(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 comma (point) is used as the decimal separator.
List of test equipment must be kept on file and available for review.
When determining for test conclusion, measurement uncertainty of tests has been considered.
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General product information:

Model TX-R3A140 can emit red light when powered.
Model TX-G3A14 can emit green light when powered.
Model TX-B3A140 can emit blue light when powered.
Model TX-Y3A140 can emit yellow light when powered.
Model TX-W3A140 can emit white light when powered.

| IEC 62471 | | | | |
|-----------|---|----------------|--------|---------|
| Clause | Requirement + Test | Result | Remark | Verdict |
| 4 | EXPOSURE LIMITS | | | N/A |
| 4.1 | General | | | N/A |
| | 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 | | | N/A |
| | 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 | | N/A |
| 4.3 | Hazard exposure limits | | | N/A |
| 4.3.1 | Actinic UV hazard exposure limit for the skin and eye | | | N/A |
| | The exposure limit for effective radiant exposure is $30 \text{ J}\cdot\text{m}^{-2}$ within any 8-hour period | | | N/A |
| | To protect against injury of the eye or skin from ultraviolet radiation exposure produced by a broad-band source, the effective integrated spectral irradiance, E_s , of the light source shall not exceed the levels defined by: | | | N/A |
| | $E_s \cdot t = \sum_{200}^{400} \sum_t E_\lambda(\lambda, t) \cdot S_{UV}(\lambda) \cdot \Delta t \cdot \Delta \lambda \leq 30 \quad \text{J}\cdot\text{m}^{-2}$ | | | N/A |
| | The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye or skin shall be computed by: | | | N/A |
| | $t_{\max} = \frac{30}{E_s} \quad \text{s}$ | | | N/A |

| IEC 62471 | | | | |
|-----------|--|--------|-----------------------------------|---------|
| Clause | Requirement + Test | Result | Remark | Verdict |
| | $L_B \cdot t = \sum_{300}^{700} \sum_t L_\lambda(\lambda, t) \cdot B(\lambda) \cdot \Delta\lambda \leq 10^6 \quad \text{J} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$ | 7 C | 4 s $t_{\max} = \frac{10^6}{L_B}$ | N/A |
| | $L_B = \sum_{300}^{700} L_\lambda \cdot B(\lambda) \cdot \Delta\lambda \leq 100 \quad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$ | | for t > 10 ⁴ s | N/A |
| 4.3.4 | Retinal blue light hazard exposure limit - small source | | | N/A |
| | Thus the spectral irradiance at the eye E, weighted against the blue-weighting function B(λ) (from Figure 4.2 and Table 4.2), i.e., the burn hazard weighted radiance, shall not exceed the levels defined by: | | see table 4.2 | N/A |
| | $E_B \cdot t = \sum_{300}^{700} \sum_t E_\lambda(\lambda, t) \cdot B(\lambda) \cdot \Delta\lambda \leq 100 \quad \text{J} \cdot \text{m}^{-2}$ | 7 C | | N/A |
| | $E_B = \sum_{300}^{700} E_\lambda \cdot B(\lambda) \cdot \Delta\lambda \leq 1 \quad \text{W} \cdot \text{m}^{-2}$ | | for t > 100 s | N/A |
| 4.3.5 | Retinal thermal hazard exposure limit | | | N/A |
| | To protect against retinal thermal injury, the integrated spectral radiance of the light source, L, weighted by the burn hazard weighting function R(λ) (from Figure 4.2 and Table 4.2), i.e., the burn hazard weighted radiance, shall not exceed the levels defined by: | | | N/A |
| | $L_R = \sum_{380}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{50\,000}{\alpha \cdot t^{0,25}} \quad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$ | | | N/A |
| 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 |
| | $L_{IR} = \sum_{780}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{6\,000}{\alpha \cdot t^{0,25}} \quad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$ | | t > 10 s | N/A |
| 4.3.7 | Infrared radiation hazard exposure limits for the eye | | | N/A |
| | 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: | | | N/A |
| | $E_{IR} = \sum_{780}^{3000} E_\lambda \cdot \Delta\lambda \leq 18\,000 \cdot t^{-0,75} \quad \text{W} \cdot \text{m}^{-2}$ | | | N/A |
| | For times greater than 1000 s the limit becomes: | | | N/A |

| IEC 62471 | | | | |
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| Clause | Requirement + Test | Result | Remark | Verdict |
| | $E_{IR} = \sum_{380}^{3000} E_{\lambda} \cdot \Delta\lambda \leq 1000 \text{ W} \cdot \text{m}^{-2}$ | t > 1000 s | | N/A |
| 4.3.8 | Thermal hazard exposure limit for the skin | | | N/A |
| | Visible and infrared radiant exposure (380 nm to 3000 nm) of the skin shall be limited to: | | | N/A |
| | $E_{H,t} = \sum_{380}^{3000} \sum_t E_{\lambda}(\lambda,t) \cdot \Delta t \cdot \Delta\lambda \leq 20000 \cdot t^{0,25} \text{ J} \cdot \text{m}^{-2}$ | | | N/A |
| 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. | | | 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 2AAC AC2 6 2 : 2= 2 525 C > 2 74 6C recommendations. | | | P |
| 5.1.3 | Extraneous radiation | | | P |
| | Careful checks should be made to ensure that extraneous sources of radiation and reflections do not add significantly to the measurement results. | | | P |
| 5.1.4 | Lamp operation | | | P |
| | Operation of the test lamp shall be provided in accordance with: | | | P |
| | the appropriate IEC lamp standard, or | | | N/A |
| | 96 > 2 74 6C 64 > > 6 52 : | | | P |
| 5.1.5 | Lamp system operation | | | P |
| | The power source for operation of the test lamp shall be provided in accordance with: | | | P |
| | the appropriate IEC standard, or | | | N/A |
| | 96 > 2 74 6C 64 > > 6 52 : n | | | P |
| 5.2 | Measurement procedure | | | P |
| 5.2.1 | Irradiance measurements | | | P |
| | Minimum aperture diameter 7mm. | | | P |

| IEC 62471 | | | | |
|-----------|--|-------------------------|--------|----------|
| Clause | Requirement + Test | Result | Remark | Verdict |
| | 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 | | | 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 | | | P |
| | 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. | | | P |
| 5.2.3 | Measurement of source size | | | P |
| | For a source, requires the determination of the 50% emission points of the source. | | | P |
| 5.2.4 | Pulse width measurement for pulsed sources | | | N/A |
| | For a source, requires the determination of the time during which the emission is > 50% of its peak value. | | | N/A |
| 5.3 | Analysis methods | | | P |
| 5.3.1 | Weighting curve interpolations | | | P |
| | To standardize interpolated values, use linear interpolation on the log of given values to obtain intermediate points at the wavelength intervals desired. | see table 4.1 | | P |
| 5.3.2 | Calculations | | | P |
| | The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy. | | | P |
| 5.3.3 | Measurement uncertainty | | | P |
| | The quality of all measurement results must be quantified by an analysis of the uncertainty. | see Annex C in the norm | | P |
| 6 | LAMP CLASSIFICATION | | | P |

| IEC 62471 | | | | |
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| Clause | Requirement + Test | Result | Remark | Verdict |
| | For the purposes of this standard it was decided that the values shall be reported as follows: | see table 6.1 | | P |
| | <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</p> <p>for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm</p> | | | N/A |

| IEC 62471 | | | | |
|-----------|--|--------|--------|---------|
| Clause | Requirement + Test | Result | Remark | Verdict |
| | 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 |
| | Pulse lamp criteria shall apply to a single pulse and to any group of pulses within 0,25 s. | | | N/A |
| | A pulsed lamp shall be evaluated at the highest nominal energy loading as specified by the manufacturer. | | | N/A |
| | The risk group determination of the lamp being tested shall be made as follows: | | | N/A |
| | a lamp that exceeds the exposure limit shall be classified as belonging to Risk Group 3 (High-Risk) | | | N/A |
| | for single pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance does is below the EL shall be classified as belonging to the Exempt Group | | | N/A |
| | for repetitively pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance dose is below the EL, shall be evaluated using the continuous wave risk criteria discussed in clause 6.1, using time averaged values of the pulsed emission | | | N/A |
| | | | | |

| IEC 62471 | | | | |
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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 | UV hazard function S _{uv} | Wavelength | UV hazard function S _{uv} | |
| 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.

| IEC 62471 | | | | |
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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 | Burn hazard function |
|------------------|----------------------------|------------------------------|
| 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 | $10^{(450-)}$ | 1,0 |
| 600-700 | 0,001 | 1,0 |
| 700-1050 | | $10^{(700-)}$ |
| 1050-1150 | | 0,2 |
| 1150-1200 | | $0,2 \cdot 10^{0,02(1150-)}$ |
| 1200-1400 | | 0,02 |

| IEC 62471 | | | | |
|-----------|--------------------|--------|--------|---------|
| Clause | Requirement + Test | Result | Remark | Verdict |

| Table 5.4 Summary of the ELs for the surface of the skin or cornea (irradiance based values) | | | | | | P |
|--|-------------------|---------------------|-----------------------|-----------------------------|---|---|
| Hazard Name | Relevant equation | Wavelength range nm | Exposure duration sec | Limiting aperture rad (deg) | EL in terms of constant irradiance $W m^{-2}$ | |
| Actinic UV skin & eye | E_S | 200 400 | < 30000 | 1,4 (80) | 30/t | |
| Eye UV-A | E_{UVA} | 315 400 | >1000 | 1,4 (80) | 10000/t 10 | |
| Blue-light small source | E_B | 300 700 | >100 | < 0,011 | 100/t 1,0 | |
| Eye IR | E_{IR} | 780 3000 | >1000 | 1,4 (80) | 18000/t ^{0,75} 100 | |
| Skin thermal | E_H | 380 3000 | < 10 | C | 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 $W m^{-2} sr^{-1}$ | |
| Blue light | L_B | 300 700 | 0,25 10 | 0,011 | $10^6/t$ | |
| | | | 10-100 | | $10^6/t$ | |
| Retinal thermal | L_R # | 380 1400 | < 0,25 | 0,0017 | $10^6/t$ | |
| | | | 0,25 10 | | 100 | |
| Retinal thermal (weak visual stimulus) | L_{IR} # | 780 1400 | > 10 | 0,011 | | |

| IEC 62471 | | | | |
|-----------|--------------------|--------|--------|---------|
| Clause | Requirement + Test | Result | Remark | Verdict |

| Table 6.1 | | Emission limits for risk groups of continuous wave lamps | | | | | | | N/A | |
|------------|-----------------|--|-------------------|----------------------|--------|----------|--------|----------|--------|--|
| Risk | Action spectrum | Symbol | Units | Emission Measurement | | | | | | |
| | | | | Exempt | | Low risk | | Mod risk | | |
| | | | | Limit | Result | Limit | Result | Limit | Result | |
| Actinic UV | S _{UV} | E _s | (> ⁻² | 0,001 | | 0,003 | | 0,03 | | |
| Near UV | | E _{UVA} | (> ⁻² | 10 | | 33 | | 100 | | |

Blue light

L_{Bf}*373.08

Attachment: European Group Differences And National Differences of IEC 62471

| Clause | Requirement + Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
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Attachment: European Group Differences And National Differences of IEC 62471

| Clause | Requirement + Test | Result | Remark | Verdict |
|--------|--------------------|--------|--------|---------|
|--------|--------------------|--------|--------|---------|

| Table 6.1 | | Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC) For model TX-R3A140 | | | | | | | P |
|---|-----------------|--|----------------------------------|-------------------------|--------|----------|--------|----------|--------|
| Risk | Action spectrum | Symbol | Units | Emission Measurement | | | | | |
| | | | | Exempt | | Low risk | | Mod risk | |
| | | | | Limit | Result | Limit | Result | Limit | Result |
| Actinic UV | S _{UV} | E _s | (> ⁻² | 0,001 | 0 | | | | |
| Near UV | | E _{UVA} | (> ⁻² | 0,33 | 0 | | | | |
| Blue light | | L _B | (> ⁻² C ¹ | 100 | 0,3 | 10000 | | 4000000 | |
| Blue light, small source | | E _B | (> ⁻² | 0,01* | | 1,0 | | 400 | |
| Retinal thermal | # | L _R | (> ⁻² C ¹ | | 16032 | | | | |
| Retinal thermal, weak visual stimulus** | # | L _{IR} | (> ⁻² C ¹ | 545000 | | | | | |
| IR radiation, eye | | E _{IR} | (> ⁻² | 100 | 0 | 570 | | 3200 | |
| Skin thermal | | E _H | (> ⁻² | 20000/t ^{0.75} | | | | 0 | |

* > 2= 46 567 65 2 6 :9 25:2 628: 8 765 7 :6 2 : 25:2

** Involves evaluation of non-GLS source

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.

Attachment: European Group Differences And National Differences of IEC 62471

| Clause | Requirement + Test | Result | Remark | Verdict |
|--------|--------------------|--------|--------|---------|
|--------|--------------------|--------|--------|---------|

| Table 6.1 | | Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC) For model TX-G3A14 | | | | | | | P |
|------------------|-----------------|---|----------------------------------|----------------------|--------|----------|--------|----------|--------|
| Risk | Action spectrum | Symbol | Units | Emission Measurement | | | | | |
| | | | | Exempt | | Low risk | | Mod risk | |
| | | | | Limit | Result | Limit | Result | Limit | Result |
| Actinic UV | S _{UV} | E _s | (> ⁻² | 0,001 | 0 | | | | |
| Near UV | | E _{UVA} | (> ⁻² | 0,33 | 0 | | | | |
| Blue light | | L _B | (> ⁻² C ¹ | 100 | | | | | |

Attachment: European Group Differences And National Differences of IEC 62471

| Clause | Requirement + Test | Result | Remark | Verdict |
|--------|--------------------|--------|--------|---------|
|--------|--------------------|--------|--------|---------|

| Table 6.1 | | Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC) For model TX-B3A140 | | | | | | | P |
|---|-----------------|--|----------------------------------|-------------------------|--------|----------|--------|----------|--------|
| Risk | Action spectrum | Symbol | Units | Emission Measurement | | | | | |
| | | | | Exempt | | Low risk | | Mod risk | |
| | | | | Limit | Result | Limit | Result | Limit | Result |
| Actinic UV | S _{UV} | E _s | (> ⁻² | 0,001 | 0 | | | | |
| Near UV | | E _{UVA} | (> ⁻² | 0,33 | 0,01 | | | | |
| Blue light | | L _B | (> ⁻² C ¹ | 100 | 241 | 10000 | 6239 | 4000000 | |
| Blue light, small source | | E _B | (> ⁻² | 0,01* | | 1,0 | | 400 | |
| Retinal thermal | # | L _R | (> ⁻² C ¹ | | 62393 | | | | |
| Retinal thermal, weak visual stimulus** | # | L _{IR} | (> ⁻² C ¹ | 545000 | | | | | |
| IR radiation, eye | | E _{IR} | (> ⁻² | 100 | 0 | 570 | | 3200 | |
| Skin thermal | | E _H | (> ⁻² | 20000/t ^{0.75} | | | 0 | | |

* > 2= 46 567 65 2 6 : 9 25:2 628: 8 765 7 :6 2 0 s is 0,1 radian.

** Involves evaluation of non-GLS source

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.

Attachment: European Group Differences And National Differences of IEC 62471

| Clause | Requirement + Test | Result | Remark | Verdict |
|--------|--------------------|--------|--------|---------|
|--------|--------------------|--------|--------|---------|

| Table 6.1 | | Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC) For model TX-Y3A140 | | | | | | | P |
|---|-----------------|--|----------------------------------|----------------------|--------|----------|--------|----------|--------|
| Risk | Action spectrum | Symbol | Units | Emission Measurement | | | | | |
| | | | | Exempt | | Low risk | | Mod risk | |
| | | | | Limit | Result | Limit | Result | Limit | Result |
| Actinic UV | S _{UV} | E _s | (> ⁻² | 0,001 | 0 | | | | |
| Near UV | | E _{UVA} | (> ⁻² | 0,33 | 0 | | | | |
| Blue light | | L _B | (> ⁻² C ¹ | 100 | 0,2 | 10000 | | 4000000 | |
| Blue light, small source | | E _B | (> ⁻² | 0,01* | | 1,0 | | 400 | |
| Retinal thermal | # | L _R | (> ⁻² C ¹ | | 686,7 | | | | |
| Retinal thermal, weak visual stimulus** | # | L _{IR} | (> ⁻² C ¹ | 545000 | | | | | |

IR radiation,
eye

Attachment: European Group Differences And National Differences of IEC 62471

| Clause | Requirement + Test | Result | Remark | Verdict |
|--------|--------------------|--------|--------|---------|
|--------|--------------------|--------|--------|---------|

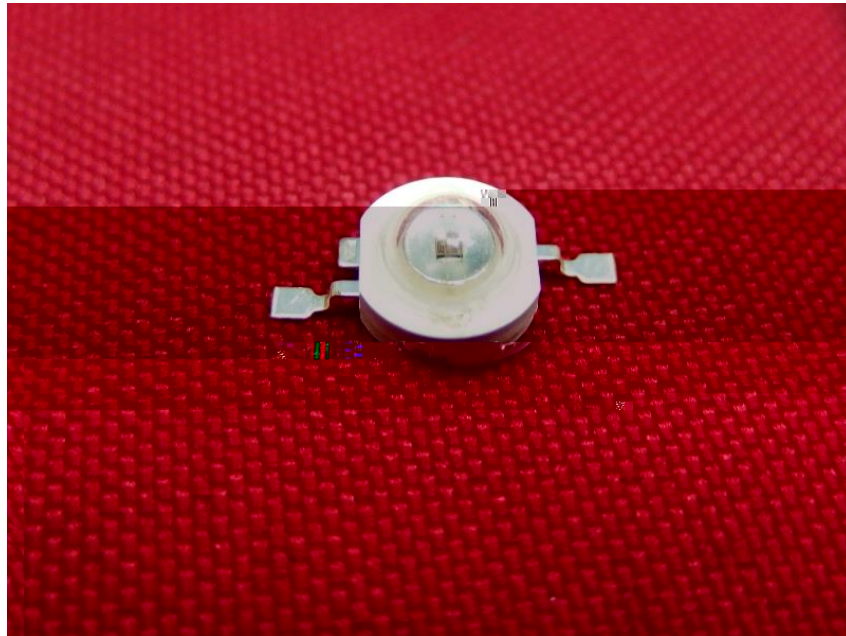
| Table 6.1 | | Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC) For model TX-W3A140 | | | | | | | P |
|---|-----------------|--|----------------------------------|-------------------------|--------|----------|--------|----------|--------|
| Risk | Action spectrum | Symbol | Units | Emission Measurement | | | | | |
| | | | | Exempt | | Low risk | | Mod risk | |
| | | | | Limit | Result | Limit | Result | Limit | Result |
| Actinic UV | S _{UV} | E _s | (> ⁻² | 0,001 | 0 | | | | |
| Near UV | | E _{UVA} | (> ⁻² | 0,33 | 0 | | | | |
| Blue light | | L _B | (> ⁻² C ¹ | 100 | 133 | 10000 | 3768,4 | 4000000 | |
| Blue light, small source | | E _B | (> ⁻² | 0,01* | | 1,0 | | 400 | |
| Retinal thermal | # | L _R | (> ⁻² C ¹ | 2 | 42642 | | | | |
| Retinal thermal, weak visual stimulus** | # | L _{IR} | (> ⁻² C ¹ | 545000 | | | | | |
| IR radiation, eye | | E _{IR} | (> ⁻² | 100 | 0 | 570 | | 3200 | |
| Skin thermal | | E _H | (> ⁻² | 20000/t ^{0.75} | | | 0 | | |

*

Details of: View for model TX-R3A140

View:

- general
- front
- rear
- right
- left
- top
- bottom



Details of: View for model TX-G3A14

View:

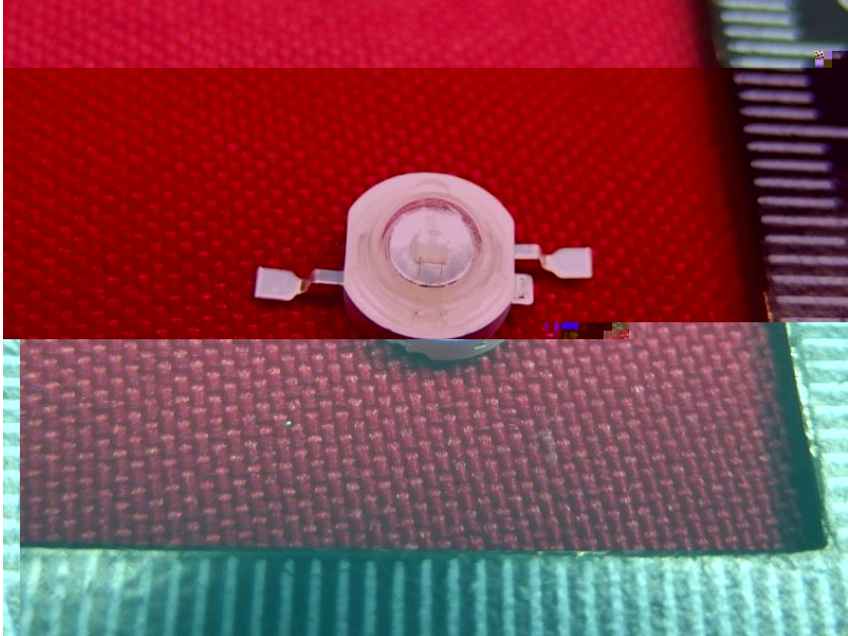
- general
- front
- rear
- right
- left
- top
- bottom



Details of: View for model TX-B3A140

View:


- general
- front
- rear
- right
- left
- top
- bottom



Details of: View for model TX-Y3A140

View:

- general
- front
- rear
- right
- left
- top
- bottom



Details of: View for model TX-W3A140

View:

- general
- front
- rear
- right
- left
- top
- bottom



End of report