



Ref. Certif. No.

DE 2-018724

IEC SYSTEM FOR MUTUAL RECOGNITION OF TEST
CERTIFICATES FOR ELECTRICAL EQUIPMENT
(IECEE) CB SCHEME

SYSTEME CEI D'ACCEPTATION MUTUELLE DE
CERTIFICATS D'ESSAIS DES EQUIPEMENTS
ELECTRIQUES (IECEE) METHODE OC

CB TEST CERTIFICATE
CERTIFICAT D'ESSAI OC

Product
Produit

LED Panel Light

Name and address of the applicant
Nom et adresse du demandeur

SHENZHEN SGSLIGHT TECHNOLOGY CO., LTD.
Area B, 5/F, (Phase 2) Plant
Yuexiu Electronic Co., Ltd., Baotian, Ind. Park, Xixiang Str., Bao'An Dist.,
Shenzhen, Guangdong, China

Name and address of the manufacturer
Nom et adresse du fabricant

SHENZHEN SGSLIGHT TECHNOLOGY CO., LTD.
Jinmeiwei Technology Park
High-tech Industry Park, Guanlan, Baoan, Shenzhen, 518100 Guangdong,
China

Name and address of the factory
Nom et adresse de l'usine

SHENZHEN SGSLIGHT TECHNOLOGY CO., LTD.
Jinmeiwei Technology Park
High-tech Industry Park, Guanlan, Baoan, Shenzhen, 518100 Guangdong,
China

Note: When more than one factory, please report on page 2
Note: Lorsque il y a plus d'une usine, veuillez utiliser la 2^{ème} page

Ratings and principal characteristics
Valeurs nominales et caractéristiques principales

AC 100-240V; 50/60Hz; Class II; Ta=40°C; IP20
1) 40W; 2) 15W

Trade mark (if any)
Marque de fabrique (si elle existe)

SGSLIGHT

Model/type Ref.
Ref. de type

1) TLP-3060; TLP-6060; TLP-6262; TLP-3012; TLP-6012;
2) TLP-3030; TLP-S7; TLP-S8; TLP-S9; TLP-S12; TLP-R7;
TLP-R8; TLP-R9; TLP-R12

Additional information (if necessary may also be
reported on page 2)
Les Informations complémentaires (si nécessaire,
peuvent être indiqués sur la 2^{ème} page)

-see also test report 17047012 001.

A sample of the product was tested and found
to be in conformity with
Un échantillon de ce produit a été essayé et a été
considéré conforme à la

PUBLICATION EDITION

IEC 60598-1:2008
IEC 60598-2-2:2011
for national deviations see test report

As shown in the Test Report Ref. No. which forms part
of this Certificate
Comme indiqué dans le Rapport d'essais numéro de
référence qui constitue une partie de ce Certificat

17047012 001

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme National de Certification



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Date: 30.03.2015

Signature:

Ing. M. Eichenseder



Test Report issued under the responsibility of:



TEST REPORT
IEC 60598-2-2
Luminaires
Part 2: Particular requirements:
Section Two – Recessed luminaires

Report Number. 17047012 001

Date of issue 2015-03-24

Total number of pages 37

Applicant's name..... **SHENZHEN SGSLIGHT TECHNOLOGY CO., LTD.**

Address Area B, 5/F, (Phase 2) Plant, Yuexiu Electronic Co., Ltd., Baotian,
Ind. Park, Xixiang Str., Bao'An Dist., Shenzhen, Guangdong, China

Test specification:

Standard IEC 60598-2-2(ed.3):2011 used in conjunction with
IEC 60598-1(ed.7):2008

Test procedure CB Scheme

Non-standard test method..... N/A

Test Report Form No...... IEC60598_2_2C

Test Report Form(s) Originator..... Intertek Semko AB

Master TRF 2013-02

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This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

Test item description LED panel light

Trade Mark See the rating labels.

Manufacturer..... **SHENZHEN SGSLIGHT TECHNOLOGY CO.,LTD**
Jinmeiwei Technology Park, High-tech Industry Park, Guanlan,
Baoan, Shenzhen, 518100 Guangdong, China

Model/Type reference See model list.

Ratings 100-240 V~, 50/60 Hz

Testing procedure and testing location:	
☒ CB Testing Laboratory:	TÜV Rheinland (Shenzhen) Co., Ltd.
Testing location/ address	3&4 F, Cybio Technology Building No. 1, Langshan No. 2 Road South, 5th Industrial Area, High-Tech Industry Park North, Nanshan District, 518057, Shenzhen, P. R. China
☐ Associated CB Laboratory:	
Testing location/ address	
Tested by (name + signature)	Grady Ye
Approved by (+ signature)	Winston Chen
☐ Testing procedure: TMP	
Testing location/ address	
Tested by (name + signature)	
Approved by (+ signature)	
☐ Testing procedure: WMT	
Testing location/ address	
Tested by (name + signature)	
Witnessed by (+ signature)	
Approved by (+ signature)	
☐ Testing procedure: SMT	
Testing location/ address	
Tested by (name + signature)	
Approved by (+ signature)	
Supervised by (+ signature)	

List of Attachments (including a total number of pages in each attachment):

1. 8 pages of photo document.
2. CB report 14715155 001 for IEC 62471:2006.

Summary of testing:**Tests performed (name of test and test clause):**

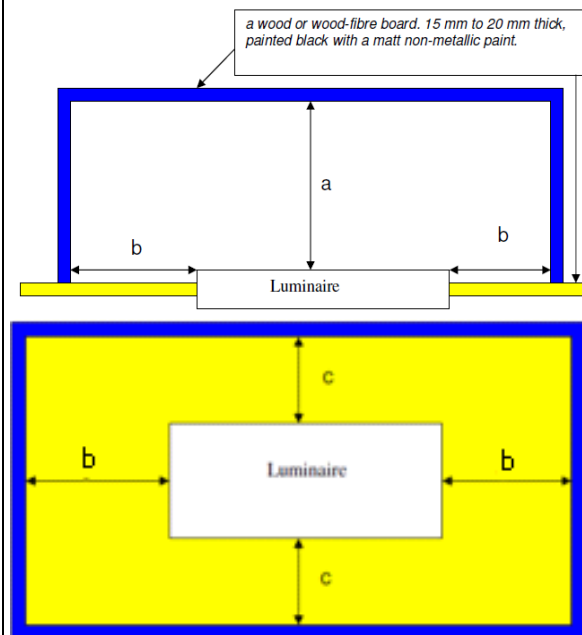
1. Full tests were performed on TLP-3060, TLP-R7 and TLP-S7.

Remark:

1. Main test report of IEC 60598-2-2;
2. European group differences, see annex 5;
3. Test according to IEC/EN 62031+A1, see annex 6;
4. Test according to IEC 62471, see annex 7.

Remark:

During heating test, fix the luminaire to a ceiling, a box as following cover the luminaire, a, b, c=0

**Testing location:****TÜV Rheinland (Shenzhen) Co., Ltd.**

3&4 F, Cybio Technology Building No. 1, Langshan No. 2 Road South, 5th Industrial Area, High-Tech Industry Park North, Nanshan District, 518057, Shenzhen, P. R. China

Summary of compliance with National Differences:

List of countries addressed:

DE=German

☒ The product fulfils the requirements of EN 60598-1:2008+A11, EN 60598-2-2:2012.
Copy of marking plate

Note: Other models have the similar label, only model name and ratings are different.

Test item particulars

Classification of installation and use Fixed luminaire

Supply Connection Terminal block/ supply cord

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 Nov.06, 2013

Date (s) of performance of tests..... Nov.06, 2013- Dec.18, 2013

General remarks:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(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. Clause numbers between brackets refer to clauses in IEC 60598-1	
Manufacturer's Declaration per sub-clause 4.2.5 of IEC 60598-1:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided :	☐ Yes ☒ Not applicable
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) :	SHENZHEN SGSLIGHT TECHNOLOGY CO., LTD Jinmeiwei Technology Park, High-tech Industry Park, Guanlan, Baoan, Shenzhen, 518100 Guangdong, P.R. China

General product information:

Product: Recessed luminaire, Class II appliance, IP20, Ta 40°C, suitable for mounting on normal flammable surface, not suitable for covering with thermally insulating material.

Model difference:

1. Models listed below have the similar constructions, but external shapes and dimensions and LED driver.
2. LED for models listed below are the same and LED layout of them are similar, CCT.2800-6000K.
3. All LED driver are approved, the Max.output voltage is 40 Vdc.

Model list:

Model name	Input parameter	Wattage	LED quantities (pcs)	LED driver
TLP-3060	100-240 Vac, 50/60 Hz	40 W	2835,108pcs	WP-TUV-36-40-1.0A
TLP-6060	100-240 Vac, 50/60 Hz	40 W	2835,108pcs	WP-TUV-36-40-1.0A
TLP-6262	100-240 Vac, 50/60 Hz	40 W	2835,108pcs	WP-TUV-36-40-1.0A
TLP-3012	100-240 Vac, 50/60 Hz	40 W	2835,216pcs	WP-TUV-36-40-1.0A
TLP-6012	100-240 Vac, 50/60 Hz	40 W	2835,216pcs	WP-TUV-36-40-1.0A
TLP-3030	100-240 Vac, 50/60 Hz	15 W	2835,96pcs	WP-TUV-18-40-0.45A
TLP-S7	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A
TLP-S8	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A
TLP-S9	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A
TLP-S12	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A
TLP-R7	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A
TLP-R8	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A
TLP-R9	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A
TLP-R12	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

2.3 (0)	GENERAL TEST REQUIREMENTS		P
2.3 (0.1)	Information for luminaire design considered	Standard Yes ☒ No ☐	—
2.3 (0.3)	More sections applicable	Yes ☐ No ☒	—

2.5 (2)	CLASSIFICATION		P
2.5 (2.2)	Type of protection	Class II	—
2.5 (2.3)	Degree of protection	IP20	—
2.5 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces	Yes ☒ No ☐	—
2.5 (2.5)	Luminaire for normal use	Yes ☒ No ☐	—
	Luminaire for rough service	Yes ☐ No ☒	—

2.6 (3)	MARKING		P
2.6 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
2.6 (3.3)	Additional information		P
	Language of instructions	English	P
2.6 (3.3.1)	Combination luminaires		N/A
2.6 (3.3.2)	Nominal frequency in Hz	50/60 Hz	P
2.6 (3.3.3)	Operating temperature		N/A
2.6 (3.3.4)	Symbol or warning notice		N/A
2.6 (3.3.5)	Wiring diagram		N/A
2.6 (3.3.6)	Special conditions		N/A
2.6 (3.3.7)	Metal halide lamp luminaire – warning		N/A
2.6 (3.3.8)	Limitation for semi-luminaires		N/A
2.6 (3.3.9)	Power factor and supply current		N/A
2.6 (3.3.10)	Suitability for use indoors	Indoor use only!	P
2.6 (3.3.11)	Luminaires with remote control		N/A
2.6 (3.3.12)	Clip-mounted luminaire – warning		N/A
2.6 (3.3.13)	Specifications of protective shields		N/A
2.6 (3.3.14)	Symbol for nature of supply		P
2.6 (3.3.15)	Rated current of socket outlet		N/A

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
2.6 (3.3.16)	Rough service luminaire		N/A
2.6 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	No external wiring.	N/A
2.6 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
2.6 (3.3.19)	Protective conductor current in instruction if applicable		N/A
2.6 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		N/A
2.6 (3.4)	Test with water	15 s	P
	Test with hexane	15 s	P
	Legible after test		P
	Label attached		P

2.7 (4)	CONSTRUCTION		P
2.7 (4.2)	Components replaceable without difficulty		P
2.7 (4.3)	Wireways smooth and free from sharp edges		P
2.7 (4.4)	Lampholders		N/A
2.7 (4.4.1)	Integral lampholder		N/A
2.7 (4.4.2)	Wiring connection		N/A
2.7 (4.4.3)	Lampholder for end-to-end mounting		N/A
2.7 (4.4.4)	Positioning		N/A
	- pressure test (N)		N/A
	After test the lampholder comply with relevant standard sheets and show no damage		N/A
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N/A
	- bending test (N)		N/A
	After test the lampholder have not moved from its position and show no permanent deformation		N/A
2.7 (4.4.5)	Peak pulse voltage		N/A
2.7 (4.4.6)	Centre contact		N/A
2.7 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
2.7 (4.4.8)	Lamp connectors		N/A
2.7 (4.4.9)	Caps and bases correctly used		N/A
2.7 (4.5)	Starter holders		N/A

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
2.7 (4.6)	Terminal blocks		N/A
	Tails		N/A
	Unsecured blocks		N/A
2.7 (4.7)	Terminals and supply connections		P
2.7 (4.7.1)	Contact to metal parts		P
2.7 (4.7.2)	Test 8 mm live conductor		N/A
	Test 8 mm earth conductor		N/A
2.7 (4.7.3)	Terminals for supply conductors	Screw terminal in approved LED driver	N/A
2.7 (4.7.3.1)	Welded connections:		N/A
	- stranded or solid conductor		N/A
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.8.2		N/A
	- electrical test according to 15.9		N/A
	- heat test according to 15.9.2.3 and 15.9.2.4		N/A
2.7 (4.7.4)	Terminals other than supply connection	Screw terminal in approved LED driver and soldered connection	P
2.7 (4.7.5)	Heat-resistant wiring/sleeves		N/A
2.7 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
2.7 (4.8)	Switches:		N/A
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with 61058-1 for electronic switches		N/A
2.7 (4.9)	Insulating lining and sleeves		P
2.7 (4.9.1)	Retainment		P
	Method of fixing :	Form a part of luminaire.	P
2.7 (4.9.2)	Insulated linings and sleeves		P

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Resistant to a temperature > 20 °C to the wire temperature or		N/A
	a) & c) Insulation resistance and electric strength		N/A
	b) Ageing test. Temperature (°C) :		N/A
2.7 (4.10)	Insulation of Class II luminaires		P
2.7 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		P
	Safe installation fixed luminaires		P
	Capacitors and switches		N/A
	Interference suppression capacitors according to IEC 60384-14		N/A
2.7 (4.10.2)	Assembly gaps:		P
	- not coincidental		P
	- no straight access with test probe		P
2.7 (4.10.3)	Retainment of insulation:		P
	- fixed		P
	- unable to be replaced; luminaire inoperative		P
	- sleeves retained in position		P
	- lining in lampholder		N/A
2.7 (4.11)	Electrical connections		P
2.7 (4.11.1)	Contact pressure		P
2.7 (4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
2.7 (4.11.3)	Screw locking:		P
	- spring washer		N/A
	- rivets		N/A
2.7 (4.11.4)	Material of current-carrying parts		P
2.7 (4.11.5)	No contact to wood or mounting surface		P
2.7 (4.11.6)	Electro-mechanical contact systems		P
2.7 (4.12)	Mechanical connections and glands		P
2.7 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A
	Torque test: torque (Nm); part :		N/A
	Torque test: torque (Nm); part :		N/A

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Torque test: torque (Nm); part		N/A
2.7 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
2.7 (4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm)		N/A
	- lampholder; torque (Nm)		N/A
	- push-button switches; torque 0,8 Nm		N/A
2.7 (4.12.5)	Screwed glands; force (Nm)		N/A
2.7 (4.13)	Mechanical strength		P
2.7 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm)		N/A
	- other parts; energy (Nm)	Enclosure: 0,35 Nm	P
	1) live parts		P
	2) linings		P
	3) protection		P
	4) covers		P
2.7 (4.13.3)	Straight test finger	30 N	P
2.7 (4.13.4)	Rough service luminaires		N/A
	- IP54 or higher		N/A
	a) fixed		N/A
	b) hand-held		N/A
	c) delivered with a stand		N/A
	d) for temporary installations and suitable for mounting on a stand		N/A
2.7 (4.13.6)	Tumbling barrel		N/A
2.7 (4.14)	Suspensions and adjusting devices		P
2.7 (4.14.1)	Mechanical load:		P
	A) four times the weight	For TLP-S series: Max. 1,19 kg x 4=4,76 kg; For TLP-R series: Max. 1,5 kg x 4=6,00 kg; For other models: Max. 8,00 kg x 4=32,00 kg	P
	B) torque 2,5 Nm		N/A
	C) bracket arm; bending moment (Nm)		N/A
	D) load track-mounted luminaires		N/A

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
	E) clip-mounted luminaires, glass-shelve. Thickness (mm)		N/A
	Metal rod. diameter (mm)		N/A
	Fixed luminaire or independent control gear without fixing devices		N/A
2.7 (4.14.2)	Load to flexible cables		N/A
	Mass (kg)		N/A
	Stress in conductors (N/mm ²)		N/A
	Mass (kg) of semi-luminaire		N/A
	Bending moment (Nm) of semi-luminaire		N/A
2.7 (4.14.3)	Adjusting devices:		N/A
	- flexing test; number of cycles		N/A
	- strands broken		N/A
	- electric strength test afterwards		N/A
2.7 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
2.7 (4.14.5)	Guide pulleys		N/A
2.7 (4.14.6)	Strain on socket-outlets		N/A
2.7 (4.15)	Flammable materials:		P
	- glow-wire test 650 °C	LED cover	P
	- spacing ≥ 30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		P
	- thermal protection		N/A
	- electronic circuits exempted		P
2.7 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N/A
	a) construction		N/A
	b) temperature sensing control		N/A
	c) surface temperature		N/A
2.7 (4.16)	Luminaires for mounting on normally flammable surfaces		P
	No lamp control gear	(compliance with Section 12)	N/A
2.7 (4.16.1)	Lamp control gear spacing:		N/A
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
2.7 (4.16.2)	Thermal protection:		N/A
	- in lamp control gear		N/A
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A
2.7 (4.16.3)	Design to satisfy the test of 12.6	(see 12.6)	N/A
2.7 (4.17)	Drain holes		N/A
	Clearance at least 5 mm		N/A
2.7 (4.18)	Resistance to corrosion:		N/A
2.7 (4.18.1)	- rust-resistance		N/A
2.7 (4.18.2)	- season cracking in copper		P
2.7 (4.18.3)	- corrosion of aluminium		N/A
2.7 (4.19)	Igniters compatible with ballast		N/A
2.7 (4.20)	Rough service vibration		N/A
2.7 (4.21)	Protective shield:		N/A
2.7 (4.21.1)	Shield fitted		N/A
	Shield of glass if tungsten halogen lamps		N/A
2.7 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
2.7 (4.21.3)	No direct path		N/A
2.7 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment		N/A
2.7 (4.22)	Attachments to lamps		N/A
2.7 (4.23)	Semi-luminaires comply Class II		N/A
2.7 (4.24)	UV radiation for tungsten halogen lamps and metal halide lamps (Annex P)		N/A
2.7 (4.25)	No sharp point or edges		P
2.7 (4.26)	Short-circuit protection:		N/A
2.7 (4.26.1)	Uninsulated accessible SELV parts		N/A
2.7 (4.26.2)	Short-circuit test		N/A
2.7 (4.26.3)	Test chain according to Figure 29		N/A
2.7 (4.27)	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
	Pull test of terminal fixing (20 N)		N/A
	After test, resistance < 0,05 Ω		N/A

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict
	Pull test of mechanical connection (50 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Voltage drop test, resistance < 0,05 Ω		N/A

2.8 (11)	CREEPAGE DISTANCES AND CLEARANCES		P
	Working voltage (V)	100-240 V	—
	Voltage form	Sinusoidal ☒ Non-sinusoidal ☐	—
	PTI	< 600 ☒ $\geq$ 600 ☐	—
	Impulse withstand category (Normal category II) (Category III Annex U)	Category II ☒ Category III ☐	—
	Rated pulse voltage (kV)	N/A	—
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm)	Approved LED driver	P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm)	Approved LED driver	P
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm)		N/A
	(4) Outer surface of cable where it is clamped and metal parts: cr (mm); cl (mm).....		N/A
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm)	Approved LED driver	P

2.9 (7)	PROVISION FOR EARTHING		N/A
2.9 (7.2.1 + 7.2.3)	Accessible metal parts		N/A
	Metal parts in contact with supporting surface		N/A
	Resistance < 0,5 Ω		N/A
	Self-tapping screws used		N/A
	Thread-forming screws		N/A
	Thread-forming screw used in a groove		N/A
	Earth makes contact first		N/A
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
2.9 (7.2.2 + 7.2.3)	Earth continuity in joints etc.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
2.9 (7.2.4)	Locking of clamping means		N/A
	Compliance with 4.7.3		N/A
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N/A
2.9 (7.2.5)	Earth terminal integral part of connector socket		N/A
2.9 (7.2.6)	Earth terminal adjacent to mains terminals		N/A
2.9 (7.2.7)	Electrolytic corrosion of the earth terminal		N/A
2.9 (7.2.8)	Material of earth terminal		N/A
	Contact surface bare metal		N/A
2.9 (7.2.10)	Class II luminaire for looping-in		N/A
	Double or reinforced insulation to functional earth		N/A
2.9 (7.2.11)	Earthing core coloured green-yellow		N/A
	Length of earth conductor		N/A

2.10 (14)	SCREW TERMINALS		P
	Separately approved; component list	Used in approved LED driver	P
	Part of the luminaire		N/A

2.10 (15)	SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS		P
	Separately approved; component list		N/A
	Part of the luminaire	Soldered connection	P

2.11 (5)	EXTERNAL AND INTERNAL WIRING		P
2.11 (5.2)	Supply connection and external wiring		P
2.11 (5.2.1)	Means of connection..... :	Cord	P
2.11 (5.2.2)	Type of cable :	According to the information in user manual of driver: H03VV-F	P
	Nominal cross-sectional area (mm ²)..... :	2 x 0,75 mm ²	P
	Cables equal to IEC 60227 or IEC 60245		P
2.11 (5.2.3)	Type of attachment, X, Y or Z		N/A
2.11 (5.2.5)	Type Z not connected to screws		N/A
2.11 (5.2.6)	Cable entries:		N/A
	- suitable for introduction		N/A
	- adequate degree of protection		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
2.11 (5.2.7)	Cable entries through rigid material have rounded edges		N/A
2.11 (5.2.8)	Insulating bushings:		N/A
	- suitably fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- tubes or guards made of insulating material		N/A
2.11 (5.2.9)	Locking of screwed bushings		N/A
2.11 (5.2.10)	Cord anchorage:		N/A
	- covering protected from abrasion		N/A
	- clear how to be effective		N/A
	- no mechanical or thermal stress		N/A
	- no tying of cables into knots etc.		N/A
	- insulating material or lining		N/A
2.11 (5.2.10.1)	Cord anchorage for type X attachment:		N/A
	a) at least one part fixed		N/A
	b) types of cable		N/A
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A
	e) no touching of clamping screws		N/A
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
2.11 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		N/A
2.11 (5.2.10.3)	Tests:		N/A
	- impossible to push cable; unsafe		N/A
	- pull test: 25 times; pull (N) :		N/A
	- torque test: torque (Nm) :		N/A
	- displacement ≤ 2 mm		N/A
	- no movement of conductors		N/A
	- no damage of cable or cord		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
2.11 (5.2.11)	External wiring passing into luminaire		N/A
2.11 (5.2.12)	Looping-in terminals		N/A
2.11 (5.2.13)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		N/A
2.11 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
2.11 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Appliance couplers of class II type		N/A
2.11 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
2.11 (5.2.18)	Used plug in accordance with		N/A
	- IEC 60083		N/A
	- other standard		N/A
2.11 (5.3)	Internal wiring		P
2.11 (5.3.1)	Internal wiring of suitable size and type	Output wire: H05VVH2-F, 2X 0,75 mm ²	P
	Through wiring		N/A
	- not delivered/ mounting instruction		N/A
	- factory assembled		N/A
	- socket outlet loaded (A)		N/A
	- temperatures	(see Annex 2)	N/A
	Green-yellow for earth only		N/A
2.11 (5.3.1.1)	Internal wiring connected directly to fixed wiring		N/A
	Cross-sectional area (mm ²)		N/A
	Insulation thickness		N/A
	Extra insulation added where necessary		N/A
2.11 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		P
	Adequate cross-sectional area and insulation thickness		P
2.11 (5.3.1.3)	Double or reinforced insulation for class II		P
2.11 (5.3.1.4)	Conductors without insulation		N/A
2.11 (5.3.1.5)	SELV current-carrying parts		N/A
2.11 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
2.11 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Joints, raising/lowering devices		N/A
	Telescopic tubes etc.		N/A
	No twisting over 360°		P
2.11 (5.3.3)	Insulating bushings:		N/A
	- suitable fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- cables with protective sheath		N/A
2.11 (5.3.4)	Joints and junctions effectively insulated		N/A
2.11 (5.3.5)	Strain on internal wiring		N/A
2.11 (5.3.6)	Wire carriers		N/A
2.11 (5.3.7)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N/A

2.12 (8)	PROTECTION AGAINST ELECTRIC SHOCK		P
2.12 (8.2.1)	Live parts not accessible		P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable and adjustable luminaires		N/A
	Basic insulated parts not accessible with Ø 50 mm probe from outside, within arm's reach, on wall-mounted luminaires		P
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N/A
	Basic insulation only accessible under lamp or starter replacement		N/A
	Protection in any position		P
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		N/A
	Double-ended high pressure discharge lamp		N/A
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A
2.12 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
2.12 (8.2.3.a)	Class II luminaire:		P
	- basic insulated metal parts not accessible during starter or lamp replacement		N/A
	- basic insulation not accessible other than during starter or lamp replacement		P
	- glass protective shields not used as supplementary insulation		N/A
2.12 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N/A
2.12 (8.2.3.c)	Class III luminaires with exposed SELV parts:		N/A
	Ordinary luminaire:		N/A
	- touch current		N/A
	- no-load voltage : Max.40 Vdc		N/A
	Other than ordinary luminaire:		N/A
	- nominal voltage		N/A
2.12 (8.2.4)	Portable luminaire have protection independent of supporting surface		N/A
2.12 (8.2.5)	Compliance with the standard test finger or relevant probe		P
2.12 (8.2.6)	Covers reliably secured		N/A
2.12 (8.2.7)	Discharging of capacitors $\geq 0,5 \mu\text{F}$	0 V < 50 V	P
	Portable plug connected luminaire with capacitor		N/A
	Other plug connected luminaire with capacitor		N/A
	Discharge device on or within capacitor		N/A
	Discharge device mounted separately		N/A

2.13 (12)	ENDURANCE TEST AND THERMAL TEST		P
2.13 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 2.14		—
2.13 (12.3)	Endurance test:		P
	- mounting-position	According to user manual which provided by client.	—
	- test temperature (°C)	50°C	—
	- total duration (h)	240 h	—
	- supply voltage: Un factor; calculated voltage (V):	264 V	—
	- lamp used	Integral LED module	—

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Clause	Requirement + Test	Result - Remark	Verdict
2.13 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
2.13 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
2.13 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	P
2.13 (12.6)	Thermal test (failed lamp control gear condition):		N/A
2.13 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A)	----	—
	- case of abnormal conditions.....	----	—
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un ..	-----	—
	- measured mounting surface temperature (°C) at 1,1 Un		N/A
	- calculated mounting surface temperature (°C) ..	-----	N/A
	- track-mounted luminaires		N/A
2.13 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions.....	-----	—
	- thermal link		N/A
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C) ...	-----	N/A
	- track-mounted luminaires		N/A
2.13 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N/A
2.13 (12.7.1)	Luminaire without temperature sensing control		N/A
2.13 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N/A
	Test method 12.7.1.1 or Annex W	-----	—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions		—
	- Ballast failure at supply voltage (V)	-----	—
	- Components retained in place after the test		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- Test with standard test finger after the test		N/A
	Test according to Annex W:		N/A
	- case of abnormal conditions		—
	- measured winding temperature (°C): at 1,1 Un.. : ----		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un..... : ----		—
	- calculated temperature of fixing point/exposed part (°C) : ----		—
	Ball-pressure test:		N/A
	- part tested; temperature (°C)..... :		N/A
	- part tested; temperature (°C)..... :		N/A
2.13 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N/A
	- case of abnormal conditions		—
	- measured winding temperature (°C): at 1,1 Un.. : ----		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un..... : ----		—
	- calculated temperature of fixing point/exposed part (°C) : ----		—
	Ball-pressure test:		N/A
	- part tested; temperature (°C)..... :		N/A
	- part tested; temperature (°C)..... :		N/A
2.13 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N/A
	- case of abnormal conditions		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
2.13 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link	Yes ☐ No ☒	—
	- manual reset cut-out	Yes ☐ No ☒	—
	- auto reset cut-out	Yes ☐ No ☒	—
	- case of abnormal conditions		—
	- highest measured temperature of fixing point/exposed part (°C):..... : ----		—
	Ball-pressure test:		N/A
	- part tested; temperature (°C)..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- part tested; temperature (°C)..... :		N/A
2.13.1 (-)	Wiring, for connection to the supply, not reach unsafe temperature		N/A
	- measured temperature of the cable (°C) :		N/A

2.14 (9)	RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE		N/A
2.14 (-)	If IP > IP 20 the order of the test specified in clause 2.13		—
2.14 (9.2)	Tests for ingress of dust, solid objects and moisture:		N/A
	- classification according to IP :	IP20	—
	- mounting position during test :	Mounting according to the instruction manual	—
	- fixing screws tightened; torque (Nm) :	-----	—
	- tests according to clauses :	Cl.9.2.0	—
	- electric strength test afterwards		N/A
	a) no deposit in dust-proof luminaire		N/A
	b) no talcum in dust-tight luminaire		N/A
	c) no trace of water on current-carrying parts or SELV parts or where it could become a hazard		N/A
	d) i) For luminaires without drain holes – no water entry		N/A
	d) ii) For luminaires with drain holes – no hazardous water entry		N/A
	e) no water in watertight luminaire		N/A
	f) no contact with live parts (IP 2X)	IP20	P
	f) no entry into enclosure (IP 3X and IP 4X)		N/A
	f) no contact with live parts (IP3X and IP4X)		N/A
	g) no trace of water on part of lamp requiring protection from splashing water		N/A
	h) no damage of protective shield or glass envelope		N/A
2.14 (9.3)	Humidity test 48 h	25°C, 93%RH	P

2.15 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
2.15 (10.2.1)	Insulation resistance test		
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø :	-----	—
	Insulation resistance (MΩ)	-----	—

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Clause	Requirement + Test	Result - Remark	Verdict
	SELV:		P
	- between current-carrying parts of different polarity		N/A
	- between current-carrying parts and mounting surface	100 MΩ > 1 MΩ	P
	- between current-carrying parts and metal parts of the luminaire	100 MΩ > 1 MΩ	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts		N/A
	- Insulation bushings as described in Section 5 ..		N/A
	Other than SELV:		P
	- between live parts of different polarity	Approved LED driver	P
	- between live parts and mounting surface	100 MΩ > 2 MΩ	P
	- between live parts and metal parts		N/A
	- between live parts of different polarity through action of a switch		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts		N/A
	- Insulation bushings as described in Section 5 ..		N/A
2.15 (10.2.2)	Electric strength test		P
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A
	Luminaires with manual ignitors		N/A
	Test voltage (V):		N/A
	SELV:		P
	- between current-carrying parts of different polarity		N/A
	- between current-carrying parts and mounting surface	500 V, 1 min.	P
	- between current-carrying parts and metal parts of the luminaire	500 V, 1 min.	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts		N/A
	- Insulation bushings as described in Section 5 ..		N/A
	Other than SELV:		P

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Clause	Requirement + Test	Result - Remark	Verdict
	- between live parts of different polarity..... :	Approved LED driver	P
	- between live parts and mounting surface..... :	2960 V, 1 min.	P
	- between live parts and metal parts..... :	2960 V, 1 min.	N/A
	- between live parts of different polarity through action of a switch..... :		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :		N/A
	- Insulation bushings as described in Section 5 .. :		N/A
2.15 (10.3)	Touch current or protective conductor current (mA)..... :	Max.0,045 mA < 0,7 mA	P

2.16 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		P
2.16 (13.2.1)	Ball-pressure test:		P
	- part tested; temperature (°C)..... :	Output connector: 1,24 mm at 125°C	P
	- part tested; temperature (°C)..... :	LED board: 0,62 mm at 125°C	P
2.16 (13.3.1)	Needle flame test (10 s):		P
	- part tested..... :		N/A
	- part tested..... :		N/A
2.16 (13.3.2)	Glow-wire test (650°C):		P
	- part tested..... :	Connector, LED lens: no flame, no drop	P
	- part tested..... :		N/A
2.16 (13.4.1)	Tracking test:		N/A
	- part tested..... :		N/A
	- part tested..... :		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 1:	Components	
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object/part No.	code	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
LED driver(15w)	B	Shenzhen Wei Peng Shiji Technology Co., Ltd.	WP-TUV-18- 40-0.45A	Input: 100-240 VAC, 0,21 A, 50/60 Hz; Output: 25-40 VDC, 0,45 A; ta:40°C, tc: 70°C, Independent SELV	IEC 61347-2- 13:2006 IEC 61347- 1:2007+A1:20 10	TUV RH R 50270474
LED driver(40w)	B	Shenzhen Wei Peng Shiji Technology Co., Ltd.	WP-TUV-36- 40-1.00A	Input: 100-240 VAC, 0,42 A, 50/60 Hz; Output: 25-38 VDC, 1,0 A; ta:40°C, tc: 75°C, Independent SELV	IEC 61347-2- 13:2006 IEC 61347- 1:2007+A1:20 10	TUV RH R 50270474
Output cord of driver (15w)	B	Shenzhen Yuxin Wire & Cable Co.,Ltd.	H05VVH2-F	2X 0,75 mm ²	DIN VDE 0281-5	VDE 40012386
Plastic enclosure of connector	B, C	SABIC INNOVATIVE PLASTICS B V	FR60	PC, 125°C, V-0, min. thickness 0,51 mm	--	UL E45329
Metal part of connector	C	Top Optoelectronic Co., Ltd.	T-1	Copper: 60%	--	Tested with appliance
Internal wire	B, C	DONGGUAN CHENG XING ELECTRONIC CO LTD	2468	80°C, 300 Vac	--	UL E249743
Insulation tube	B, C	XIAN NING CITY HAI JIN YANG INSULATION MATERIAL CO LTD	SRG-868-7AE	VW-1, 600 V, 105°C	--	UL E303665

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Clause	Requirement + Test			Result - Remark		Verdict
LED board	B, C	SHENZHEN BOMIN ELECTRONIC CO LTD	BM3	Metal base, V-0, 130°C	--	UL E213371
LED	C	Shenzhen Smalite Optoelectronics Co.,Ltd	2835	2,8-3,5 V, 120 mA, 3000-6000 K	--	Tested with appliance
LED lens	B, C	TEIJIN LIMITED RESIN AND PLASTIC	L-1250U(#)(f1), L-1250V(#)(f1), L-1250Z(#)(f1)	PC, HB, 115°C	--	UL E50075
Plastic enclosure	B, C	BAYER MATERIALSCIENCE AG	6485+(f1)	PC, V-0, 125 °C	--	UL E41613

The codes above have the following meaning:

- A - The component is replaceable with another one, also certified, with equivalent characteristics
- B - The component is replaceable if authorised by the test house
- C - Integrated component tested together with the appliance
- D - Alternative component

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Clause	Requirement + Test				Result - Remark		Verdict
ANNEX 2:	Temperature measurements, thermal tests of Section 12						P
	Type reference				TLP-3060		—
	Lamp used.....				Integral LED module		—
	Lamp control gear used				Built in LED driver		—
	Mounting position of luminaire				According to user manual		—
	Supply wattage (W)				40,2 W		—
	Supply current (A)				0,172 A		—
	Table: measured temperatures corrected for ta = 40°C:						P
	- abnormal operating mode				1. Short-circuit output of driver;		—
	- test 1: rated voltage				240 Vac		—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....				254,4 Vac		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage				-----		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....				264 Vac, short-circuit output of driver: shutdown at once.		—
	Through wiring or looping-in wiring loaded by a current of A during the test				-----		—
temperature (°C) of part		Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Supply wire	--	41,7°C	--	90°C	--	--	
Tc of LED driver	--	57,5°C	--	75°C	--	--	
Output wire of driver	--	42,9°C	--	100°C	--	--	
Output connector of driver	--	41,3°C	--	Ref.	--	--	
Top enclosure of panel light	--	49,0°C	--	Ref.	--	--	
Internal wire of panel light	--	57,2°C	--	Ref.	--	--	
LED board of panel light	--	64,6°C	--	Ref.	--	--	
LED cover	--	54,1°C	--	Ref.	--	--	
Lamp cover	--	48,9°C	--	Ref.	--	--	
Test box	--	48,7°C	--	90°C	--	--	
Lighting object (0,1 m)	--	51,0°C	--	90°C	--	--	
Mounting surface	--	44,8°C	--	90°C	51,2°C	130°C	

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Clause	Requirement + Test				Result - Remark		Verdict
	Type reference:				TLP-R7		—
	Lamp used.....:				Integral LED module		—
	Lamp control gear used:				Built in LED driver		—
	Mounting position of luminaire:				According to user manual		—
	Supply wattage (W):				17,7 W		—
	Supply current (A):				0,078 A		—
	Table: measured temperatures corrected for ta = 40°C:						P
	- abnormal operating mode:				1. Short-circuit output of driver;		—
	- test 1: rated voltage:				240 Vac		—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....:				254,4 Vac		—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage:				-----		—
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....:				264 Vac, short-circuit output of driver: shutdown at once.		—
	Through wiring or looping-in wiring loaded by a current of A during the test:				-----		—
temperature (°C) of part		Clause 12.4 – normal			Clause 12.5 – abnormal		
		test 1	test 2	test 3	limit	test 4	limit
Supply wire	--	41,0°C	--	90°C	--	--	
Tc of LED driver	--	52,4°C	--	70°C	--	--	
Output wire of driver	--	43,5°C	--	100°C	--	--	
Output connector of driver	--	41,1°C	--	Ref.	--	--	
Top enclosure of panel light	--	49,8°C	--	Ref.	--	--	
Internal wire of panel light	--	54,0°C	--	Ref.	--	--	
LED board of panel light	--	64,7°C	--	Ref.	--	--	
LED cover	--	63,9°C	--	Ref.	--	--	
Lamp cover	--	55,6°C	--	Ref.	--	--	
Test box	--	55,5°C	--	90°C	--	--	
Lighting object (0,1 m)	--	56,3°C	--	90°C	--	--	
Mounting surface	--	47,9°C	--	90°C	56,4°C	130°C	

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Clause	Requirement + Test	Result - Remark	Verdict

	Type reference	TLP-S7	—			
	Lamp used.....	Integral LED module	—			
	Lamp control gear used	Built in LED driver	—			
	Mounting position of luminaire	According to user manual	—			
	Supply wattage (W)	18,1 W	—			
	Supply current (A)	0,078 A	—			
	Table: measured temperatures corrected for ta = 40°C:		P			
	- abnormal operating mode	1. Short-circuit output of driver; 2. Double load; 3. No load; 4. Fault conditions.	—			
	- test 1: rated voltage	240 Vac	—			
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage.....	254,4 Vac	—			
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage	-----	—			
	- test 4: 1,1 times rated voltage or 1,05 times rated wattage.....	264 Vac, short-circuit output of driver: shutdown at once.	—			
	Through wiring or looping-in wiring loaded by a current of A during the test	-----	—			
temperature (°C) of part		Clause 12.4 – normal		Clause 12.5 – abnormal		
	test 1	test 2	test 3	limit	test 4	limit
Supply wire	--	41,0°C	--	90°C	--	--
Tc of LED driver	--	57,7°C	--	70°C	--	--
Output wire of driver	--	51,9°C	--	100°C	--	--
Output connector of driver	--	45,9°C	--	Ref.	--	--
Top enclosure of panel light	--	53,3°C	--	Ref.	--	--
Internal wire of panel light	--	66,2°C	--	Ref.	--	--
LED board of panel light	--	71,3°C	--	Ref.	--	--
LED cover	--	62,6°C	--	Ref.	--	--
Lamp cover	--	57,8°C	--	Ref.	--	--
Test box	--	57,6°C	--	90°C	--	--
Lighting object (0,1 m)	--	60,4°C	--	90°C	--	--
Mounting surface	--	50,7°C	--	90°C	61,5°C	130°C

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX 3: screw terminals (part of the luminaire)		N/A
--	---	--	-----

(14)	SCREW TERMINALS		N/A
(14.2)	Type of terminal.....:		—
	Rated current (A).....:		—
(14.3.2.1)	One or more conductors		N/A
(14.3.2.2)	Special preparation		N/A
(14.3.2.3)	Terminal size		N/A
	Cross-sectional area (mm ²).....:		N/A
(14.3.3)	Conductor space (mm).....:		N/A
(14.4)	Mechanical tests		N/A
(14.4.1)	Minimum distance		N/A
(14.4.2)	Cannot slip out		N/A
(14.4.3)	Special preparation		N/A
(14.4.4)	Nominal diameter of thread (metric ISO thread) ..:	M	N/A
	External wiring		N/A
	No soft metal		N/A
(14.4.5)	Corrosion		N/A
(14.4.6)	Nominal diameter of thread (mm)		N/A
	Torque (Nm)		N/A
(14.4.7)	Between metal surfaces		N/A
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test; pull (N)		N/A
(14.4.8)	Without undue damage		N/A

IEC 60598-2-2			
Clause	Requirement + Test	Result - Remark	Verdict

	ANNEX 4: screwless terminals (part of the luminaire)		N/A
--	---	--	-----

(15)	SCREWLESS TERMINALS		N/A
(15.2)	Type of terminal.....:		—
	Rated current (A).....:		—
(15.3.1)	Material		N/A
(15.3.2)	Clamping		N/A
(15.3.3)	Stop		N/A
(15.3.4)	Unprepared conductors		N/A
(15.3.5)	Pressure on insulating material		N/A
(15.3.6)	Clear connection method		N/A
(15.3.7)	Clamping independently		N/A
(15.3.8)	Fixed in position		N/A
(15.3.10)	Conductor size		N/A
	Type of conductor		N/A
(15.5.1)	Terminals internal wiring		N/A
(15.5.1.1)	Pull test spring-type terminals (4 N, 4 samples).....:		N/A
(15.5.1.2)	Pull test pin or tab terminals (4 N, 4 samples).....:		N/A
	Insertion force not exceeding 50 N		N/A
(15.5.1.2)	Permanent connections: pull-off test (20 N)		N/A
(15.6)	Electrical tests		N/A
	Voltage drop (mV) after 1 h (4 samples).....:		N/A
	Voltage drop of two inseparable joints		N/A
	Number of cycles.....:		—
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:		N/A
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:		N/A
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples)		N/A
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples)		N/A
(15.7)	Terminals external wiring		N/A
	Terminal size and rating		N/A

IEC 60598-2-2										
Clause	Requirement + Test					Result - Remark				Verdict
(15.8.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N)									N/A
	Pull test pin or tab terminals (4 samples); pull (N)									N/A
(15.9)	Contact resistance test									N/A
	Voltage drop (mV) after 1 h									N/A
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Voltage drop of two inseparable joints									N/A
	Voltage drop after 10th alt. 25th cycle									N/A
	Max. allowed voltage drop (mV)									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Voltage drop after 50th alt. 100th cycle									N/A
	Max. allowed voltage drop (mV)									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Continued ageing: voltage drop after 10th alt. 25th cycle									N/A
	Max. allowed voltage drop (mV)									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
	Continued ageing: voltage drop after 50th alt. 100th cycle									N/A
	Max. allowed voltage drop (mV)									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										

Annex 5
ATTACHMENT TO TEST REPORT IEC 60598-2-2 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES Luminaires Part 2: Particular requirements: Section Two – Recessed luminaires
Differences according: EN 60598-2-2:2012 used in conjunction with EN 60598-1:2008 + A11:2009

	CENELEC COMMON MODIFICATIONS (EN)	P
--	--	----------

2.11 (5)	EXTERNAL AND INTERNAL WIRING	N/A
2.11 (5.2.1)	Connecting leads	N/A
	- without a means for connection to the supply	N/A
	- terminal block specified	N/A
	- relevant information provided	N/A
	- compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1	N/A
2.11 (5.2.2)	Cables equal to HD21 S2 or HD22 S2	N/A

2.12 (8)	PROTECTION AGAINST ELECTRIC SHOCK	P
-----------------	--	----------

2.13 (12)	ENDURANCE TEST AND THERMAL TEST	P
2.12 (12.4.2c)	Thermal test (normal operation)	(see Annex 2) P

Annex 6	LED modules for general lighting —Safety specifications IEC 62031:2008 or EN 62031:2008+A1		P
Clause	Requirement – Test	Result - Remark	Verdict

13	Fault conditions		P
13.1	General The module shall not impair safety when operated under fault conditions that may occur during the intended use. The requirements of IEC 61347-1, Clause 14, apply. Additionally, the following test shall be carried out.		P
13.2	Overpower condition: 1. Adjusted until 150% of the rated voltage, current or power is reached. 2. The test continued until the module is thermally stable. Test result: the lamp operated as usual, no hazard.		P

Annex 7	Photobiological safety of lamps and lamp systems were classified Exempt Group according to standard IEC/EN 62471 and EU Directive 2006/25/EC. This classification is applicable to all models.			P
Evaluated according to IEC 62471:2006				
TLP-3060 with 3000K is in Exempt Group:				
Optical hazard	Test result	Used hazard exposure limit		Verdict
1. Es	1,305x10 ⁻⁷ W/m ²	0,001 W/m ²	200-400 nm	P
2. E _{UVA}	2,915x10 ⁻³ W/m ²	10 W/m ²	315-400 nm	P
3. L _B	8,942 W/m ²	100 W/m ²	300-700 nm	P
4. E _B (Small source)	--	--	300-700 nm	N/A
5. L _R	1,065x10 ² W/m ² sr	2,800x10 ⁵ W/m ² sr	380-1400 nm	P
6. L _{IR}	0 W/m ²	100 W/m ²	780-3000 nm	P
7. E _{IR}	0 W/m ² sr	6,000 x10 ⁴ W/m ² sr	780-1400 nm	P
8. E _H	3,814 W/m ²	3556,56 W/m ²	380-3000 nm	P
TLP-3060 with 6000K is in Exempt Group:				
Optical hazard	Test result	Used hazard exposure limit		Verdict
1. Es	1,432x10 ⁻⁷ W/m ²	0,001 W/m ²	200-400 nm	P
2. E _{UVA}	3,192x10 ⁻³ W/m ²	10 W/m ²	315-400 nm	P
3. L _B	9,652 W/m ²	100 W/m ²	300-700 nm	P
4. E _B (Small source)	--	--	300-700 nm	N/A
5. L _R	1,154x10 ² W/m ² sr	2,800x10 ⁵ W/m ² sr	380-1400 nm	P
6. L _{IR}	1,320 x10 ⁻⁴ W/m ²	100 W/m ²	780-3000 nm	P
7. E _{IR}	0 W/m ² sr	6,000 x10 ⁴ W/m ² sr	780-1400 nm	P
8. E _H	4,261 W/m ²	3556,56 W/m ²	380-3000 nm	P
TLP-R7 with 3000K is in Exempt Group:				
Optical hazard	Test result	Used hazard exposure limit		Verdict
1. Es	2,546x10 ⁻⁸ W/m ²	0,001 W/m ²	200-400 nm	P
2. E _{UVA}	5,626x10 ⁻⁴ W/m ²	10 W/m ²	315-400 nm	P
3. L _B	2,154 x 10 W/m ²	100 W/m ²	300-700 nm	P
4. E _B (Small source)	--	--	300-700 nm	N/A
5. L _R	3,577x10 ² W/m ² sr	2,800x10 ⁵ W/m ² sr	380-1400 nm	P
6. L _{IR}	0 W/m ²	100 W/m ²	780-3000 nm	P
7. E _{IR}	0 W/m ² sr	6,000 x10 ⁴ W/m ² sr	780-1400 nm	P
8. E _H	1,447 W/m ²	3556,56 W/m ²	380-3000 nm	P

TLP-R7 with 6000K is in Exempt Group:				
Optical hazard	Test result	Used hazard exposure limit		Verdict
1. Es	$4,602 \times 10^{-8} \text{ W/m}^2$	$0,001 \text{ W/m}^2$	200-400 nm	P
2. E _{UVA}	$1,026 \times 10^{-3} \text{ W/m}^2$	10 W/m^2	315-400 nm	P
3. L _B	$6,646 \times 10 \text{ W/m}^2$	100 W/m^2	300-700 nm	P
4. E _B (Small source)	--	--	300-700 nm	N/A
5. L _R	$8,060 \times 10^2 \text{ W/m}^2\text{sr}$	$2,800 \times 10^5 \text{ W/m}^2\text{sr}$	380-1400 nm	P
6. L _{IR}	0 W/m^2	100 W/m^2	780-3000 nm	P
7. E _{IR}	$0 \text{ W/m}^2\text{sr}$	$6,000 \times 10^4 \text{ W/m}^2\text{sr}$	780-1400 nm	P
8. E _H	$1,554 \text{ W/m}^2$	$3556,56 \text{ W/m}^2$	380-3000 nm	P

Evaluated according to EN 62471:2008				
TLP-3060 with 3000K is in Exempt Group:				
Optical hazard	Test result	Used hazard exposure limit		Verdict
1. Es	$1,305 \times 10^{-7} \text{ W/m}^2$	$0,001 \text{ W/m}^2$	200-400 nm	P
2. E _{UVA}	$2,915 \times 10^{-3} \text{ W/m}^2$	$0,33 \text{ W/m}^2$	315-400 nm	P
3. L _B	$8,916 \text{ W/m}^2$	100 W/m^2	300-700 nm	P
4. E _B (Small source)	--	--	300-700 nm	N/A
5. L _R	$1,063 \times 10^2 \text{ W/m}^2\text{sr}$	$2,800 \times 10^5 \text{ W/m}^2\text{sr}$	380-1400 nm	P
6. L _{IR}	0 W/m^2	100 W/m^2	780-3000 nm	P
7. E _{IR}	$0 \text{ W/m}^2\text{sr}$	$9,925 \times 10^4 \text{ W/m}^2\text{sr}$	780-1400 nm	P
8. E _H	$3,814 \text{ W/m}^2$	$3556,56 \text{ W/m}^2$	380-3000 nm	P
TLP-3060 with 6000K is in Exempt Group:				
Optical hazard	Test result	Used hazard exposure limit		Verdict
1. Es	$1,432 \times 10^{-7} \text{ W/m}^2$	$0,001 \text{ W/m}^2$	200-400 nm	P
2. E _{UVA}	$3,192 \times 10^{-3} \text{ W/m}^2$	$0,33 \text{ W/m}^2$	315-400 nm	P
3. L _B	$9,624 \text{ W/m}^2$	100 W/m^2	300-700 nm	P
4. E _B (Small source)	--	--	300-700 nm	N/A
5. L _R	$1,151 \times 10^2 \text{ W/m}^2\text{sr}$	$2,800 \times 10^5 \text{ W/m}^2\text{sr}$	380-1400 nm	P
6. L _{IR}	$1,320 \times 10^{-4} \text{ W/m}^2$	100 W/m^2	780-3000 nm	P
7. E _{IR}	$0 \text{ W/m}^2\text{sr}$	$9,925 \times 10^4 \text{ W/m}^2\text{sr}$	780-1400 nm	P
8. E _H	$4,261 \text{ W/m}^2$	$3556,56 \text{ W/m}^2$	380-3000 nm	P

TLP-R7 with 3000K is in Exempt Group:				
Optical hazard	Test result	Used hazard exposure limit		Verdict
1. E_s	$2,546 \times 10^{-8} \text{ W/m}^2$	$0,001 \text{ W/m}^2$	200-400 nm	P
2. E_{UVA}	$5,626 \times 10^{-4} \text{ W/m}^2$	$0,33 \text{ W/m}^2$	315-400 nm	P
3. L_B	$2,146 \times 10 \text{ W/m}^2$	100 W/m^2	300-700 nm	P
4. E_B (Small source)	--	--	300-700 nm	N/A
5. L_R	$3,569 \times 10^2 \text{ W/m}^2\text{sr}$	$2,800 \times 10^5 \text{ W/m}^2\text{sr}$	380-1400 nm	P
6. L_{IR}	0 W/m^2	100 W/m^2	780-3000 nm	P
7. E_{IR}	$0 \text{ W/m}^2\text{sr}$	$6,000 \times 10^4 \text{ W/m}^2\text{sr}$	780-1400 nm	P
8. E_H	$1,447 \text{ W/m}^2$	$3556,56 \text{ W/m}^2$	380-3000 nm	P
TLP-R7 with 6000K is in Exempt Group:				
Optical hazard	Test result	Used hazard exposure limit		Verdict
1. E_s	$4,602 \times 10^{-8} \text{ W/m}^2$	$0,001 \text{ W/m}^2$	200-400 nm	P
2. E_{UVA}	$1,026 \times 10^{-3} \text{ W/m}^2$	$0,33 \text{ W/m}^2$	315-400 nm	P
3. L_B	$6,626 \times 10 \text{ W/m}^2$	100 W/m^2	300-700 nm	P
4. E_B (Small source)	--	--	300-700 nm	N/A
5. L_R	$8,040 \times 10^2 \text{ W/m}^2\text{sr}$	$2,800 \times 10^5 \text{ W/m}^2\text{sr}$	380-1400 nm	P
6. L_{IR}	0 W/m^2	100 W/m^2	780-3000 nm	P
7. E_{IR}	$0 \text{ W/m}^2\text{sr}$	$6,000 \times 10^4 \text{ W/m}^2\text{sr}$	780-1400 nm	P
8. E_H	$1,554 \text{ W/m}^2$	$3556,56 \text{ W/m}^2$	380-3000 nm	P



Test Report issued under the responsibility of:



TEST REPORT IEC 62471 Photobiological safety of lamps and lamp systems	
Report Reference No.	14715155 001
Date of issue	2015-03-24
Total number of pages	21
CB Testing Laboratory	TÜV Rheinland / CCIC (Ningbo) Co., Ltd.
Address	3F, Building C13, R&D Park, No.32 Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, P.R.China.
Applicant's name	Shenzhen SGSLight Technology Co., Ltd.
Address	5/F, Bldg 4, Baoshu Industrial Park, Baotian 4th Rd, Xixiang, Bao'an District, 518102 Shenzhen, China
Test specification:	
Standard	IEC 62471:2006 EN 62471:2008
Test procedure	CB
Non-standard test method	N/A
Test Report Form No.	IEC62471A
TRF Originator	VDE Testing and Certification Institute
Master TRF	Dated 2009-05
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This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.	
Test item description	LED panel light
Trade Mark	See the rating labels.
Manufacturer	Shenzhen SGSLight Technology Co., Ltd. Jinmeiwei Technology Park, High-tech Industry Park, Guanlan, Baoan, Shenzhen, 518100 Guangdong, P.R. China
Factory	Same as Manufacturer
Model/Type reference	See general product information for detail
Ratings	100-240 V~, 50/60 Hz (See general production for details)

Testing procedure and testing location:	
☒ CB Testing Laboratory:	TÜV Rheinland / CCIC (Ningbo) Co., Ltd.
Testing location/ address	3F, Building C13, R&D Park, No.32 Lane 299 Guanghua Road, National Hi-Tech Zone, Ningbo 315048, P.R.China.
☐ Associated CB Laboratory:	
Testing location/ address	
Tested by (name + signature)..... :	Zeen Xu 
Approved by (+ signature)	Heiko Li 
☐ Testing procedure: TMP	
Tested by (name + signature)..... :	
Approved by (+ signature)	
Testing location/ address	
☐ Testing procedure: WMT	
Tested by (name + signature)..... :	
Witnessed by (+ signature)	
Approved by (+ signature)	
Testing location/ address	
☐ Testing procedure: SMT	
Tested by (name + signature)..... :	
Approved by (+ signature)	
Supervised by (+ signature)..... :	
Testing location/ address	
☐ Testing procedure: RMT	
Tested by (name + signature)..... :	
Approved by (+ signature)	
Supervised by (+ signature)..... :	
Testing location/ address	

Summary of testing:**Tests performed (name of test and test clause):**

All applicable tests as described in test case and measurement sections were performed.

- Following model:
TLP-3060 and TLP-R7 were selected to perform the test, the highest power and the working current is the heaviest.
- Test voltage: 240Vac, 50Hz.
- The tests are carried out at ambient temperature 25°C.
- Test equipment, see attachment 1.

For safety report of standard IEC 60598-1:2008, IEC 60598-2-2:2011, please refer to 17047012 001.

Testing location:**TÜV Rheinland / CCIC (Ningbo) Co., Ltd.**

3F, Building C13, R&D Park, No.32 Lane 299
Guanghua Road, National Hi-Tech Zone, Ningbo
315048, P.R.China.

Summary of compliance with National Differences:

For National Differences see corresponding Attachment.

Copy of marking plate:

Note: this label is only representative, other model label bear the same content and the same design, except model name and rating are different correspondingly.

Test item particulars

Tested lamp: ☒ continuous wave lamps ☐ pulsed lamps

Tested lamp system: LED panel light

Lamp classification group: ☒ exempt ☐ risk 1 ☐ risk 2 ☐ risk 3

Lamp cap: N/A

Bulb: Integral LED module

Rated of the lamp: 100-240V~, 50/60Hz

Furthermore marking on the lamp.....: N/A

Seasoning of lamps according IEC standard: --

Used measurement instrument.....: See equipment list

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..... : Nov.06, 2013

Date (s) of performance of tests..... : Nov.06, 2013- Dec.18, 2013

General remarks:

The test results presented in this report relate only to the object tested.

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.

"(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 point is used as the decimal separator.

List of test equipment must be kept on file and available for review.

General product information:

Product: LED panel light

Rating: AC 100-240V, 50/60Hz

Class II appliance, IP20, Ta 40°C, suitable for mounting on normal flammable surface, not suitable for covering with thermally insulating material.

Model differences:

1. Models listed below have the similar constructions, but external shapes and dimensions and LED driver.
2. LED for models listed below are the same and LED layout of them are similar, CCT.2800-6000K.
3. All LED driver are approved, the Max.output voltage is 40 Vdc.

Model list

Model name	Input parameter	Wattage	LED quantities (pcs)	LED driver
TLP-3060	100-240 Vac, 50/60 Hz	40 W	2835,108pcs	WP-TUV-36-40-1.0A
TLP-6060	100-240 Vac, 50/60 Hz	40 W	2835,108pcs	WP-TUV-36-40-1.0A
TLP-6262	100-240 Vac, 50/60 Hz	40 W	2835,108pcs	WP-TUV-36-40-1.0A
TLP-3012	100-240 Vac, 50/60 Hz	40 W	2835,216pcs	WP-TUV-36-40-1.0A
TLP-6012	100-240 Vac, 50/60 Hz	40 W	2835,216pcs	WP-TUV-36-40-1.0A
TLP-3030	100-240 Vac, 50/60 Hz	15 W	2835,96pcs	WP-TUV-18-40-0.45A
TLP-S7	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A
TLP-S8	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A
TLP-S9	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A
TLP-S12	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A
TLP-R7	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A
TLP-R8	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A
TLP-R9	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A
TLP-R12	100-240 Vac, 50/60 Hz	15 W	2835,60pcs	WP-TUV-18-40-0.45A

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	N/A
4.3	Hazard exposure limits		P
4.3.1	Actinic UV hazard exposure limit for the skin and eye	(See appended test data)	N/A
	The exposure limit for effective radiant exposure is $30 \text{ J}\cdot\text{m}^{-2}$ within any 8-hour period	(See appended test data)	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
4.3.2	Near-UV hazard exposure limit for eye		N/A
	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 $10 \text{ W}\cdot\text{m}^{-2}$.		N/A
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye for time less than 1000 s, shall be computed by:		N/A
	$t_{\max} \leq \frac{10\,000}{E_{\text{UVA}}} \quad \text{s}$		N/A
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
	$I_R = \sum_{380}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \leq \frac{50\,000}{\alpha \cdot t^{0,25}} \quad \text{W} \cdot \text{m}^{-2} \cdot \text{sr}^{-1}$	($10 \mu\text{s} \leq t \leq 10 \text{ s}$)	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:	(See appended test data)	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		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
	$E_{IR} = \sum_{780}^{3000} E_\lambda \cdot \Delta\lambda \leq 18\,000 \cdot t^{-0,75} \quad \text{W} \cdot \text{m}^{-2}$	$t \leq 1000 \text{ s}$	N/A
	For times greater than 1000 s the limit becomes:		N/A

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Clause	Requirement + Test	Result – Remark	Verdict
	$E_{IR} = \sum_{780}^{3000} E_{\lambda} \cdot \Delta\lambda \leq 100 \quad \text{W} \cdot \text{m}^{-2}$	$t > 1000 \text{ s}$	N/A
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
	$E_H \cdot t = \sum_{380}^{3000} \sum_t E_{\lambda}(\lambda, t) \cdot \Delta\lambda \cdot \Delta t \leq 20\,000 \cdot t^{0,25} \quad \text{J} \cdot \text{m}^{-2}$		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)	Sample was stable after being operated with 1 hour.	P
	Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard.		P
5.1.2	Test environment	(See appended test data)	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.		P
5.1.4	Lamp operation	Recessed luminaires	P
	Operation of the test lamp shall be provided in accordance with:		P
	– 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 7mm.		P
	Maximum aperture diameter 50 mm.		P

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Clause	Requirement + Test	Result – Remark	Verdict
	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
	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.		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	(See appended test data)	P
	The determination of α , the angle subtended by 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
	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.	see Annex C	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

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Clause	Requirement + Test	Result – Remark	Verdict
	– 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	Tested at a distance which produced an illuminance of 500 lux.	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	Except Group		P
	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		N/A
	– a near-UV hazard (E_{UVA}) within 1000 s, (about 16 min), nor		N/A
	– 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		N/A
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

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Clause	Requirement + Test	Result – Remark	Verdict
	– 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

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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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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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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 For TLP-3060 with 6000K							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	--	0,003	--	0,03	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	--	33	--	100	--
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	9,652	10000	--	4000000	--
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	1,0*	--	1,0	--	400	--
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	$28000/\alpha$	$1,154 \times 10^2$	$28000/\alpha$	--	$71000/\alpha$	--
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	$6000/\alpha$	--	$6000/\alpha$	--	$6000/\alpha$	--
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	--	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 *** $\alpha = 100,0$ mrad									

Table 6.1 Emission limits for risk groups of continuous wave lamps For TLP-R7 with 6000K									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	--	0,003	--	0,03	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	--	33	--	100	--
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	6,646 x 10	10000	--	4000000	--
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	1,0*	--	1,0	--	400	--
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/ α	8,060x10 ²	28000/ α	--	71000/ α	--
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/ α	--	6000/ α	--	6000/ α	--
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	--	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 *** $\alpha = 100,0$ mrad									

IEC62471A - 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			
Attachment Form No.: EU_GD_IEC62471A			
Attachment Originator: IMQ S.p.A.			
Master Attachment: 2009-07			
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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
	Limits of the Artificial Optical Radiation Directive (2006/25/EC) have been applied instead of those fixed in IEC 62471:2006	See appended Table 6.1	P
4.1	General		P
	First paragraph deleted		—

EN 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 TLP-3060 with 6000K							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	--	--	--	--	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	--	--	--	--	--
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	9,624	10000	--	4000000	--
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	0,01*	--	1,0	--	400	--
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	$28000/\alpha$	$1,151 \times 10^2$	$28000/\alpha$	--	$71000/\alpha$	--
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 $0,0017 \leq \alpha \leq 0,011$	--				
				$6000/\alpha$ $0,011 \leq \alpha \leq 0,1$	--				

Table 6.1	Emission limits for risk groups of continuous wave lamps (based on EU Directive 2006/25/EC) For TLP-3060 with 6000K								P
IR radiation, eye		E _{IR}	W•m ⁻²	100	--	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 *** $\alpha = 100,0$ mrad 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.									

EN 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 TLP-R7 with 6000K							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	--	--	--	--	--
Near UV		E_{UVA}	$W \cdot m^{-2}$	0,33	--	--	--	--	--
Blue light	$B(\lambda)$	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	$6,626 \times 10$	10000	--	4000000	--
Blue light, small source	$B(\lambda)$	E_B	$W \cdot m^{-2}$	0,01*	--	1,0	--	400	--
Retinal thermal	$R(\lambda)$	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	$28000/\alpha$	$8,040 \times 10^2$	$28000/\alpha$	--	$71000/\alpha$	--
Retinal thermal, weak visual stimulus**	$R(\lambda)$	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	545000 $0,0017 \leq \alpha \leq 0,011$	--				
				$6000/\alpha$ $0,011 \leq \alpha \leq 0,1$	--				

EN 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 TLP-R7 with 6000K								P
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	--	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 *** $\alpha = 100,0$ mrad 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.									

-- End of report --