

# Test Report

Report No.: GZEE230900350431

Date: 2023-09-25

The following sample(s) was/were submitted and identified on behalf of the client as:

Applicant: Guangzhou Tianxin Photoelectric Co., Ltd.  
#15-1JinGu Road South, Xiutang, Huadong Town, Huadu District, Guangzhou, Guangdong, China

Manufacturer: Same as Applicant

Factory: Same as Applicant

Testing location/address: SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch  
198 Kezhu Road, Science City, Economic & Technology Development Area, Guangzhou, Guangdong, China

Standard(s): IEC 62471-7: 2023  
Photobiological safety of lamps and lamp systems – Part 7: Light sources and luminaires primarily emitting visible radiation

Test item description: Tunable White COB

Trade Mark/Brand: TYANSHINE

Model/Type reference: TX-H1309

Ratings: DC 500 mA (250 mA for each colour), 33-37 V

Test result: See page 11.

Remark: Throughout this report a comma is used as the decimal separator.

Alex Tan  
Reviewer  
E&E Safety Laboratory

Venice Liu  
Project Engineer



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<b>Copy of marking plate</b>	
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<b>Summary of testing:</b> The LED chip was tested under 500mA DC (250mA for each colour). The test was conducted with both colour turned on.	
<b>Use of uncertainty of measurement for decisions on conformity (decision rule) :</b> No decision rule is specified by the standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").	
<b>Test item particulars .....</b>	
<b>Product evaluated .....</b>	<input checked="" type="checkbox"/> Light source <input type="checkbox"/> Luminaire
<b>Blue light hazard Application Group.....</b>	<input type="checkbox"/> BLH-A: <input type="checkbox"/> BLH-B: <input type="checkbox"/> BLH-C: <input type="checkbox"/> BLH-D:
<b>Component report data used .....</b>	<input checked="" type="checkbox"/> Not applicable <input type="checkbox"/> LED package <input type="checkbox"/> LED module <input type="checkbox"/> Lamp
Report number: N/A	
<b>Possible test case verdicts:</b>	
- test case does not apply to the test object : N/A	
- test object does meet the requirement .....	
- test object does not meet the requirement : F (Fail)	
<b>Testing</b>	
Date of receipt of test item .....	2023-09-13
Date (s) of performance of tests .....	2023-09-13 to 2023-09-22
<b>General product information:</b>	
This LED chip can emit warm and cold white light. The test was conducted with both colour turned on.	



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IEC 62471-7			
Clause	Requirement + Test	Result - Remark	Verdict
<b>4</b>	<b>Optical radiation hazards of light sources and luminaires</b>		<b>P</b>
	The hazards considered in this document are summarized in Table 1 and described in detail in the remainder		<b>P</b>
	If measurements are necessary, they shall be carried out in accordance with IEC 62471:2006 unless otherwise specified in this document.		<b>P</b>
	For light sources with pulse width modulation (PWM), emission levels of continuous light (continuous wave (CW)) are applied.		<b>N/A</b>
	For luminaires with adjustable beam angle the most severe condition shall be selected for each assessment.		<b>N/A</b>
	The evaluation of a luminaire is understood to mean the evaluation of a luminaire with the intended normal use of the specified light sources or with the light sources installed		<b>P</b>
<b>5</b>	<b>Actinic UV hazards exposure for skin and eye (200 nm to 400 nm)</b>		<b>P</b>
5.2	Actinic UV assessment for light sources		<b>P</b>
	Light sources shall be assessed and classified according to the three ranges as follows:		<b>P</b>
	a) $K_{S,V} \leq 2 \text{ mW} \cdot \text{klm}^{-1}$		<b>P</b>
	b) $2 \text{ mW} \cdot \text{klm}^{-1} < K_{S,V} \leq 6 \text{ mW} \cdot \text{klm}^{-1}$		<b>N/A</b>
	c) $K_{S,V} > 6 \text{ mW} \cdot \text{klm}^{-1}$		<b>N/A</b>
5.3	Actinic UV assessment for luminaires		<b>N/A</b>
	The ultraviolet hazard efficacy of luminous radiation $K_{S,V}$ of luminaires shall not exceed $2 \text{ mW} \cdot \text{klm}^{-1}$ .		<b>N/A</b>
	According to the actinic UV evaluation of the light source, the following requirements for luminaires shall be fulfilled so that the luminaire can be used without restrictions:		<b>N/A</b>
	a) For luminaires operating with light sources whose evaluation has resulted in a value $K_{S,V}$ of $\leq 2 \text{ mW} \cdot \text{klm}^{-1}$ no tests or evaluations are required.		<b>N/A</b>
	b) For luminaires operating with light sources whose evaluation has resulted in a value $2 \text{ mW} \cdot \text{klm}^{-1} < K_{S,V} \leq 6 \text{ mW} \cdot \text{klm}^{-1}$ a protective shield is required.		<b>N/A</b>



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IEC 62471-7			
Clause	Requirement + Test	Result - Remark	Verdict
	c) For luminaires operating with light sources whose evaluations have resulted in a value exceeding $K_{S,v} = 6 \text{ mW} \cdot \text{klm}^{-1}$ a protective shield or front glass is required.		N/A
	If no assessment results according to 5.2 are provided for the light source, the value of $K_{S,v}$ shall be calculated from the spectral irradiance measurements specified in IEC 62471		N/A
	Luminaires which are not able to generate an actinic UV irradiance $E_S$ higher than $0,001 \text{ W} \cdot \text{m}^{-2}$ when assessed in accordance with IEC 62471:2006 at 200 mm distance, are deemed to comply with the requirements of this Subclause 5.3		N/A
<b>6</b>	<b>UV-A hazard assessment for the eye lens (315 nm to 400 nm)</b>		<b>P</b>
6.2	UV-A light source and luminaire assessment		P
	For light sources emitting visible radiation, a cumulative direct viewing duration into the light sources is expected to be no longer than 1 000 s over the course of 8 h.		P
	No UV-A tests are necessary for light sources and luminaires except where UV-A is intentionally added to the visible light.		N/A
	Luminaires shall be assessed as they are delivered and can be used by the user – if functions cannot be switched off, they are also assessed.		N/A
	The assessment of UV-A radiation shall be carried out in the direction with the highest UV-A irradiance.		N/A
	Luminaires which are not able to generate an irradiance $E_{UV-A}$ higher than $10 \text{ W} \cdot \text{m}^{-2}$ when assessed in accordance with IEC 62471:2006 at 200 mm distance, are deemed to comply with the requirements of this Subclause 6.2.		N/A
<b>7</b>	<b>Retinal blue light hazard assessment (300 nm to 700 nm)</b>		<b>P</b>
7.2	Blue light hazard assessment for light sources		P
	Light sources are not limited to a specific application. In order to allow the transferability of the light source results for blue light hazard radiance ( $L_B$ ) to the luminaire including the same light source, the light source shall be evaluated according to the methodology described in IEC 62471 and provided for an assessment distance of 200 mm and FOV of 1,7 mrad		P



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IEC 62471-7			
Clause	Requirement + Test	Result - Remark	Verdict
	The light sources shall be operated and evaluated under conditions with the highest luminous flux		P
	When lamps are used in luminaires without additional focusing optics a FOV of 11 mrad at 200 mm distance may also be applied.		P
	The technical documentation of the light sources shall indicate the maximum blue light hazard radiance measured under the above conditions or the corresponding application group for the luminaires according to Table 2. The measured emission value $L_B$ shall be the basis for the selection of the application group according to Table 2.		N/A
7.3	Blue light hazard assessment for luminaires		N/A
	Luminaires shall comply with the emission limits given in Table 2 relevant to that application group.		N/A
	The procedure for blue light hazard assessment of luminaires is as follows:		N/A
	– Luminaires are assigned for specific applications (BLH-A to BLH-C) according to the technical design		N/A
	– Based on the exposure limits of the ICNIRP, the emission limits per application group are then specified as "Blue light radiance emission limits $L_B$ " in Table 2		N/A
	– Luminaires are evaluated at the distance specified for the application. The measured emission level shall be below the emission limit value		N/A
	If a light source is classified into an application group according to the procedure in 7.2, the data can be transferred to the luminaire without any additional test on the luminaire		N/A
	The following restrictions and permissions shall apply to the transfer of blue light hazard radiance results from the light sources to the luminaire		N/A
	– The result of a light source specified for application group BLH-A can be used in luminaires and applications of groups BLH-A, BLH-B and BLH-C, without additional measurement.		N/A
	– The result of a light source specified for application group BLH-B can be used in luminaires and applications of groups BLH-B and BLH-C, without additional measurement. A measurement of the luminaire is necessary if the light source is used in application group BLH-A.		N/A



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IEC 62471-7			
Clause	Requirement + Test	Result - Remark	Verdict
	– The result of a light source specified for application group BLH-C can be used in luminaires and applications of group BLH-C, without additional measurement. A measurement of the luminaire is necessary if the light source is used in application groups BLH-A or BLH-B.		N/A
	– If a light source is specified for application group BLH-D a measurement of the luminaire is necessary to specify the application group or a suitable assessment distance		N/A
	If a luminaire measurement is required, it shall be performed with a FOV of 11 mrad and the assessment distance (Table 2) for the luminaire application shall be used		N/A
7.4	Retinal blue light hazard assessment – Small source (300 nm to 700 nm)		N/A
	The assessment according to 7.2 is also applicable to small light sources as the radiance is measured with a 1,7 mrad FOV		N/A
	The irradiance measurement of small light sources is not transferable to the luminaire		N/A
	Luminaire does not need address the evaluation of the blue light hazard assessment of small sources with irradiance measurements		N/A
<b>8</b>	<b>Retinal thermal hazard assessment (380 nm to 1 400 nm)</b>		<b>P</b>
8.2	Retinal thermal hazard for light source assessment		P
	The retinal thermal hazard shall be considered only for white light sources with a blue light hazard radiance $L_B$ higher than $100\,000\text{ W}\cdot\text{m}^{-2}\cdot\text{sr}^{-1}$		P
	For light sources other than white light sources, the retinal thermal hazard shall be considered when the radiance in the wavelength range of 380 nm to 1 400 nm is higher than $280\,000\text{ W}\cdot\text{m}^{-2}\cdot\text{sr}^{-1}$		N/A
	The following assessment requirements apply:		P
	– The retinal thermal radiance $L_R$ of the light source shall be evaluated according to the methodology described in the IEC 62471 series and provided for an assessment distance of 200 mm and a FOV of 1,7 mrad. The measurement aperture shall be smaller than the light emitting area.		P
	– The light source shall be operated and evaluated under conditions with the highest luminous flux.		P
8.3	Retinal thermal hazard assessment for luminaire		N/A



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IEC 62471-7			
Clause	Requirement + Test	Result - Remark	Verdict
	If $L_R$ of the light source is smaller than 280 000 $W \cdot m^{-2} \cdot sr^{-1}$ no retinal thermal radiance assessment of the luminaire is necessary		N/A
	If the retinal thermal radiance $L_R$ on the light source level exceeds 280 000 $W \cdot m^{-2} \cdot sr^{-1}$ an assessment of the luminaire according to IEC 62471 at a distance of 1 000 mm is necessary for the assessment of the luminaire.		N/A
	If the measured retinal thermal radiance is lower than the relevant emission limits no further assessment is necessary. In case the emission limits at 1 000 mm are exceeded, the distance beyond which the retinal thermal radiance $L_R$ is below the emission limit, shall be measured or calculated.		N/A
	Consult the relevant product standard to determine how to inform the user or installer of a product to avoid viewing the product at shorter distances:		N/A
	If a luminaire measurement is required, it shall be performed with a FOV of 11 mrad.		N/A
8.4	Retinal thermal hazard assessment – Weak visual stimulus (780 nm to 1 400 nm)		N/A
	The retinal thermal hazard assessment with weak stimulus in the wavelength range from 780 nm to 1 400 nm is not applicable for light sources and luminaires primarily emitting visible radiation. Therefore, retinal thermal hazard testing or assessment is not necessary		N/A
<b>9</b>	<b>Infrared hazard assessment for the eye (780 nm to 3 000 nm)</b>		<b>P</b>
9.2	Light source and luminaire assessment		P
	For light sources emitting visible radiation a cumulative direct viewing duration into the light sources is expected to be not longer than 1 000 s over the course of 8 h.		P
	Infrared radiation hazard testing or assessment is not necessary		N/A
	Luminaires where IR radiation is intentionally added to the visible light shall be evaluated. Irradiance measurement procedures are given in IEC 62471		N/A
	Luminaires shall be assessed as they are delivered and can be used by the user – if non-illumination functions cannot be switched off, they are also assessed		N/A



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**Test Report**

**Report No.: GZEE230900350431**  
**Date: 2023-09-25**

IEC 62471-7			
Clause	Requirement + Test	Result - Remark	Verdict
	The assessment of infrared radiation shall be carried out in the direction with the highest infrared irradiance		P
<b>10</b>	<b>Thermal hazard assessment for the skin (380 nm to 3 000 nm)</b>		P
10.2	Light source and luminaire assessment		P
	The maximum exposure duration is specified as 10 s. The corresponding emission limit is $E_H = 3\,556\text{ W}\cdot\text{m}^{-2}$ which is so high that a thermal aversion response of humans is expected. Therefore, thermal hazard testing or assessment is not necessary.		P



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**1 Measurement conditions**

Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard. The seasoning time for fluorescent or High Intensity Discharge (HID) types is typically 100 h, 0 h for LED lamp.

The sample was measured in a dark room with ambient temperature  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$  & Max. 65 % Rh.

Measure distance:

$K_{S,V}$  : 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;

$E_s, E_{UVA}, L_R, E_{IR}$  : The hazard values shall be reported at a distance of 200 mm;

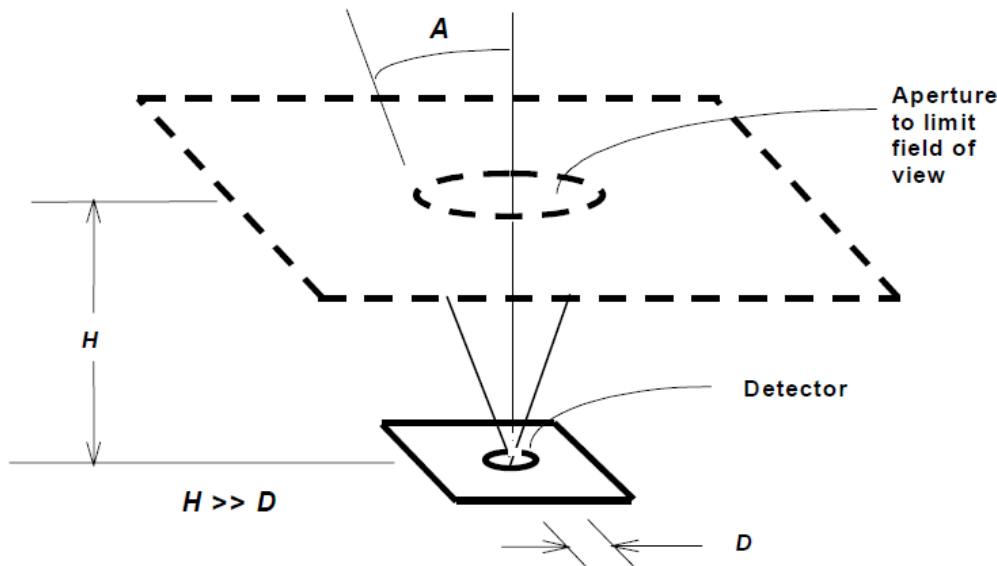
$L_B$  : The hazard values shall be reported at a distance of 200 mm;

**2 Measurement procedure**

**2.1 Irradiance measurements**

The input aperture diameter was 7 mm Min. to 50 mm Max.

The measurement shall be made in that position of the beam giving the maximum reading. The instrument shall be calibrated to read in absolute incident radiant power per unit receiving area. Summary of the ELs see table 5.4



**Figure 5.1 Schematic - Irradiance measurements.**



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2.2 Radiance measurements - Standard method

As with irradiance measurements, the minimum aperture stop diameter  $D$ , as shown in Figure 5.2, corresponds to a 7 mm pupil diameter.

The instrument shall be calibrated to read in absolute incident radiant power per unit receiving area and per unit solid angle of acceptance averaged over the field of view (FOV) of the instrument. Summary of the ELs see table 5.5.

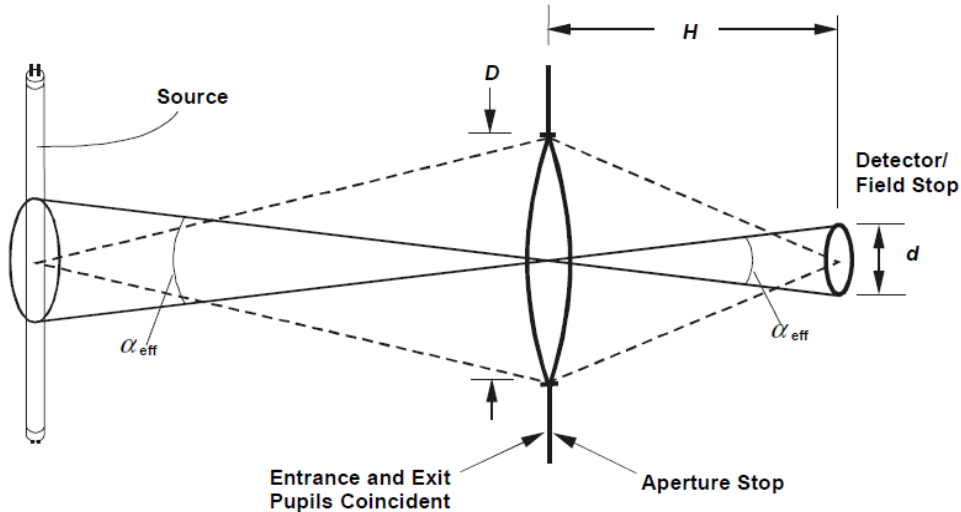


Figure 5.2 Example of an imaging device for radiance measurements.

2.3 Pulse width measurement for pulsed sources (only for Pulse lamp)

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.



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TABLE: Emission measurement & limits of continuous wave

	Measurement performed on:		<input checked="" type="checkbox"/> Light source <input type="checkbox"/> Luminaire			
	Model number.....:		TX-H1309			
	Test voltage (V).....:		34,43		—	
	Test current (mA).....:		500		—	
	Test frequency (Hz).....:		DC		—	
	Ambient, t (°C).....:		25		—	
Risk	Action spectrum	Symbol	Units	FOV (mrad)	Emission Measurement	
					Limit	Result
Actinic UV efficacy	SUV( $\lambda$ )	$K_{S,v}$	$mW \cdot klm^{-1}$	—	—	0
Actinic UV	SUV( $\lambda$ )	$E_s$	$W \cdot m^{-2}$	—	—	0
Near UV	—	$E_{UVA}$	$W \cdot m^{-2}$	—	10	0
Blue light	B( $\lambda$ )	$L_B$	$W \cdot m^{-2} \cdot sr^{-1}$	1,7	—	691,6
Retinal thermal	R( $\lambda$ )	$L_R$	$W \cdot m^{-2} \cdot sr^{-1}$	1,7	280 000	$1,15 \times 10^5$
IR radiation, eye	—	$E_{IR}$	$W \cdot m^{-2}$	—	100	0,25
Angular subtense of apparent source $\alpha = 0,0285$ rad						
Only for pulse source: Frequency: -- Hz, Pulse duration: -- s, Constant duty factor: -- %						
Remark: N/A						



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Photo documentation:

Details of: View of the product

View:

general

front

rear

right

left

top

bottom

--- End of Report ---



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