SEMLIGHT SEMICONDUCTOR LIGHTING CO., LIMITED

TEST 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 STREET LIGHT
Model :	SEM-R30-01B, SEM-R10-01B, SEM-R25-01B, SEM-R28-01B, SEM-R36-01B, SEM-R48-01B, SEM-R56-02B, SEM-R112-02B, SEM-R168-02B, SEM-R224-02B, SEM-R30-03C, SEM-R45-03C, SEM-R60-03C, SEM-R90-03C, SEM-R120-03C
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. 13- 23, 2013
Date of Report :	May. 23, 2013
Report No.:	BSTDG13050811SR-2

LVD REPORT

IEC 60598-1 & IEC 60598-2-3

Luminaires

Part 2-3: Particular requirements
Section Three – Luiminaires for road and street lights

IEC 62471

Luminaires

Part 1: General requirements and tests

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
Test specification	
Standard .....:	IEC 60598-1:2008 + IEC 60598 2-3:2011 + IEC 62471:2006
Procedure deviation .....:	N/A
Non-standard test method .....:	N/A
Test item description .....:	LED STREET LIGHT
Trademark .....:	SEMLIGHT
Model and/or type reference .....:	SEM-R30-01B, SEM-R10-01B, SEM-R25-01B, SEM-R28-01B, SEM-R36-01B, SEM-R48-01B, SEM-R56-02B, SEM-R112-02B, SEM-R168-02B, SEM-R224-02B, SEM-R30-03C, SEM-R45-03C, SEM-R60-03C, SEM-R90-03C, SEM-R120-03C
Rating(s) .....:	230V~ 50Hz 30W
Test case verdicts	
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 60598-2-3 (EN 60598-2-3)

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

Brief description of the test sample:

The equipment is a LED STREET LIGHT (fixed luminaire) for general use.

Copy of marking plate:

LED STREET LIGHT
Model: SEM-R30-01B
Rated: 230V~ 50Hz 30W

SEMLIGHT SEMICONDUCTOR LIGHTING CO., LIMITED

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

Test by : _____ May. 23, 2013
Signature Date

Technician
Title

Review by : _____ May. 23, 2013
Signature Date

Project Engineer
Title

Approved by : _____ May. 23, 2013
Signature Date

Christina/ Manager
Name and Title

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
3.1 (0)	SCOPE		P
3.4 (2)	CLASSIFICATION		P
(2.2)	Type of protection.....:	Class I	—
(2.3)	Degree of protection.....:	IP 65	—
(2.4)	Portable or handheld luminaire .....:	No	—
	Fixed luminaire suitable for normally flammable surfaces.....:	Yes	—
	Fixed luminaire suitable for non-combustible materials only .....:	No	—
(2.5)	Luminaire for normal use .....:	Yes	—
	Luminaire for rough service .....:	No	—
3.5 (3)	MARKING		P
(3.2)	Mandatory markings		P
	Position of the marking	On the enclosure	P
	Format of symbols/text		P
(3.3)	Additional information		P
	Language of instructions	English	P
(3.3.1)	Combination luminaires	Not combination luminaire	N
(3.3.2)	Nominal frequency in Hz	50Hz	P
(3.3.3)	Operating temperature		N
(3.3.4)	Symbol or warning notice		N
(3.3.5)	Wiring diagram		P
(3.3.6)	Special conditions		N
(3.3.7)	Metal halid lamp luminaire – warning		N
(3.3.8)	Limitation for semi-luminaires		N
(3.3.9)	Power factor and supply current		P
(3.3.10)	Suitability for use indoors		N
(3.3.11)	Luminaires with remote control	No remote control	N
(3.3.12)	Clip-mounted luminaire – warning		N
(3.3.13)	Specifications of protective shields		N
(3.3.14)	Symbol for nature of supply	~	P

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
(3.3.15)	Rated current of socket outlet	Not provided socket outlet	N
(3.3.16)	Rough service luminaire		N
(3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	Type Y	P
(3.3.18)	Non-ordinary luminaires with PVC cable		N
(3.3.101)	Terminal block supplied with luminaire		P
(3.4)	Test with water	15s with water	P
	Test with hexane	15s with hexane	P
	Legible after test	The marking is legible	P
	Label attached	The marking not be easily removable and shows no curling	P
3.5(-)	In addition infornation shall provided in instruction		--
	a) design attitude		P
	b) weight		P
	c) overall dimensions		P
	d) wind force (mounting more than 8m)		N
	e) the range of cross-sectional areas of suspension wire		N
	f) indoor use		N
	g) dimension of compartment		N
	h) torque		P

3.6 (4)	CONSTRUCTION		P
3.6.1(-)	All luminaires shall have protenction against ingrsee of mistureof at least IPX3		P
	Other		N
3.6.2(-)	Luminaires for suspension on span wire		N
3.6.3(-)	Attcched and external parts shall withstand wind speed of 150Km/h		N
3.6.3.1(-)	Static force test		N
3.6.4(-)	A single lampholder shall adequate support		N
3.6.5(-)	Glass covers		P
3.6.6(-)	Adequate sapce for connection compartment		N
3.6.7(-)	Column intergrate luminaires shall comply with ISO standards		N

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
3.6.8(-)	The door of column-integrated luminaires shall against corrosion.		N
3.6.9(-)	For Column-intergrated luminaires		N
	- Cable enter slot shall not less than 50mm X 150mm		N
	- the path from slot to compartment shall not less than 50mm		N
3.6 (4.2)	Components replaceable without difficulty		P
3.6 (4.3)	Wireways smooth and free from sharp edges		P
3.6 (4.4)	Lampholders		N
3.6 (4.4.1)	Integral lampholder		N
3.6 (4.4.2)	Wiring connection		N
3.6 (4.4.3)	Lampholder for end-to-end mounting		N
3.6 (4.4.4)	Positioning		N
3.6 (4.4.5)	Peak pulse voltage		N
3.6 (4.4.6)	Centre contact		N
3.6 (4.4.7)	Rough service luminaires		N
3.6 (4.4.8)	Lamp connectors	No lamp connector provided	N
3.6 (4.5)	Starter holders		N
	Starter holder in luminaires other than class II		N
	Starter holder class II construction		N
3.6 (4.6)	Terminal blocks		P
	Tails		N
	Unsecured blocks		P
3.6 (4.7)	Terminals and supply connections		P
3.6 (4.7.1)	Contact to metal parts		P
3.6 (4.7.2)	Test 8 mm live conductor		P
	Test 8 mm earth conductor		P
3.6 (4.7.3)	Terminals for supply conductors		P
3.6 (4.7.4)	Terminals other than supply connection		N
3.6 (4.7.5)	Heat-resistant wiring/sleeves		N
3.6 (4.7.6)	Multi-pole plug		N
3.6 (4.8)	Switches:		N
	- adequate rating	No switch	N
	- adequate fixing		N

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
	- polarized supply		N
3.6 (4.9)	Insulating lining and sleeves		P
3.6 (4.9.1)	Retainment		P
	Method of fixing ..... :		P
3.6 (4.9.2)	Insulated linings and sleeves		P
	a) & c) Insulation resistance and electric strength		P
	b) Ageing test. Temperature (°C) ..... :		N
3.6 (4.10)	Insulation of Class II luminaires		N
3.6 (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	No such capacitor	N
3.6 (4.10.2)	Assembly gaps:		N
	- not coincidental		N
	- no straight access with test probe		N
3.6 (4.10.3)	Retainment of insulation:		N
	- fixed		N
	- unable to be replaced; luminaire inoperative		N
	- sleeves retained in position		N
	- lining in lampholder		N
3.6 (4.11)	Electrical connections		P
.6 (4.11.1)	Contact pressure	Not transmitted through insulating material	P
3.6 (4.11.2)	Screws:		N
	- self-tapping screws		N
	- thread-cutting screws		N
	- at least two self-tapping screws		N
3.6 (4.11.3)	Screw locking:		P
	- spring washer		P
	- rivets		N

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
3.6 (4.11.4)	Material of current-carrying parts	Copper conductor used	P
3.6 (4.11.5)	No contact to wood	No wood material in the luminaire	P
3.6 (4.11.6)	Electro-mechanical contact systems	No such systems	N
3.6 (4.12)	Mechanical connections and glands		P
3.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N
	Torque test: torque (Nm); part.....:	2.82 mm;0.5Nm	P
	Torque test: torque (Nm); part.....:		N
	Torque test: torque (Nm); part.....:		N
3.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		N
3.6 (4.12.4)	Locked connections:		N
	- fixed arms; torque (Nm) .....:		N
	- lampholder; torque (Nm) .....:		N
	- push-button switches; torque 0,8 Nm .....:		N
3.6 (4.12.5)	Screwed glands; force (N).....:		N
3.6 (4.13)	Mechanical strength		P
3.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm) .....:	0.5 Nm	P
	- other parts; energy (Nm).....:	Enclosure : 0.7Nm	P
	1) live parts	Not access	P
	2) linings	Not impaired	P
	3) protection	Continue to afford the degree of protection against ingress of dust, solid objects and moisture	P
	4) covers	No break	P
3.6 (4.13.3)	Straight test finger	Can't touch with live part with 30N	P
3.6 (4.13.4)	Rough service luminaires		N
	a) fixed		N

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
	b) hand-held		N
	c) delivered with a stand		N
	d) for temporary installations and suitable for mounting on a stand		N
3.6 (4.13.6)	Tumbling barrel		N
3.6 (4.14)	Suspensions and adjusting devices		N
3.6 (4.14.1)	Mechanical load:		N
	A) four times the weight	Not suspended luminaire	N
	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
3.6 (4.14.2)	Load to flexible cables		N
	Mass (kg).....:	Not suspended by flexible cables	N
	Stress in conductors (N/mm²) .....:		N
	Semi-luminaires – mass (kg) .....:		N
	Semi-luminaires – bending moment (Nm) .....:		N
3.6 (4.14.3)	Adjusting devices:		N
	- flexing test; number of cycles.....:	No adjusting devices	N
	- strands broken		N
	- electric strength test afterwards		N
3.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors	No telescopic tubes	N
3.6 (4.14.5)	Guide pulleys	No guide pulleys	N
3.6 (4.14.6)	Strain on socket-outlets		N
3.6 (4.15)	Flammable materials:		N
	- glow-wire test 650 °C		N
	- spacing ≥ 30 mm		N
	- screen withstanding test of 13.3.1		N

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
	- screen dimensions		N
	- no fiercely burning material		N
	- thermal protection		N
	- electronic circuits exempted		N
3.6 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		P
	a) construction		P
	b) temperature sensing control		N
	c) surface temperature		N
3.6 (4.16)	Luminaires marked with F-symbol		P
	No lamp control gear	(compliance with Section 12)	N
3.6 (4.16.1)	Lamp control gear spacing:		N
	- spacing 35 mm		N
	- spacing 10 mm		N
3.6 (4.16.2)	Thermal protection:		N
	- in lamp control gear		N
	- external		N
	- fixed position		N
	- temperature marked lamp control gear		N
3.6 (4.16.3)	"F" curve measured	(see 12.6)	N
3.6 (4.17)	Drain holes		N
	Clearance at least 5 mm		N
3.6 (4.18)	Resistance to corrosion:		P
3.6 (4.18.1)	- rust-resistance		P
1.6 (4.18.2)	- season cracking in copper		P
3.6 (4.18.3)	- corrosion of aluminium		N
3.6 (4.19)	Ignitors compatible with ballast		N
3.6 (4.20)	Rough service vibration.....:		N
3.6 (4.21)	Protective shield:		N
3.6 (4.21.1)	Shield fitted		N

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
3.6 (4.21.2)	Particles from a shattering lamp not impair safety		N
3.6 (4.21.3)	No direct path		N
3.6 (4.21.4)	Impact test on shield		N
	Glow-wire test on lamp compartment		N
3.6 (4.22)	Attachments to lamps	No attachments	N
3.6 (4.23)	Semi-luminaires comply class II		N
3.6 (4.24)	UV radiation		N
3.6 (4.25)	No sharp point or edges	No sharp points or edges	P
3.6 (4.26)	Short-circuit protection:		N
3.6 (4.26.1)	Uninsulated accessible SELV parts		N
3.6 (4.26.2)	Short-circuit test		N
3.6 (4.26.3)	Test chain according to IEC 61032		N

3.7 (11)	CREEPAGE DISTANCES AND CLEARANCES		P
	Working voltage (V) ..... :	230V ~	—
	Voltage form	Sinusoidal	—
	PTI	< 600	—
	Rated pulse voltage (kV) ..... :	--	—
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm) ..... :	Between L and N, cr>2.5mm, cl>1.5mm required cr: 2.5mm, cl: 1.5mm	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

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
3.8 (7)	PROVISION FOR EARTHING		P
3.8 (7.2.1 + 7.2.3)	Accessible metal parts		P
	Metal parts in contact with supporting surface		P
	Resistance < 0,5 Ω	0.1Ω	P
	Two self-tapping screws used		N
	Thread-forming screws		N
	Connector earthing first		P
3.8.1(-)	The attahcment of fixed parts of termials shall not rotated when clamped part is removed		N
3.8 (7.2.2 + 7.2.3)	Earth continuity in joints etc.		P
3.8 (7.2.4)	Locking of clamping means		P
	Compliance with 4.7.3		N
3.8 (7.2.5)	Earth terminal integral part of connector socket		N
3.8 (7.2.6)	Earth terminal adjacent to mains terminals		P
3.8 (7.2.7)	Electrolytic corrosion of the earth terminal		P
3.8 (7.2.8)	Material of earth terminal		P
	Contact surface bare metal		P
3.8 (7.2.10)	Class II luminaire for looping-in		N
3.8 (7.2.11)	Earthing core coloured green-yellow		P
	Length of earth conductor		N

3.9 (14)	TERMINALS		N
	Separately approved; component list	(see Annex 1)	N
	Part of the luminaire	(see Annex 3)	N
(-)	The cross-sectional ares of conduct for erminals for supply connection shall comply Table 14.1 of IEC 60598-1		N
	Exclude provision of supply cable		N

3.9 (15)	TERMINALS		N
	Separately approved; component list	(see Annex 1)	N
	Part of the luminaire	(see Annex 4)	N

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
3.10 (5)	EXTERNAL AND INTERNAL WIRING		P
3.10.1(-)	A cord anchorage		P
	Test		P
	Mounted high than 20m and weight than 4Kg		P
3.10 (5.2)	Supply connection and external wiring		P
3.10 (5.2.1)	Means of connection .....:	Connect wire	P
3.10 (5.2.2)	Type of cable .....:	H05RN-F	P
	Nominal cross-sectional area (mm²) .....:	1.0mm^2	P
3.10 (5.2.3)	Type of attachment, X, Y or Z	Y	P
3.10 (5.2.5)	Type Z not connected to screws		N
3.10 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
3.10 (5.2.7)	Cable entries through rigid material have rounded edges		P
1.10 (5.2.8)	Insulating bushings:		N
	- suitably fixed		N
	- material in bushings		N
	- tubes or guards made of insulating material		N
3.10 (5.2.9)	Locking of screwed bushings		P
3.10 (5.2.10)	Cord anchorage:		P
	- 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
3.10 (5.2.10.1)	Cord anchorage for type X attachment:		N
	a) at least one part fixed		N
	b) types of cable		N

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
	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
3.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		P
3.10 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N).....:	60N	P
	- torque test: torque (Nm).....:	0.15	P
	- displacement ≤ 2 mm	0.3	P
	- no movement of conductors		P
	- no damage of cable or cord		P
3.10 (5.2.11)	External wiring passing into luminaire		N
3.10 (5.2.12)	Looping-in terminals		N
1.10 (5.2.13)	Wire ends not tinned		N
	Wire ends tinned: no cold flow		N
3.10 (5.2.14)	Mains plug same protection		N
	Class III luminaire plug		N
3.10 (5.2.15)	Colour code low voltage		N
3.10 (5.2.16)	Appliance inlets (IEC 60320)		N
	Appliance couplers of class II type		N
3.10 (5.3)	Internal wiring		P
3.10 (5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		N
	- not delivered/ mounting instruction		N

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
	- factory assembled		N
	- socket outlet loaded (A) .....:		N
	- temperatures .....:		N
	Green-yellow for earth only		P
3.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		P
	Cross-sectional area (mm²).....:	20AWG	P
	Insulation thickness		P
	Extra insulation added where necessary		N
3.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		N
	Adequate cross-sectional area and insulation thickness		N
3.10 (5.3.1.3)	Double or reinforced insulation for class II		N
3.10 (5.3.1.4)	Conductors without insulation		N
3.10 (5.3.1.5)	SELV current-carrying parts		N
1.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N
3.10 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.	No moving parts used	N
	Joints, raising/lowering devices	No such devices	N
	Telescopic tubes etc.	No telescopic tubes etc.	N
	No twisting over 360°		P
3.10 (5.3.3)	Openings	No openings	N
	Bushings not removable		N
	Bushings in sharp openings		N
	Cables with protective sheath		N
3.10 (5.3.4)	Joints and junctions effectively insulated	No joints and junctions	N
3.10 (5.3.5)	Strain on internal wiring		N
3.10 (5.3.6)	Wire carriers	The equipment is fixed luminaire	N

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
3.10 (5.3.7)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N

3.11 (8)	PROTECTION AGAINST ELECTRIC SHOCK		P
3.11 (8.2.1)	Live parts not accessible	No access of live part in normal use	P
	Protection in any position		P
	Double-ended tungsten filament lamp		N
	Insulation lacquer not reliable	No insulation lacquer and similar materials as protection against electric shock	N
	Double-ended high pressure discharge lamp		N
3.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N
3.11 (8.2.3)	Class II luminaire:		N
	- basic insulated metal parts not accessible during starter or lamp replacement		N
	- basic insulation not accessible other than during starter or lamp replacement		N
	- glass protective shields not used as supplementary insulation		N
	Class I luminaire with BC lampholder		N
3.11 (8.2.4)	Portable luminaire:		N
	- protection independent of supporting surface		N
	- terminal block completely covered		N
3.11 (8.2.6)	Covers reliably secured		P
3.11 (8.2.7)	Discharging of capacitors $\geq$ 0,5 μF		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

3.12 (12)	ENDURANCE TEST AND THERMAL TEST	P

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
3.12.1(-)	The limit shall deducte 10°C the tables of section 12 of IEC 60598-1		P
	Test ambient at ta±5°C for outdoor use		P
3.12.2(-)	IP greater than IP20	IP65	P
3.12 (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.....:		—
3.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system	No track system	N
	- marking legible	Marking still legible and shows no curling	P
	- no cracks, deformation etc.		P
3.12 (12.4)	Thermal test (normal operation)	(see Annex 2)	P
312 (12.5)	Thermal test (abnormal operation)	(see Annex 2)	P
3.12 (12.6)	Thermal test (failed lamp control gear condition):		N
3.12 (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
	- calculated mounting surface temperature (°C) .:		N
	- track-mounted luminaires		N
3.12 (12.6.2)	Temperature sensing control		N
	- case of abnormal conditions .....:	No temperature sensing control	—
	- thermal link		N
	- manual reset cut-out		N
	- auto reset cut-out		N

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
	- measured mounting surface temperature (°C) :		N
	- track-mounted luminaires		N
3.12 (12.7)	Thermal test (failed lamp control gear in plastic luminaires):		N
	- case of abnormal conditions .....:		—
3.12 (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
3.12 (12.7.2)	Temperature sensing control		N
	- thermal link		N
	- manual reset cut-out		N
	- auto reset cut-out		N
	- measured temperature of fixing point/ exposed part (°C) ..... :		N

3.13 (9)	RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE		P
3.13.1(-)	IP greater than IP20	IP65	P
3.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP.....:	IP65	—
	- 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		N
	b) no talcum in dust-tight luminaire		P
	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		P
	f) no contact with live parts (IP 2X)		N

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
	f) no entry into enclosure (IP 3X and IP 4X)		N
3.13 (9.3)	Humidity test 48 h	R.H.:93% T:25℃	P

3.14 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
3.14 (10.2.1)	Insulation resistance test		P
	Insulation resistance (MΩ):		P
	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:		P
	- between live parts of different polarity .....:	>100M	P
	- between live parts and mounting surface .....:	>100M	P
	- between live parts and enclosure .....:	>100M	P
	- between live parts of different polarity through action of a switch.....:		N
3.14 (10.2.2)	Electric strength test		P
	Dummy lamp		P
	Luminaires with ignitors after 24 h test		P
	Luminaires with manual ignitors		P
	Test voltage (V):		P
	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:		P
	- between live parts of different polarity .....:	1460V	P
	- between live parts and mounting surface .....:	2920V	P

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
	- between live parts and enclosure .....:	2920V	P
	- between live parts of different polarity through action of a switch.....:		N
3.14 (10.3.1)	Leakage current (mA).....:	0.06 mA	P

3.15 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		N
3.15 (13.2.1)	Ball-pressure test:		N
	- part tested; temperature (°C) .....:		N
	- part tested; temperature (°C) .....:		N
3.15 (13.3.1)	Needle flame test (10 s):		N
	- part tested .....:		N
	- part tested .....:		N
3.15 (13.3.2)	Glow wire test (650°C):		N
	- part tested .....:		N
	- part tested .....:		N
3.15 (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
(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

IEC 60598-1 & IEC 60598-2-3			
Cl.	Requirement – Test	Result	Verdict
(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				
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
LED Driver	Various	Various	Input: 90-260V~ 50/60Hz	--	Accept by test
Internal wire	Zhong Shan Yong Roi Electronic Factory	Various	20WAG 105°C 600V		UL
Supply cord	Various	Various	H05RN-F 300/500V		VDE

	ANNEX 2: temperature measurements, thermal tests of Section 12		P
	Type reference ..... :	SEM-R30-01B	—
	Lamp used..... :	LED STREET LIGHT	—
	Lamp control gear used ..... :		—
	Mounting position of luminaire ..... :	Street lamp	—
	Supply wattage (W)..... :	30W	—
	Supply current (A) ..... :	0.136A	—
	Calculated power factor ..... :		—
	Table: measured temperatures corrected for ta = 25 °C:		P
	- abnormal operating mode..... :	abnormal mode	—
	- test 1: rated voltage..... :	--	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage..... :	243.8	—
	- 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

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Cl.	Requirement – Test			Result		Verdict
LED driver Tc		58.2		70		
Internal wire		41.5		105		
Ambient		25.6		--		

	ANNEX 3: screw terminals (part of the luminaire)		P
(14)	SCREW TERMINALS		N
(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 (mm²).....:		N
(14.3.3)	Conductor space (mm).....:		N
(14.4)	Mechanical tests		N
(14.4.1)	Minimum distance		N
(14.4.2)	Cannot slip out		N
(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		N
(15.2)	Type of terminal.....:	No screwless terminals	—
	Rated current (A).....:		—
(15.3.1)	Material		N

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Cl.	Requirement – Test	Result	Verdict
(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
	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

IEC 60598-1 & IEC 60598-2-3										
Cl.	Requirement – Test					Result				Verdict
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 [√] No [ ]	—

Annex ZB 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

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Cl.	Requirement – Test	Result	Verdict
5.2.4	Pulse width measurement for pulsed sources.....:		N
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		N
	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 thatdoes not pose		N
	an actinic ultraviolet hazard (E_S) within 8-hours exposure (30000 s), nor		N
	a near-UV hazard (E_{UVA}) within 1000 s, (about 16 min) nor		N
	a retinal blue-light hazard (L_B) within 10000 s (about 2,8 h), nor		N
	a retinal thermal hazard (L_R) within 10 s, nor		N
	an infrared radiation hazard for the eye (E_{IR}) within 1000 s.		N
6.1.2	Risk Group 1 (Low-Risk)	Group 1	P

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Cl.	Requirement – Test	Result	Verdict
	The philosophical basis for this classification is that the lamp does not pose a hazard due to normalbehavioral limitations on exposure. This requirement is met by any lamp that exceeds the limits for theExempt Group but that does not pose		P
	an actinic ultraviolet hazard (E_S) within 10000 s, nor		P
	a near ultraviolet hazard (E_{UVA}) within 300 s, nor		P
	a retinal blue-light hazard (L_B) within 100 s, nor		P
	a retinal thermal hazard (L_R) within 10 s, nor		P
	an infrared radiation hazard for the eye (E_{IR}) within 100 s.		P
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 notpose 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 doesnot 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 Group3 (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		--
	Bioeffect datasheet #1: Infrared cataract		N
A.1	**Bioeffect:** 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

IEC 62471			
Cl.	Requirement – Test	Result	Verdict
A.1.2	**Spectral range**: 700 nm to 1400 nm and possibly to 3000 nm.		N
A.1.3	**Peak of action spectrum**: Not known; probably between 900-1000 nm.		N
A.1.4	**State of knowledge:** 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	**Time course**: 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	**Mechanism**: 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	**Symptoms**: Clouding of vision.		N
A.1.8	**Needed information:** 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	**Experience with lamps:** Accidental injury is not known, even from exposure to heat lamps. Limited population exposed.		N
A.1.10	Key references		N

	Bioeffect datasheet #2		--
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

IEC 62471			
Cl.	Requirement – Test	Result	Verdict
A.2.10	Key references		P
Bioeffect datasheet #3			--
A.3	Bioeffect		N
A.3.1	Organ/Site		N
A.3.2	Spectral range		N
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
Bioeffect datasheet #4			--
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
Bioeffect datasheet #5			--
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

IEC 62471			
Cl.	Requirement – Test	Result	Verdict
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
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

ANNEX A:

Photo-documentation

Photo 1 General appearance of EUT

Photo 2 General appearance of EUT

Photo 3 General appearance of EUT