



## SEMLIGHT SEMICONDUCTOR LIGHTING CO., LIMITED

# CE LVD REPORT

Prepared For:	SEMLIGHT SEMICONDUCTOR LIGHTING CO., LIMITED 5F, Building No.2, Yituan Industrial Park, 10th Shangxue Yituan Road, Bantian Street, Longgang District, Shenzhen
Product Name:	LED EXPLOSION PROOF LIGHT
Model :	SEM-EX100-A, SEM-EX20-A, SEM-EX20-B, SEM-EX30-A, SEM-EX30-B, SEM-EX40-A, SEM-EX40-B, SEM-EX50-A, SEM-EX50-B, SEM-EX60-A, SEM-EX60-B, SEM-EX60-C, SEM-EX70-A, SEM-EX70-B, SEM-EX80-A, SEM-EX80-B, SEM-EX90-A, SEM-EX90-B, SEM-EX90-C, SEM-EX100-B, SEM-EX110-A, SEM-EX110-B, SEM-EX120-A, SEM-EX120-B, SEM-EX120-C, SEM-EX150-B, SEM-EX160-C, SEM-EX180-C, SEM-EX200-C, SEM-EX240-C, SEM-EX300-C, SEM-EX360-C
Prepared By :	Shenzhen BST Technology Co., Ltd. Building No.23-24, Zhiheng Industrial Park, Guankouer Road, Nantou, Nanshan District, Shenzhen, Guangdong, China
Test Date:	May. 11- 21, 2013
Date of Report :	May. 21, 2013
Report No.:	BSTDG13050806SR-2



<b>TEST REPORT</b> <b>EN 60598-1 &amp; EN 60598-2-1</b> <b>Luminaires</b> <b>Part 1: General requirements and tests</b> <b>Part 2: Particular requirements</b> <b>Section one – Fixed general purpose luminaires</b> <b>EN 62471</b> <b>Photobiological safety of lamps and lamp systems</b>	
Testing Laboratory Name .....	Shenzhen BST Technology Co., Ltd.
Address .....	Building No.23-24, Zhiheng Industrial Park, Guankouer Road, Nantou, Nanshan District, Shenzhen, Guangdong, China
Testing location .....	Shenzhen BST Technology Co., Ltd.
Applicant's Name .....	SEMLIGHT SEMICONDUCTOR LIGHTING CO., LIMITED
Address .....	5F, Building No.2, Yituan Industrial Park, 10th Shangxue Yituan Road, Bantian Street, Longgang District, Shenzhen
Manufacturer .....	SEMLIGHT SEMICONDUCTOR LIGHTING CO., LIMITED
Address .....	5F, Building No.2, Yituan Industrial Park, 10th Shangxue Yituan Road, Bantian Street, Longgang District, Shenzhen
<b>Test specification</b>	
Standard .....	EN 60598-1:2008+A11:2009 + EN 60598-2-1:1989 + EN 62471:2008
Test item description .....	LED EXPLOSION PROOF LIGHT
Trademark .....	SEMLIGHT
Model and/or type reference .....	SEM-EX100-A, SEM-EX20-A, SEM-EX20-B, SEM-EX30-A, SEM-EX30-B, SEM-EX40-A, SEM-EX40-B, SEM-EX50-A, SEM-EX50-B, SEM-EX60-A, SEM-EX60-B, SEM-EX60-C, SEM-EX70-A, SEM-EX70-B, SEM-EX80-A, SEM-EX80-B, SEM-EX90-A, SEM-EX90-B, SEM-EX90-C, SEM-EX100-B, SEM-EX110-A, SEM-EX110-B, SEM-EX120-A, SEM-EX120-B, SEM-EX120-C, SEM-EX150-B, SEM-EX160-C, SEM-EX180-C, SEM-EX200-C, SEM-EX240-C, SEM-EX300-C, SEM-EX360-C
Rating(s) .....	230V~ 50Hz 100W
<b>Test case verdicts</b>	
Test case does not apply to the test object ....	N/A
Test item does meet the requirement .....	P(ass)
Test item does not meet the requirement .....	F(ail)



General remarks

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

The test results presented in this report relate only to the item(s) tested.

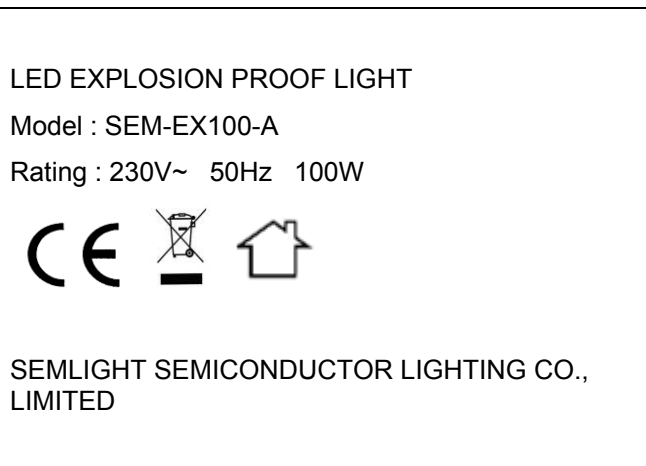
"(see remark #)" refers to a remark appended to the report.

"(see Annex #)" refers to an annex appended to the report.

Clause numbers between brackets refer to clauses in IEC 60 598-1 (EN 60 598-1)

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

Copy of marking plate:





**Name and address of the testing laboratory : Shenzhen BST Technology Co.,Ltd.**  
**Building No.23-24, Ziheng Industrial Park,**  
**Guankouer Road, Nantou, Nanshan**  
**District,Shenzhen,Guangdong,China**

**Test by :** Sgan May. 21, 2013  
Signature Date  
Technician  
Title

**Review by :** Apple Li May. 21, 2013  
Signature Date  
Project Engineer  
Title

**Approved by :**  May. 21, 2013  
Signature Date  
Christina/ Manager  
Name and Title



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict

1.1 (0)	SCOPE		P
1.1 (0.1)	More sections applicable.....	Yes [ ]      No [ ]	—

1.4 (2)	CLASSIFICATION		P
1.4 (2.2)	Type of protection.....	Class I	—
1.4 (2.3)	Degree of protection.....	IP 65	—
1.4 (2.4)	Portable or handheld luminaire .....	No	—
	Fixed luminaire suitable for normally flammable surfaces .....	Yes	—
	Fixed luminaire suitable for non-combustible materials only .....	No	—
1.4 (2.5)	Luminaire for normal use .....	Yes	—
	Luminaire for rough service .....	No	—

1.5 (3)	MARKING		P
1.5 (3.2)	Mandatory markings		--
	Position of the marking	On the enclosure	P
	Format of symbols/text	Symbols: 5.0mm min; Letter: 2.0mm min.	P
1.5 (3.3)	Additional information		--
	Language of instructions	English	P
1.5 (3.3.1)	Combination luminaires		N
1.5 (3.3.2)	Nominal frequency in Hz	50Hz	P
1.5 (3.3.3)	Operating temperature		N
1.5 (3.3.4)	Symbol or warning notice		N
1.5 (3.3.5)	Wiring diagram		P
1.5 (3.3.6)	Special conditions		N
1.5 (3.3.7)	Metal halid lamp luminaire – warning		N
1.5 (3.3.8)	Limitation for semi-luminaires		N
1.5 (3.3.9)	Power factor and supply current		N
1.5 (3.3.10)	Suitability for use indoors		P
1.5 (3.3.11)	Luminaires with remote control		N



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
1.5 (3.3.12)	Clip-mounted luminaire – warning		N
1.5 (3.3.13)	Specifications of protective shields		P
1.5 (3.3.14)	Symbol for nature of supply	~	P
1.5 (3.3.15)	Rated current of socket outlet	No socket outlet	N
1.5 (3.3.16)	Rough service luminaire		N
1.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	Type Y	P
1.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N
1.5 (3.3.19)	The protective conductor current shall be clearly stated in the manufacturers' instructions		N
1.5 (3.4)	Test with water	15s with water	P
	Test with hexane	15s with hexane	P
	Legible after test	Yes	P
	Label attached	The marking not be easily removable and shows no curling	P

1.6 (4)	CONSTRUCTION		P
1.6 (4.2)	Components replaceable without difficulty		N
1.6 (4.3)	Wireways smooth and free from sharp edges		P
1.6 (4.4)	Lampholders		P
1.6 (4.4.1)	Integral lampholder	Not integral lampholder	N
1.6 (4.4.2)	Wiring connection		N
1.6 (4.4.3)	Lampholder for end-to-end mounting		N
1.6 (4.4.4)	Positioning		N
1.6 (4.4.5)	Peak pulse voltage		N
1.6 (4.4.6)	Centre contact		N
1.6 (4.4.7)	Rough service luminaires	Ordinary luminaires	N
1.6 (4.4.8)	Lamp connectors	No lamp connector provided	N
1.6 (4.5)	Starter holders		--
	Starter holder in luminaires other than class II		N



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
	Starter holder class II construction		N
1.6 (4.6)	Terminal blocks		N
	Tails		N
	Unsecured blocks		N
1.6 (4.7)	Terminals and supply connections		P
1.6 (4.7.1)	Contact to metal parts		P
1.6 (4.7.2)	Test 8 mm live conductor		P
	Test 8 mm earth conductor		P
1.6 (4.7.3)	Terminals for supply conductors		P
1.6 (4.7.4)	Terminals other than supply connection		N
1.6 (4.7.5)	Heat-resistant wiring/sleeves		P
1.6 (4.7.6)	Multi-pole plug	No multi-pole plug	N
1.6 (4.8)	Switches:		--
	- adequate rating	No switch	N
	- adequate fixing		N
	- polarized supply		N
1.6 (4.9)	Insulating lining and sleeves		--
1.6 (4.9.1)	Retainment		P
	Method of fixing .....		P
1.6 (4.9.2)	Insulated linings and sleeves		--
	a) & c) Insulation resistance and electric strength		P
	b) Ageing test. Temperature (°C) .....		P
1.6 (4.10)	Insulation of Class II luminaires		N
1.6 (4.10.1)	No contact, mounting surface - accessible metal parts - wiring of basic insulation		N
	Safe installation fixed luminaires		N
	Capacitors		N
	Interference suppression capacitors according to IEC 60384-14		N
1.6 (4.10.2)	Assembly gaps:		N
	- not coincidental		N
	- no straight access with test probe		N
1.6 (4.10.3)	Retainment of insulation:		--



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
	- fixed		N
	- unable to be replaced; luminaire inoperative		N
	- sleeves retained in position		N
	- lining in lampholder		N
1.6 (4.11)	Electrical connections		P
1.6 (4.11.1)	Contact pressure		P
1.6 (4.11.2)	Screws:		--
	- self-tapping screws		N
	- thread-cutting screws		N
	- at least two self-tapping screws		P
1.6 (4.11.3)	Screw locking:		--
	- spring washer		P
	- rivets		N
1.6 (4.11.4)	Material of current-carrying parts		P
1.6 (4.11.5)	No contact to wood	No wood material in the luminaire	N
1.6 (4.11.6)	Electro-mechanical contact systems	No such systems	N
1.6 (4.12)	Mechanical connections and glands		--
1.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N
	Torque test: torque (Nm); part.....:	Enclosure: 2.87mm , 0.5Nm	P
	Torque test: torque (Nm); part.....:		N
	Torque test: torque (Nm); part.....:		N
1.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N
1.6 (4.12.4)	Locked connections:		--
	- fixed arms; torque (Nm).....:		N
	- lampholder; torque (Nm) .....		N
	- push-button switches; torque 0,8 Nm .....		N





EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
1.6 (4.12.5)	Screwed glands; force (N).....:		N
1.6 (4.13)	Mechanical strength		--
1.6 (4.13.1)	Impact tests:		--
	- fragile parts; energy (Nm) .....		N
	- other parts; energy (Nm) .....	0.35Nm	P
	1) live parts	Unlikely become accessible	P
	2) linings		N
	3) protection	Continue to afford the degree of protection against ingress of dust, solid objects and moisture	P
	4) covers		N
1.6 (4.13.3)	Straight test finger		N
1.6 (4.13.4)	Rough service luminaires		--
	a) fixed		N
	b) hand-held		N
	c) delivered with a stand		N
	d) for temporary installations and suitable for mounting on a stand		N
1.6 (4.13.6)	Tumbling barrel		N
1.6 (4.14)	Suspensions and adjusting devices		--
1.6 (4.14.1)	Mechanical load:		--
	A) four times the weight		P
	B) torque 2,5 Nm		N
	C) bracket arm; bending moment (Nm).....:		N
	D) load track-mounted luminaires		N
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) .....		N
	metal rod. Diameter (mm) .....		N
1.6 (4.14.2)	Load to flexible cables		--
	Mass (kg).....:		N



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
	Stress in conductors (N/mm <sup>2</sup> ).....:		N
	Semi-luminaires – mass (kg) .....		N
	Semi-luminaires – bending moment (Nm).....:		N
1.6 (4.14.3)	Adjusting devices:		--
	- flexing test; number of cycles.....:		N
	- strands broken		N
	- electric strength test afterwards		N
1.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors	No telescopic tubes	N
1.6 (4.14.5)	Guide pulleys	No guide pulleys	N
1.6 (4.14.6)	Strain on socket-outlets	No socket-outlet	N
1.6 (4.15)	Flammable materials:		P
	- glow-wire test 650 °C		P
	- spacing ≥ 30 mm		P
	- screen withstanding test of 13.3.1		N
	- screen dimensions		N
	- no fiercely burning material		P
	- thermal protection		N
	- electronic circuits exempted		P
1.6 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		--
	a) construction		N
	b) temperature sensing control		N
	c) surface temperature		N
1.6 (4.16)	Luminaires marked with F-symbol		--
	No lamp control gear	(compliance with Section 12)	N
1.6 (4.16.1)	Lamp control gear spacing:		--
	- spacing 35 mm		N
	- spacing 10 mm		P
1.6 (4.16.2)	Thermal protection:		--
	- in lamp control gear		N



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
	- external		N
	- fixed position		N
	- temperature marked lamp control gear		N
1.6 (4.16.3)	"F" curve measured	(see 12.6)	N
1.6 (4.17)	Drain holes	Not protection against water	N
	Clearance at least 5 mm		N
1.6 (4.18)	Resistance to corrosion:		--
1.6 (4.18.1)	- rust-resistance		N
1.6 (4.18.2)	- season cracking in copper		N
1.6 (4.18.3)	- corrosion of aluminium		N
1.6 (4.19)	Ignitors compatible with ballast		N
1.6 (4.20)	Rough service vibration .....		N
1.6 (4.21)	Protective shield:		--
1.6 (4.21.1)	Shield fitted		P
1.6 (4.21.2)	Particles from a shattering lamp not impair safety		N
1.6 (4.21.3)	No direct path		N
1.6 (4.21.4)	Impact test on shield		N
	Glow-wire test on lamp compartment		N
1.6 (4.22)	Attachments to lamps	No attachments	N
1.6 (4.23)	Semi-luminaires comply class II		N
1.6 (4.24)	UV radiation		N
1.6 (4.25)	No sharp point or edges	No sharp points or edges	P
1.6 (4.26)	Short-circuit protection:		N
1.6 (4.26.1)	Uninsulated accessible SELV parts		N
1.6 (4.26.2)	Short-circuit test		N
1.6 (4.26.3)	Test chain according to IEC 61032		N



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
1.7 (11)	CREEPAGE DISTANCES AND CLEARANCES		P
	Working voltage (V) .....	230V ac	—
	Voltage form	Sinusoidal	—
	PTI	< 600V	—
	Rated pulse voltage (kV) .....	--	—
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm) .....		P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm) .....		P
	(3) Parts becoming live due to breakdown of basic insulation and metal parts: cr (mm); cl (mm) .....		N
	(4) Outer surface of cable where it is clamped and metal parts: cr (mm); cl (mm) .....		N
	(5) Current-carrying parts of switches and metal parts, after removal of insulation: cr (mm); cl (mm) .....		N
	(6) Current-carrying parts and supporting surface: cr (mm); cl (mm) .....		P

1.8 (7)	PROVISION FOR EARTHING		P
1.8 (7.2.1 + 7.2.3)	Accessible metal parts		N
	Metal parts in contact with supporting surface		P
	Resistance < 0,5 Ω	0.2Ω	P
	Two self-tapping screws used		N
	Thread-forming screws		N
	Connector earthing first		P
1.8 (7.2.2 + 7.2.3)	Earth continuity in joints etc.		P
1.8 (7.2.4)	Locking of clamping means		N
	Compliance with 4.7.3		N
1.8 (7.2.5)	Earth terminal integral part of connector socket		N
1.8 (7.2.6)	Earth terminal adjacent to mains terminals		N
1.8 (7.2.7)	Electrolytic corrosion of the earth terminal		N
1.8 (7.2.8)	Material of earth terminal		P
	Contact surface bare metal		N



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
1.8 (7.2.10)	Class II luminaire for looping-in		N
1.8 (7.2.11)	Earthing core coloured green-yellow		P
	Length of earth conductor		P

1.9 (14)	SCREW TERMINALS		N
	Separately approved; component list		N
	Part of the luminaire		N

1.9 (15)	SCREWLESS TERMINALS		N
	Separately approved; component list		N
	Part of the luminaire		N

1.10 (5)	EXTERNAL AND INTERNAL WIRING		P
1.10 (5.2)	Supply connection and external wiring		--
1.10 (5.2.1)	Means of connection .....	Non-detachable cable	P
1.10 (5.2.2)	Type of cable .....		P
	Nominal cross-sectional area (mm <sup>2</sup> ) .....	0.75 mm <sup>2</sup>	P
1.10 (5.2.3)	Type of attachment, X, Y or Z	Type Y	P
1.10 (5.2.5)	Type Z not connected to screws		N
1.10 (5.2.6)	Cable entries:		--
	- suitable for introduction		P
	- adequate degree of protection		P
1.10 (5.2.7)	Cable entries through rigid material have rounded edges		N
1.10 (5.2.8)	Insulating bushings:		--
	- suitably fixed		N
	- material in bushings		N
	- tubes or guards made of insulating material		N



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
1.10 (5.2.9)	Locking of screwed bushings		N
1.10 (5.2.10)	Cord anchorage:		--
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P
	- no tying of cables into knots etc.		P
	- insulating material or lining		P
1.10 (5.2.10.1)	Cord anchorage for type X attachment:		--
	a) at least one part fixed		N
	b) types of cable		N
	c) no damaging of the cable		N
	d) whole cable can be mounted		N
	e) no touching of clamping screws		N
	f) metal screw not directly on cable		N
	g) replacement without special tool		N
	Glands not used as anchorage		N
	Labyrinth type anchorages		N
1.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment	Type Y	P
1.10 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N).....:		N
	- torque test: torque (Nm) .....		N
	- displacement $\leq 2$ mm		P
	- no movement of conductors		P
	- no damage of cable or cord		N
1.10 (5.2.11)	External wiring passing into luminaire		N
1.10 (5.2.12)	Looping-in terminals		N
1.10 (5.2.13)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		P



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
1.10 (5.2.14)	Mains plug same protection		N
	Class III luminaire plug		N
1.10 (5.2.15)	Colour code low voltage		N
1.10 (5.2.16)	Appliance inlets (IEC 60320)		N
	Appliance couplers of class II type		N
1.10 (5.3)	Internal wiring		--
1.10 (5.3.1)	Internal wiring of suitable size and type	suitable size	P
	Through wiring		--
	- not delivered/ mounting instruction		N
	- factory assembled		N
	- socket outlet loaded (A) .....		N
	- temperatures .....		N
	Green-yellow for earth only		N
1.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		P
	Cross-sectional area (mm <sup>2</sup> ).....	-	P
	Insulation thickness		P
	Extra insulation added where necessary		N
1.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		--
	Adequate cross-sectional area and insulation thickness		P
1.10 (5.3.1.3)	Double or reinforced insulation for class II		N
1.10 (5.3.1.4)	Conductors without insulation		N
1.10 (5.3.1.5)	SELV current-carrying parts		N
1.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N
1.10 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		N
	Joints, raising/lowering devices		N



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
	Telescopic tubes etc.		N
	No twisting over 360°		N
1.10 (5.3.3)	Openings		N
	Bushings not removable		N
	Bushings in sharp openings		N
	Cables with protective sheath		N
1.10 (5.3.4)	Joints and junctions effectively insulated		N
1.10 (5.3.5)	Strain on internal wiring		P
1.10 (5.3.6)	Wire carriers		N
1.10 (5.3.7)	Wire ends not tinned		N
	Wire ends tinned: no cold flow		N

1.11 (8)	PROTECTION AGAINST ELECTRIC SHOCK		P
1.11 (8.2.1)	Live parts not accessible		P
	Protection in any position		P
	Double-ended tungsten filament lamp		N
	Insulation lacquer not reliable	No insulation lacquer	N
	Double-ended high pressure discharge lamp	No double-ended high pressure discharge lamp	N
1.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position	Fixed luminaire	N
1.11 (8.2.3)	Class II luminaire:		P
	- basic insulated metal parts not accessible during starter or lamp replacement		P
	- basic insulation not accessible other than during starter or lamp replacement		P
	- glass protective shields not used as supplementary insulation		P
	Class I luminaire with BC lampholder		N
1.11 (8.2.4)	Portable luminaire:		--





EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
	- protection independent of supporting surface		N
	- terminal block completely covered		N
1.11 (8.2.6)	Covers reliably secured		N
1.11 (8.2.7)	Discharging of capacitors $\geq 0,5 \mu\text{F}$	No capacitors	P
	Portable plug connected luminaire with capacitor		N
	Other plug connected luminaire with capacitor		N
	Discharge device on or within capacitor		N
	Discharge device mounted separately		N

1.12 (12)	ENDURANCE TEST AND THERMAL TEST		P
1.12 (12.3)	Endurance test:		P
	- mounting-position .....	Normal position	—
	- test temperature (°C).....	35°C	—
	- total duration (h) .....	240h	—
	- supply voltage: Un factor; calculated voltage (V) .....	243.8V	—
	- lamp used .....		—
1.12 (12.3.2)	After endurance test:		--
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N
	- marking legible	Marking still legible and shows no curling	P
	- no cracks, deformation etc.		P
1.12 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
1.12 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	P
1.12 (12.6)	Thermal test (failed lamp control gear condition):		--
1.12 (12.6.1)	- case of abnormal conditions .....		—
	- electronic lamp control gear		N
	- measured winding temperature (°C) at 1,1 Un .:		—
	- measured mounting surface temperature (°C) at 1,1 Un .....		N



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
	- calculated mounting surface temperature (°C) .:		N
	- track-mounted luminaires		N
1.12 (12.6.2)	Temperature sensing control		--
	- case of abnormal conditions .....		—
	- thermal link		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- measured mounting surface temperature (°C) :		N
	- track-mounted luminaires		N
1.12 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N
	- case of abnormal conditions .....		—
1.12 (12.7.1)	- measured winding temperature (°C) at 1,1 Un .:		—
	- measured temperature of fixing point/ exposed part (°C) at 1,1 Un .....		N
	- calculated temperature of fixing point/ exposed part (°C) .....		N
1.12 (12.7.2)	Temperature sensing control		--
	- thermal link		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- measured temperature of fixing point/ exposed part (°C) .....		N

1.13 (9)	RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE		P
1.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		--
	- classification according to IP .....	IP65	P
	- mounting position during test .....		—
	- fixing screws tightened; torque (Nm).....		—
	- tests according to clauses .....		—
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		P
	b) no talcum in dust-tight luminaire		N



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
	c) no trace of water on current-carrying parts or where it could become a hazard		P
	d) i) For luminaires without drain holes – no water entry		P
	d) ii) For luminaires with drain holes – no hazardous water entry		N
	e) no water in watertight luminaire		N
	f) no contact with live parts (IP 2X)		P
	f) no entry into enclosure (IP 3X and IP 4X)		N
1.13 (9.3)	Humidity test 48 h	25 , 93%	P

1.14 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
1.14 (10.2.1)	Insulation resistance test		--
	Insulation resistance (MΩ):		--
	SELV:		N
	- between current-carrying parts of different polarity .....		N
	- between current-carrying parts and mounting surface .....		N
	- between current-carrying parts and metal parts of the luminaire .....		N
	Other than SELV:		--
	- between live parts of different polarity.....	> 100MΩ	P
	- between live parts and mounting surface .....	> 100MΩ	P
	- between live parts and enclosure.....	> 100MΩ	P
	- between live parts of different polarity through action of a switch .....		N
1.14 (10.2.2)	Electric strength test		--
	Dummy lamp		N
	Luminaires with ignitors after 24 h test		N
	Luminaires with manual ignitors		N
	Test voltage (V):		--
	SELV:		N
	- between current-carrying parts of different polarity .....		N



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
	- between current-carrying parts and mounting surface .....		N
	- between current-carrying parts and metal parts of the luminaire .....		N
	Other than SELV:		--
	- between live parts of different polarity.....	1460V	P
	- between live parts and mounting surface .....	2920V	P
	- between live parts and enclosure.....	2920V	P
	- between live parts of different polarity through action of a switch .....		N
1.14 (10.3.1)	Leakage current (mA).....	0.09mA	P

1.15 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		P
1.15 (13.2.1)	Ball-pressure test:		--
	- part tested; temperature (°C) .....	Plastic	P
	- part tested; temperature (°C) .....		N
1.15 (13.3.1)	Needle flame test (10 s):		P
	- part tested .....		N
	- part tested .....		N
1.15 (13.3.2)	Glow wire test (650°C):		--
	- part tested .....	Plastic	P
	- part tested .....		N
1.15 (13.4.1)	Tracking test: part tested .....		N

	COMMON MODIFICATIONS		N
(3.3.101 + 5.2.1)	For luminaires connected by tails, information about terminal block		N
(5.2.2)	Cables equal to HD 21 S2 or HD 22 S2		N
(5.2.15)	Colour code low voltage		N

ZB	ANNEX ZB, SPECIAL NATIONAL CONDITIONS		N
(2.2)	Class 0 not accepted		N



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
(3.3)	DK: power supply cord with label		N
	IT: warning label on Class 0 luminaire		N
(4.5.1)	DK: socket-outlets		N
(4.5.1)	FR: socket-outlets		N
(5.2.1)	DK, FI, SE, GB: type of plug		N

ZC	ANNEX ZC, NATIONAL DEVIATIONS		N
(13.3)	DK: Needle flame test or glow-wire test 750°C for luminaires in access routes		N
(13.3)	GB: Requirements according to United Kingdom Building Regulation		N
(13.3.2)	FR: Glow-wire test 850°C alt. 750°C for luminaires in premises open to public and workers		N

ANNEX 1: components					P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
Lampholder	Xiangfa (Fengwei) Electric & Accessory Factory	--	FENG WEI 250V 500W	UL	E212050
Alternate Lampholder	Yarnic Lighting Technology Co. Ltd.	YX305	250V 6A T250	VDE	40008792
Electric wire	Guangzhou Feng Tai Electronic Co., Ltd.	FT-FEP-102	TAIFULONG FT-FEP-102 18AWG 0.75MM <sup>2</sup> 180 300/500V	VDE	40013289
Heat shrinkable tube	Dongguan Salipt Co Ltd	SALIPT S- 901-600	AC 600V, T125, E209436	UL	E209436
(Alternate tube) Silicone Glassfiber sleeving	Yongchao Insulation Material(Dongguan) Co., Ltd.		Silicone Glassfiber sleeving	SGS SVHC	CANEC130 142222001
(Alternate tube) Glass fibre tube	Donguan Juyou Insulation Material Co Ltd	JTY	Silicone- varnished fiberglass sleeving	UL	E255729

ANNEX 2: temperature measurements, thermal tests of Section 12					P
--	--	--	--	--	---



EN 60598-1 & EN 60598-2-1						
Cl.	Requirement – Test	Result				Verdict
	Type reference .....	LED EXPLOSION PROOF LIGHT				—
	Lamp used .....	SEM-EX100-A				—
	Lamp control gear used.....					—
	Mounting position of luminaire.....					—
	Supply wattage (W) .....	100W				—
	Supply voltage (V) .....	230V				—
	Supply current (A).....	0.455A				—
	Calculated power factor .....	--				—
	Table: measured temperatures corrected for ta = 25 °C:					P
	- abnormal operating mode .....	--				—
	- test 1: rated voltage .....					—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage .....	243.8V				—
	- 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 .....	--				—
temperature (°C) of part		clause 12.4 - normal			clause 12.5 - abnormal	
		test 1	test 2	test 3	limits	test 4 limit
	Enclosure		39.6		85	44.6 85
	Mounting surface		45.8		105	52.6 105
	Ambient		25.2		--	26.0
	ANNEX 3: screw terminals (part of the luminaire)					N
(14)	SCREW TERMINALS					--
(14.2)	Type of terminal .....					—
	Rated current (A) .....					—
(14.3.2.1)	One or more conductors					N
(14.3.2.2)	Special preparation					N
(14.3.2.3)	Terminal size					N
	Cross-sectional area (mm <sup>2</sup> ).....					N
(14.3.3)	Conductor space (mm).....					N
(14.4)	Mechanical tests					--
(14.4.1)	Minimum distance					N
(14.4.2)	Cannot slip out					N



EN 60598-1 & EN 60598-2-1			
Cl.	Requirement – Test	Result	Verdict
(14.4.3)	Special preparation		N
(14.4.4)	Nominal diameter of thread (metric ISO thread) .:		N
	External wiring		N
	No soft metal		N
(14.4.5)	Corrosion		N
(14.4.6)	Nominal diameter of thread (mm).....:		N
	Torque (Nm) .....		N
(14.4.7)	Between metal surfaces		N
	Lug terminal		N
	Mantle terminal		N
	Pull test; pull (N) .....		N
(14.4.8)	Without undue damage		N
	ANNEX 4: SCREWLESS TERMINALS (PART OF THE LUMINAIRE)		N
(15)	SCREWLESS TERMINALS		--
(15.2)	Type of terminal.....:		—
	Rated current (A) .....		—
(15.3.1)	Material		N
(15.3.2)	Clamping		N
(15.3.3)	Stop		N
(15.3.4)	Unprepared conductors		N
(15.3.5)	Pressure on insulating material		N
(15.3.6)	Clear connection method		N
(15.3.7)	Clamping independently		N
(15.3.8)	Fixed in position		N
(15.3.10)	Conductor size		N
	Type of conductor		N
(15.5.1)	Terminals internal wiring		N
(15.5.1.1)	Pull test spring-type terminals (4 N, 4 samples)		N
(15.5.1.2)	Pull test pin or tab terminals (4 N, 4 samples)		N
	Insertion force not exceeding 50 N		N
(15.5.2)	Permanent connections: pull-off test (20 N)		N
(15.6)	Electrical tests		N
	Voltage drop (mV) after 1 h (4 samples).....:		N
	Voltage drop of two inseparable joints		N



EN 60598-1 & EN 60598-2-1												
Cl.	Requirement – Test										Result	Verdict
	Number of cycles.....:											—
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:											N
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:											N
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:											N
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:											N
(15.7)	Terminals external wiring											N
	Terminal size and rating											N
(15.8.1)	Pull test spring-type terminals (4 samples); pull (N)											N
	Pull test pin or tab terminals (4 samples); pull (N)											N
(15.9)	Contact resistance test											N
	Voltage drop (mV) after 1 h											N
terminal	1	2	3	4	5	6	7	8	9	10		
voltage drop (mV)												
	Voltage drop of two inseparable joints											
	Voltage drop after 10th alt. 25th cycle											
	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											
	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											
	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											
	Max. allowed voltage drop (mV).....:											—
terminal	1	2	3	4	5	6	7	8	9	10		
voltage drop (mV)												





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Cl.	Requirement – Test	Result	Verdict
1	SCOPE		P
	More sections applicable .....	Yes [ <input checked="" type="checkbox"/> ]      No [ <input type="checkbox"/> ]	—

4	EXPOSURE LIMITS		P
4.1	General		P
4.2	Specific factors involved in the determination and application of retinal exposure limits		P
4.2.1	Pupil diameter		N
4.2.2	Angular subtense of source and measurement field-of-view		P
4.3	Hazard exposure limits		P
4.3.1	Actinic UV hazard exposure limit for the skin and eye		N
4.3.2	Near-UV hazard exposure limit for the eye		N
4.3.3	Retinal blue light hazard exposure limit		N
4.3.4	Retinal blue light hazard exposure limit - small source		P
4.3.5	Retinal thermal hazard exposure limit		N
4.3.6	Retinal thermal hazard exposure limit – weak visual stimulus		N
4.3.7	Infrared radiation hazard exposure limits for the eye		N
4.3.8	Thermal hazard exposure limit for the skin		N
5	MEASUREMENT OF LAMPS AND LAMP SYSTEMS		P
5.1	Measurement conditions		--
5.1.1	Lamp ageing (seasoning) .....		P
5.1.2	Test environment .....		P
5.1.3	Extraneous radiation .....		N
5.1.4	Lamp operation .....		P
5.1.5	Lamp system operation .....		N
5.2	Measurement procedure		--
5.2.1	Irradiance measurements .....		N
5.2.2	Radiance measurements .....		N
5.2.2.1	Standard method .....		N
5.2.2.2	Alternative method .....		P
5.2.3	Measurement of source size .....		P
5.2.4	Pulse width measurement for pulsed sources.....		N



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Cl.	Requirement – Test	Result	Verdict
5.3	Analysis methods		P
5.3.1	Weighting curve interpolations .....		P
5.3.2	Calculations .....		P
5.3.3	Measurement uncertainty .....		N
6	LAMP CLASSIFICATION		--
	This standard was developed by CIE TC 6-47 with representation of IEC SC34A. This joint effort was deemed important so that issues concerning risk group classification and distance at which the photobiological hazard values due to lamp radiation are reported could be agreed upon. Since lamps may be hazardous from several aspects, a classification scheme is helpful. For the purposes of this standard it was decided that the values shall be reported as follows:		N
	for lamps intended for general lighting service (GLS), see definition 3.11, 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;		N
	for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm.		N
6.1	Continuous wave lamps		P
6.1.1	Exempt group	See table 6.1	P
	The philosophical basis for the exempt group classification is that the lamp does not pose any photobiological hazard for the end points in this standard. This requirement is met by any lamp that does not pose		P
	an actinic ultraviolet hazard ( $E_s$ ) within 8-hours exposure (30000 s), nor		P
	a near-UV hazard ( $E_{UVA}$ ) within 1000 s, (about 16 min) nor		P
	a retinal blue-light hazard ( $L_B$ ) within 10000 s (about 2,8 h), nor		P
	a retinal thermal hazard ( $L_R$ ) within 10 s, nor		P
	an infrared radiation hazard for the eye ( $E_{IR}$ ) within 1000 s.		P
6.1.2	Risk Group 1 (Low-Risk)		N
	The philosophical basis for this classification is that the lamp does not pose a hazard due to normal behavioral limitations on exposure. This requirement is met by any lamp that exceeds the limits for the Exempt Group but that does not pose		N



EN 62471			
Cl.	Requirement – Test	Result	Verdict
	an actinic ultraviolet hazard ( $E_s$ ) within 10000 s, nor		N
	a near ultraviolet hazard ( $E_{UVA}$ ) within 300 s, nor		N
	a retinal blue-light hazard ( $L_B$ ) within 100 s, nor		N
	a retinal thermal hazard ( $L_R$ ) within 10 s, nor		N
	an infrared radiation hazard for the eye ( $E_{IR}$ ) within 100 s.		N
6.1.3	Risk Group 2 (Moderate-Risk)		N
	The philosophical basis for the Risk Group 2 (Moderate-Risk) classification is that the lamp does not pose a hazard due to the aversion response to very bright light sources or due to thermal discomfort. This requirement is met by any lamp that exceeds the limits for Risk Group 1 (Low-Risk), but that does not pose		N
	an actinic ultraviolet hazard ( $E_s$ ) within 1000 s exposure, nor		N
	a near ultraviolet hazard ( $E_{UVA}$ ) within 100 s, nor		N
	a retinal blue-light hazard ( $L_B$ ) within 0,25 s (aversion response), nor		N
	a retinal thermal hazard ( $L_R$ ) within 0,25 s (aversion response), nor		N
	an infrared radiation hazard for the eye ( $E_{IR}$ ) within 10 s.		N
6.1.4	Risk Group 3 (High-Risk)		N
	The philosophical basis for this classification is that the lamp may pose a hazard even for momentary or brief exposure. Lamps which exceed the limits for Risk Group 2 (Moderate-Risk) are in Risk Group 3 (High-Risk).		N
6.2	Pulsed lamps		N
	Pulsed lamp criteria shall apply to a single pulse and to any group of pulses within 0,25 second.		N

ANNEX A	SUMMARY OF BIOLOGICAL EFFECTS		--
	<b>Bioeffect datasheet #1: Infrared cataract</b>		N
A.1	<b>Bioeffect:</b> INFRARED CATARACT also known as "industrial heat cataract", "furnaceman's cataract", or "glassblower's cataract".		N
A.1.1	Organ/Site: Eye/Crystalline Lens.		N
A.1.2	<b>Spectral range:</b> 700 nm to 1400 nm and possibly to 3000 nm.		N
A.1.3	<b>Peak of action spectrum:</b> Not known; probably between 900-1000 nm.		N



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Cl.	Requirement – Test	Result	Verdict
A.1.4	<b>State of knowledge:</b> Limited threshold data available for acute cataract for rabbit at 1064 nm (Wolbarsht, 1992) and IR-A region (Pitts and Cullen, 1981); no data for man. Degree of additivity and action spectrum unknown. Good epidemiological evidence (Lydahl, 1984).		N
A.1.5	<b>Time course:</b> Noticeable clouding of the lens generally following years of chronic high-level exposure, the elapsed time depending upon how much difference between exposure and threshold, heavy exposures producing reaction in shortest time.		N
A.1.6	<b>Mechanism:</b> Generally presumed to be thermal, although recent evidence suggests possible photochemical reaction - details not understood. The lens may be heated either from direct irradiation (Vogt, 1919) or by conductive heating from the heated iris (Goldmann, 1983).		N
A.1.7	<b>Symptoms:</b> Clouding of vision.		N
A.1.8	<b>Needed information:</b> Action spectrum, if existent, for acute and for effects of concomitant ultraviolet radiation exposure; additivity of multiple exposures, and the possibility of delayed effects from recurrent exposures.		N
A.1.9	<b>Experience with lamps:</b> Accidental injury is not known, even from exposure to heat lamps. Limited population exposed.		N
A.1.10	Key references		N

A.2	Bioeffect		P
A.2.1	Organ/Site		P
A.2.2	Spectral range		P
A.2.3	Peak of action spectrum		P
A.2.4	State of knowledge		P
A.2.5	Time course		P
A.2.6	Mechanism		P
A.2.7	Symptoms		P
A.2.8	Needed information		P
A.2.9	Experience with lamps		P
A.2.10	Key references		P
A.3	Bioeffect		N
A.3.1	Organ/Site		N
A.3.2	Spectral range		N



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Cl.	Requirement – Test	Result	Verdict
A.3.3	Peak of action spectrum		N
A.3.4	State of knowledge		N
A.3.5	Time course		N
A.3.6	Mechanism		N
A.3.7	Symptoms		N
A.3.8	Needed information		N
A.3.9	Experience with lamps		N
A.3.10	Key references		N
A.4	Bioeffect		N
A.4.1	Organ/Site		N
A.4.2	Spectral range		N
A.4.3	Peak of action spectrum		N
A.4.4	State of knowledge		N
A.4.5	Time course		N
A.4.6	Mechanism		N
A.4.7	Symptoms		N
A.3.8	Needed information		N
A.4.9	Experience with lamps		N
A.4.10	Key references		N
A.5	Bioeffect		N
A.5.1	Organ/Site		N
A.5.2	Spectral range		N
A.5.3	Peak of action spectrum		N
A.5.4	State of knowledge		N
A.5.5	Time course		N
A.5.6	Mechanism		N
A.5.7	Symptoms		N
A.5.8	Needed information		N
A.5.9	Experience with lamps		N
A.5.10	Key references		N
ANNEX B	MEASUREMENT METHOD		N
B.1	Instrumentation		N
B.1.1	Double monochromator: Recommended instrument		N
B.1.2	Broadband detectors		N



EN 62471			
Cl.	Requirement – Test	Result	Verdict
B.2	Instrument limitations		N
B.2.1	Noise equivalent irradiance		N
B.2.2	Instrument spectral response		N
B.2.3	Wavelength accuracy		N
B.2.4	Stray radiant power		N
B.2.5	Input optics for spectral irradiance measurements: Recommendation		N
B.2.6	Linearity		N
B.3	Calibration sources		N
ANNEX C	UNCERTAINTY ANALYSIS		N
ANNEX D	GENERAL REFERENCES		N
ANNEX ZA	Normative references to international publications with their corresponding European publications		N
ANNEX ZB	EXPOSURE LIMITS (EL'S)	See ANNEX ZB above	P



Table 6.1		Emission limits for risk groups of continuous wave lamps					
Risk	Action Spectrum	Symbol	Units	Emission Measurement			
				Exempt		Low risk	
				Limit	Result	Limit	Result
Actinic UV	Suv( $\lambda$ )	E <sub>S</sub>	W·m <sup>-2</sup>	0,001	0.64×10 <sup>-3</sup>	0,003	N/A
Near UV	--	E <sub>UVA</sub>	W·m <sup>-2</sup>	10	5.7×10 <sup>-3</sup>	33	N/A
Blue light	B( $\lambda$ )	L <sub>B</sub>	W·m <sub>1</sub> <sup>-2</sup> ·sr <sup>-1</sup>	100	39.5	10000	N/A
Blue light, small source	B( $\lambda$ )	E <sub>B</sub>	W·m <sup>-2</sup>	1,0	N/A	1,0	N/A
Retinal thermal	R( $\lambda$ )	L <sub>R</sub>	W·m <sub>1</sub> <sup>-2</sup> ·sr <sup>-1</sup>	1×10 <sup>6</sup> (28000/ $\alpha$ )	653/0.1	1×10 <sup>6</sup> (28000/ $\alpha$ )	N/A
Retinal thermal, weak visual stimulus	R( $\lambda$ )	L <sub>IR</sub>	W·m <sub>1</sub> <sup>-2</sup> ·sr <sup>-1</sup>	214×10 <sup>-3</sup> (6000/ $\alpha$ )	N/A	214×10 <sup>-3</sup> (6000/ $\alpha$ )	N/A
IR radiation, eye	--	E <sub>IR</sub>	W·m <sup>-2</sup>	100	2.9	570	N/A

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



## **ANNEX A:**

### **Photo-documentation**





**Photo 1 General Appearance of the EUT**



**Photo 2 General Appearance of the EUT**





**Photo 3 General Appearance of the EUT**



**Photo 4 General Appearance of the EUT**

