




Growcol International Technology (Shenzhen) Co., Ltd

CE LVD REPORT

Prepared For: Address	Growcol International Technology (Shenzhen) Co., Ltd 2D05, baoyunda R & D complex building, Fuhua community, Xixiang street, Bao'an District, Shenzhen
Product Name:	Surge Protective Device
Trade Name:	
Main Test Model:	SLP40-PV450/2
Additional Model:	SLP40-PV100/2, SLP40-PV100/2S, SLP40-PV140/2, SLP40-PV140/2S, SLP40-PV180/2, SLP40-PV180/2S, SLP40-PV275/2, SLP40-PV275/2S, SLP40-PV350/2, SLP40-PV350/2S, SLP40-PV400/2, SLP40-PV400/2S, SLP40-PV450/2, SLP40-PV450/2S, SLP40-PV600/2, SLP40-PV600/2S, SLP40-PV1000/3, SLP40-PV1000/3S, SLP40-PV1200/3, SLP40-PV1200/3S, SLP40-PV1500/3, SLP40-PV1500/3S,
Prepared By :	Shenzhen BST Technology Co., Ltd.
Address	Building No.23-24, Zhiheng Industrial Park, Guankouer Road, Nantou, Nanshan District, Shenzhen, Guangdong, China
Test Date:	Oct. 17. 2021 – Oct. 20. 2021
Date of Report :	Oct. 21. 2021
Report No.:	BSTXD211021005501SR



TEST REPORT EN 61643-31:2019 Low-Voltage Surge Protective Devices-Part 31: requirements and test methods for SPDs for photovoltaic installations (IEC 61643-31:2018,modified)	
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	Growcol International Technology (Shenzhen) Co., Ltd
Address	2D05, baoyunda R & D complex building, Fuhua community, Xixiang street, Bao'an District, Shenzhen
Manufacturer	Growcol International Technology (Shenzhen) Co., Ltd
Address	2D05, baoyunda R & D complex building, Fuhua community, Xixiang street, Bao'an District, Shenzhen
Test specification	
Standard.....	EN 61643-31:2019
Procedure deviation	N/A
Non-standard test method	N/A
Test item description	Low-Voltage Surge Protective Device
Trade Name	N/A
Model and/or type reference ..	See page1
Rating(s).....	U: 350-450VDC, I: 20-40kA
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.

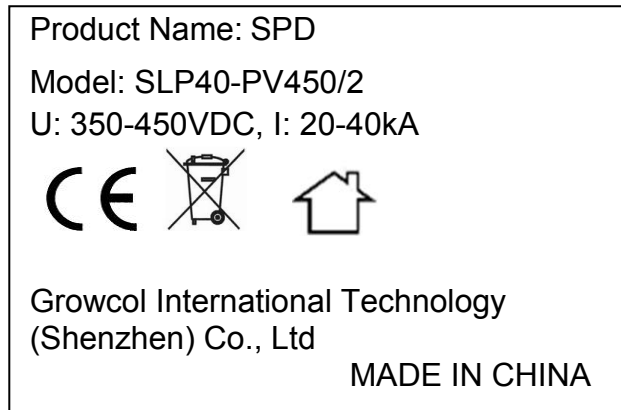
"(see remark #)" refers to a remark appended to the report.

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

Clause numbers between brackets refer to clauses in EN 61643-31:2019

General product information: The series products have the same circuit diagram, PCB layout and functionality. The differences are the model name, so, we select SLP40-PV450/2 to test.

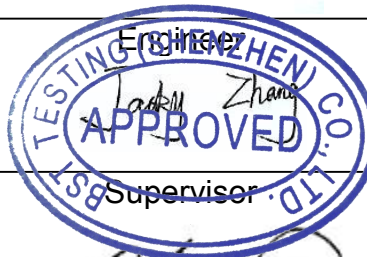
Copy of marking plate:



Prepared by :

Adam Chen

Reviewer :



Approved & Authorized
Signer :

W.S.

Manager



EN 61643-31:2019

Clause	Requirement + Test	Result - Remark	Verdict
1.2 (0)	GENERAL TEST REQUIREMENTS		P
1.2 (0.1)	Information for SPD design considered.....:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Lamp standard:	—
1.2 (0.3)	More sections applicable.....:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Section/s:	—
1.4 (2)	CLASSIFICATION OF SPD		P
1.4 (2.2)	Type of protection	Class II	P
1.4 (2.3)	Degree of protection.....:	IP20	P
1.4 (2.4)	SPD suitable for direct mounting on normally flammable surfaces.....:	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
1.4 (2.5)	SPD for normal use	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	—
	SPD for rough service	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	—
1.5 (3)	MARKING		P
1.5 (3.2)	Mandatory markings		P
	Position of the marking	On the enclosure	P
	Format of symbols/text		P
1.5 (3.3)	Additional information		P
	Language of instructions	English	P
1.5 (3.3.1)	Combination SPD		N
1.5 (3.3.2)	Nominal frequency in Hz	/	P
1.5 (3.3.3)	Operating temperature	-40~+70°C	P
1.5 (3.3.4)	Symbol or warning notice		N
1.5 (3.3.5)	Wiring diagram		N
1.5 (3.3.6)	Special conditions		N
1.5 (3.3.7)	Metal halide lamp luminaire – warning		N
1.5 (3.3.8)	Limitation for semi- SPD		N
1.5 (3.3.9)	Power factor and supply current	PF>0.5.	N
1.5 (3.3.10)	Suitability for use indoors		P
1.5 (3.3.11)	SPD with remote control		N
1.5 (3.3.12)	Clip-mounted SPD – warning		N



1.5 (3.3.13)	Specifications of protective shields		N
1.5 (3.3.14)	Symbol for nature of supply	~	P
1.5 (3.3.15)	Rated current of socket outlet		N
1.5 (3.3.16)	Rough service SPD		N
1.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments		P
1.5 (3.3.18)	Non-ordinary SPD with PVC cable		N
1.5 (3.3.19)	Protective conductor current in instruction if applicable		N
1.5 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		N
1.5 (3.3.21)	Non replaceable and non-user replaceable light sources information provided		N
	Cautionary symbol		N
1.5 (3.3.22)	Controllable luminaires, classification of insulation provided		N
1.5 (3.4)	Test with water		P
	Test with hexane		P
	Legible after test		P
	Label attached		P

1.6 (4)	CONSTRUCTION		P
1.6 (4.2)	Components replaceable without difficulty		P
1.6 (4.3)	Wireways smooth and free from sharp edges		P
1.6 (4.4)	Lampholders		N
1.6 (4.4.1)	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
	- pressure test (N)		-
	After test the lampholder comply with relevant standard sheets and show no damage		N
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N
	- bending test (Nm).....		-
	After test the lampholder have not moved from its position and show no permanent deformation		N



1.6 (4.4.5)	Peak pulse voltage		N
1.6 (4.4.6)	Centre contact		N
1.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N
1.6 (4.4.8)	SPD connectors		P
1.6 (4.4.9)	Caps and bases correctly used		P
1.6 (4.5)	Starter holders		N
	Starter holder in SPD other than class II		N
	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		N
1.6 (4.7.1)	Contact to metal parts		N
1.6 (4.7.2)	Test 8 mm live conductor		N
	Test 8 mm earth conductor		N
1.6 (4.7.3)	Terminals for supply conductors		N
1.6 (4.7.3.1)	Welded method and material		N
	- stranded or solid conductor		N
	- spot welding		N
	- welding between wires		N
	- Type Z attachment		N
	- mechanical test according to 15.6.2		N
	- electrical test according to 15.6.3		N
	- heat test according to 15.6.3.2.3 and 15.6.3.2.4		N
1.6 (4.7.4)	Terminals other than supply connection		N
1.6 (4.7.5)	Heat-resistant wiring/sleeves		N
1.6 (4.7.6)	Multi-pole plug		N
	- test at 30 N		N
1.6 (4.8)	Switches		N
	- adequate rating		N
	- adequate fixing		N
	- polarized supply		N
	- compliance with IEC 61058-1 for electronic switches		N
1.6 (4.9)	Insulating lining and sleeves		P



1.6 (4.9.1)	Retainment		P
	Method of fixing.....:		P
1.6 (4.9.2)	Insulated linings and sleeves:		P
	Resistant to a temperature > 20 °C to the wire temperature or		N
	a) & c) Insulation resistance and electric strength		P
	b) Ageing test. Temperature (°C).....:		P
1.6 (4.10)	Double or reinforced insulation		P
1.6 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		N
	Safe installation fixed SPD		P
	Capacitors and switches		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:		N
	- fixed		N
	- unable to be replaced; luminaire inoperative		N
	- sleeves retained in position		N
	- lining in socket		N
1.6 (4.10.4)	Protective impedance device		N
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N
	Y1 or Y2 capacitors comply with IEC 60384-14		N
	Resistors comply with test (a) in 14.1 of IEC 60065		N
1.6 (4.11)	Electrical connections and current-carrying parts		P
1.6 (4.11.1)	Contact pressure		P
1.6 (4.11.2)	Screws:		N
	- self-tapping screws		N
	- thread-cutting screws		N
1.6 (4.11.3)	Screw locking:		P
	- 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 or mounting surface		N
1.6 (4.11.6)	Electro-mechanical contact systems		N
1.6 (4.12)	Screws and connections (mechanical) and glands		P
1.6 (4.12.1)	Screws not made of soft metal		N
	Screws of insulating material		N
	Torque test: torque (Nm); part..... :		N
	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:		N
	- fixed arms; torque (Nm)..... :		N
	- lampholder; torque (Nm)..... :		N
	- push-button switches; torque 0,8 Nm..... :		N
1.6 (4.12.5)	Screwed glands; force (Nm)..... :	5 Nm	P
1.6 (4.13)	Mechanical strength		P
1.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm)..... :		N
	- other parts; energy (Nm)..... :	0.35 Nm	P
	1) live parts	Not access	P
	2) linings		N
	3) protection	Continue to afford the degree of protection against ingress of dust, solid objects and moisture	P
	4) covers	No break	P
1.6 (4.13.3)	Straight test finger	Can't touch with live part with 30N	P
1.6 (4.13.4)	Rough service SPD		N
	- IP20 or higher	IP20	P
	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, fixings and means of adjusting		N
1.6 (4.14.1)	Mechanical load:		N



	A) four times the weight		N
	B) torque 2,5 Nm		N
	C) bracket arm; bending moment (Nm)..... :		N
	D) load track- mounted SPD		N
	E) clip-mounted luminaires, glass-shelve. Thickness (mm)		N
	Metal rod. diameter (mm)		N
	Fixed luminaire or independent control gear without fixing devices		N
1.6 (4.14.2)	Load to flexible cables		N
	Mass (kg)		—
	Stress in conductors (N/mm ²)		N
	Mass (kg) of semi-luminaire		N
	Bending moment (Nm) of semi-SPD		N
1.6 (4.14.3)	Adjusting devices:		N
	- 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		N
1.6 (4.14.5)	Guide pulleys		N
1.6 (4.14.6)	Strain on socket-outlets		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		N
	- thermal protection		N
	- electronic circuits exempted		N
1.6 (4.15.2)	SPD made of thermoplastic material with SPD control gear		N
	a) construction		N
	b) temperature sensing control		N
	c) surface temperature		N
1.6 (4.16)	SPD for mounting on normally flammable surfaces		P
	No SPD control gear..... :	(compliance with Section 12)	N



1.6 (4.16.1)	SPD control gear spacing:		P
	- spacing 35 mm		N
	- spacing 10 mm		P
1.6 (4.16.2)	Thermal protection:		N
	- in SPD control gear		N
	- external		N
	- fixed position		N
	- temperature marked lamp control gear		N
1.6 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	N
1.6 (4.17)	Drain holes		N
	Clearance at least 5 mm		N
1.6 (4.18)	Resistance to corrosion		N
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)	Igniters compatible with ballast		N
1.6 (4.20)	Rough service vibration		N
1.6 (4.21)	Protective shield		N
1.6 (4.21.1)	Shield fitted if tungsten halogen SPD or metal halide SPD		N
	Shield of glass if tungsten halogen SPD		N
1.6 (4.21.2)	Particles from a shattering SPD 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 SPD not cause overheating or damage		N
1.6 (4.24)	Photobiological hazards		P
1.6 (4.24.1)	No excessive UV radiation if tungsten halogen SPD and metal halide SPD (Annex P)		N
1.6 (4.24.2)	Retinal blue light hazard		P
	Class of risk group assessed according to IEC/TR 62778		—
	a) Fixed SPD		N
	- distance x m, borderline between RG1 and RG2... :	RG0	N
	- marking and instruction according 3.2.23		N



	b) Portable and handheld luminaires		N
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N
	Portable luminaires for children IEC 60598-2-10 and Mains socket outlet nightlights IEC 60598-2-12 not exceed RG1 at 200 mm according to IEC/62778		N
1.6 (4.25)	Mechanical hazard		P
	No sharp point or edges		P
1.6 (4.26)	Short-circuit protection		P
1.6 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N
1.6 (4.26.2)	Short-circuit test with test chain according 4.26.3		P
	Test chain not melt through		P
	Test sample not exceed values of Table 12.1 and 12.2		N
1.6 (4.27)	Terminal blocks with integrated screwless earthing contacts		N
	Test according Annex V		N
	Pull test of terminal fixing (20 N)		N
	After test, resistance < 0,05 Ω		N
	Pull test of mechanical connection (50 N)		N
	After test, resistance < 0,05 Ω		N
	Voltage drop test, resistance < 0,05 Ω		N
1.6 (4.28)	Fixing of thermal sensing control		N
	Not plug-in or easily replaceable type		N
	Reliably kept in position		N
	No adhesive fixing if UV radiations from a SPD can degrade the fixing		N
	Not outside the luminaire enclosure		N
	Test of adhesive fixing:		N
	Max. temperature on adhesive material (°C) :		—
	100 cycles between t min and t max		N
	Temperature sensing control still in position		N
1.6 (4.29)	Luminaires with non-replaceable light source		N
	Not possible to replace light source		N
	Live part not accessible after parts have been opened by hand or tools		N
1.6 (4.30)	SPD with non-user replaceable light source		N



	If protective cover provide protection against electric shock and marked with “caution, electric shock risk” symbol:	N
	Minimum two fixing means	N
1.6 (4.31)	Insulation between circuits	N
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3	N
	Controllable luminaires requiring same level of insulation for all components, the insulation between control terminals and LV supply fulfil requirements according 4.31.1 – 4.31.3	N
1.6 (4.31.1)	SELV circuits	N
	Used SELV source	N
	Voltage \leq ELV	N
	Insulating of SELV circuits from LV supply	N
	Insulating of SELV circuits from other non SELV circuits	N
	Insulating of SELV circuits from FELV	N
	Insulating of SELV circuits from other SELV circuits	N
	SELV circuits insulated from accessible parts according Table X.1	N
	Plugs not able to enter socket-outlets of other voltage systems	N
	Socket outlets does not admit plugs of other voltage systems	N
	Plugs and socket-outlets does not have protective conductor contact	N
1.6 (4.31.2)	FELV circuits	N
	Used FELV source	N
	Voltage \leq ELV	N
	Insulating of FELV circuits from LV supply	N
	FELV circuits insulated from accessible parts according Table X.1	N
	Plugs not able to enter socket-outlets of other voltage systems	N
	Socket outlets does not admit plugs of other voltage systems	N
	Socket-outlets does not have protective conductor contact	N
1.6 (4.31.3)	Other circuits	N



	Other circuits insulated from accessible parts according Table X.1		N
	Class I construction with equipotential bonding for protection against indirect contacts with live parts:		N
	- conductive parts are connected together		N
	- test according 7.2.3		N
	- conductive part not cause an electric shock in case of an insulation fault		N
	- equipotential bonding in master/slave applications		N
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		N
	- slave SPD constructed as class II		P
1.6 (4.32)	Overvoltage protective devices		P
	Comply with IEC 61643-11		P
	External to controlgear and connected to earth:		P
	- only in fixed SPD		P
	- only connected to protective earth		P

1.7 (11)	CREEPAGE DISTANCES AND CLEARANCES		P
	Working voltage (V)..... :	U: 350-450VDC	—
	Voltage form	Sinusoidal	—
	PTI	< 600 [√] ≥ 600 []	—
	Rated pulse voltage (kV) :		—
	(1) Current-carrying parts of different polarity: cr (mm); cl (mm)..... :	Cr.2.5mm Cl.1.5mm	P
	(2) Current-carrying parts and accessible parts: cr (mm); cl (mm)..... :	Cr.5mm Cl.3mm	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)..... :	Cr.5mm Cl.3mm	P

1.8 (7)	PROVISION FOR EARTHING		P
---------	------------------------	--	---



1.8 (7.2.1 + 7.2.3)	Accessible metal parts		P
	Metal parts in contact with supporting surface		P
	Resistance < 0,5 Ω.....: < 0,5Ω		P
	Self-tapping screws used		N
	Thread-forming screws		N
	Thread-forming screw used in a groove		N
	Earth makes contact first		P
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		N
	Protective earthing of the luminaire not via built-in control gear		P
1.8 (7.2.2 + 7.2.3)	Earth continuity in joints, etc.		N
1.8 (7.2.4)	Locking of clamping means		N
	Compliance with 4.7.3		N
	Terminal blocks with integrated screwless earthing contacts tested according Annex V		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		N
	Contact surface bare metal		N
1.8 (7.2.10)	Class II luminaire for looping-in		N
	Double or reinforced insulation to functional earth		N
1.8 (7.2.11)	Earthing core coloured green-yellow		P
	Length of earth conductor		N

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

1.9 (15)	SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS		N
	Separately approved; component list.....:		N
	Part of the luminaire.....:		N



1.10 (5)	EXTERNAL AND INTERNAL WIRING		
1.10 (5.2)	Supply connection and external wiring		P
1.10 (5.2.1)	Means of connection..... :		P
	Outdoor SPD has not PVC insulated external wiring if not class III or SELV ≤ 25 V a.c./60 V d.c. or protected from outdoor environment		N
1.10 (5.2.2)	Type of cable..... :		N
	Nominal cross-sectional area (mm ²)..... :		N
	Cables equal to IEC 60227 or IEC 60245	IEC 60227	N
1.10 (5.2.3)	Type of attachment, X, Y or Z		N
1.10 (5.2.5)	Type Z not connected to screws		N
1.10 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
1.10 (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
	- material not likely to deteriorate		N
	- tubes or guards made of insulating material		N
1.10 (5.2.9)	Locking of screwed bushings		N
1.10 (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		N
1.10 (5.2.10.1)	Cord anchorage for type X attachment:		N
	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		N
1.10 (5.2.10.3)	Tests:		N
	- impossible to push cable; unsafe		N
	- pull test: 25 times; pull (N)..... :		N
	- torque test: torque (Nm)..... :		N
	- displacement ≤ 2 mm		N
	- no movement of conductors		N
	- no damage of cable or cord		N
	- function independent of electrical connection		N
1.10 (5.2.11)	External wiring passing into SPD		P
1.10 (5.2.12)	Looping-in terminals		N
1.10 (5.2.13)	Wire ends not tinned		N
	Wire ends tinned: no cold flow		N
1.10 (5.2.14)	Mains plug same protection		N
	Class III luminaire plug		N
	No unsafe compatibility		N
1.10 (5.2.15)	Colour code low voltage		N
1.10 (5.2.16)	Appliance inlets (IEC 60320)		N
	Installation couplers (IEC 61535)		N
	Other appliance inlet or connector according relevant IEC standard		N
1.10 (5.2.17)	No standardized interconnecting cables properly assembled		N
1.10 (5.2.18)	Used plug in accordance with		N
	- IEC 60083		N
	- other standard		N
1.10 (5.3)	Internal wiring		P



1.10 (5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		N
	- not delivered/ mounting instruction		N
	- factory assembled		N
	- socket outlet loaded (A)..... :		N
	- temperatures..... :	(see Annex 2)	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 ²)..... :		P
	Insulation thickness		P
	Extra insulation added where necessary		P
1.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		N
	Adequate cross-sectional area and insulation thickness		N
1.10 (5.3.1.3)	Double or reinforced insulation for class II		P
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
	Telescopic tubes etc.		N
	No twisting over 360°		N
1.10 (5.3.3)	Insulating bushings:		N
	- suitable fixed		N
	- material in bushings		N
	- material not likely to deteriorate		N
	- cables with protective sheath		N
1.10 (5.3.4)	Joints and junctions effectively insulated		P
1.10 (5.3.5)	Strain on internal wiring		N
1.10 (5.3.6)	Wire carriers		P
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
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable SPD		P
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires		P
	SPD and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N
	Basic insulation only accessible under SPD or starter replacement		N
	Protection in any position		N
	Double-ended tungsten filament SPD		N
	Insulation lacquer not reliable		N
	Double-ended high pressure discharge SPD		N
	Relevant warning according to 3.2.18 fitted to the luminaire		P
1.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N
1.11 (8.2.3.a)	Class II SPD		P
	- 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
1.11 (8.2.3.b)	BC lampholder of metal in class I luminaires shall be earthed		N
1.11 (8.2.3.c)	SELV circuits with exposed current carrying parts:		N
	Ordinary SPD:		N
	- voltage under load (V)..... :		N
	- no-load voltage (V)..... :		N
	- touch current if applicable (mA) :		N
	One conductive part insulated if required		N



	Other than ordinary SPD:		N
	- nominal voltage (V)		N
	Class III SPD only for connection to SELV		N
	Class III SPD not provided with means for protective earthing		N
1.11 (8.2.4)	Portable ISPD have protection independent of supporting surface		N
1.11 (8.2.5)	Compliance with the standard test finger or relevant probe		N
1.11 (8.2.6)	Covers reliably secured		N
1.11 (8.2.7)	SPD other than below with capacitor >0,5μF not exceed 50 V 1 min after disconnection		N
	Portable SPD with capacitor >0,1μF (0.25) not exceed 34 V 1 s after disconnection		N
	Other SPDs with capacitor >0,1μF (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection		N

1.12 (12)	ENDURANCE TEST AND THERMAL TEST		P
1.12 (-)	If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 1.13		—
1.12 (12.3)	Endurance test:		P
	- mounting- position.....	Normal position	—
	- test temperature (°C).....	-40~+70°C	—
	- total duration (h).....	240h	—
	- supply voltage: Un factor; calculated voltage (V)...	350x1.1=385V	—
	- lamp used.....		—
1.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- SPD not unsafe		P
	- no damage to track system		N
	- marking legible		P
	- no cracks, deformation etc.		P
1.12 (12.4)	Thermal test (normal operation)	(see Annex2)	P
1.12 (12.5)	Thermal test (abnormal operation)	(see Annex2)	N
1.12 (12.6)	Thermal test (failed lamp control gear condition):		N



1.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A)		—
	- case of abnormal conditions.....		—
	- electronic SPD control gear		
	- 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 SPD		N
1.12 (12.6.2)	Temperature sensing control		N
	- 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 SPD		N
1.12 (12.7)	Thermal test (failed lamp control gear in plastic SPD):		N
1.12 (12.7.1)	SPD without temperature sensing control		N
1.12 (12.7.1.1)	SPD with fluorescent lamp ≤ 70W		N
	Test method 12.7.1.1 or Annex W		—
	Test according to 12.7.1.1:		N
	- case of abnormal conditions.....		—
	- Ballast failure at supply voltage (V)		—
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N
	Test according to Annex W:		N
	- 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



1.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 30W, transformer > 10 VA		N
	- 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
1.12 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N
	- case of abnormal conditions.....:		—
	- Components retained in place after the test		N
	- Test with standard test finger after the test		N
1.12 (12.7.2)	Luminaire with temperature sensing control		N
	- thermal link.....:	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- manual reset cut-out.....:	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- auto reset cut-out.....:	Yes <input type="checkbox"/> No <input type="checkbox"/>	—
	- case of abnormal conditions.....:		—
	- highest measured temperature of fixing point/exposed part (°C):.....:		—
	Ball-pressure test.....:		N

1.13 (9)	RESISTANCE TO DUST AND MOISTURE		P
1.13 (-)	If IP > IP 20 the order of tests as specified in clause 1.12		N
1.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP.....:	IP20	P
	- mounting position during test.....:	As normal use	P
	- fixing screws tightened; torque (Nm).....:		—
	- tests according to clauses.....:		—
	- electric strength test afterwards		P
	a) no deposit in dust-proof SPD		P
	b) no talcum in dust-tight SPD		N
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard		N
	c.1) For SPD without drain holes – no water entry		N



	c.2) For SPD with drain holes – no hazardous water entry		N
	d) no water in watertight or pressure watertight SPD		N
	e) no contact with live parts (IP 2X)		N
	e) no entry into enclosure (IP 3X and IP 4X)		N
	e) no contact with live parts through drain holes and ventilation slots (IP3X and IP4X)		N
	f) no trace of water on part of SPD requiring protection from splashing water		P
	g) no damage of protective shield or glass envelope		P
1.13 (9.3)	Humidity test 48 h	95% RH,30°C,48H	P

1.14 (10)	INSULATION RESISTANCE AND ELECTRIC STRENGTH		P
1.14 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø		—
	Insulation resistance (MΩ)..... :	>2MΩ	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
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :		N
	- Insulation bushings as described in Section 5		N
	Other than SELV		N
	- between live parts of different polarity..... :	>2MΩ	N
	- between live parts and mounting surface..... :	>2MΩ	N
	- between live parts and metal parts..... :	>4MΩ	N
	- between live parts of different polarity through action of a switch..... :	No switch	N
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :		N
	- Insulation bushings as described in Section 5		N
1.14 (10.2.2)	Electric strength test		P



	Dummy lamp		N
	Luminaires with ignitors after 24 h test		N
	Luminaires with manual ignitors		N
	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
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....:		N
	- Insulation bushings as described in Section 5		N
	Other than SELV		N
	- between live parts of different polarity.....:	1500V,No breakdown	P
	- between live parts and mounting surface.....:	3000V,No breakdown	P
	- between live parts and metal parts.....:	3000V,No breakdown	P
	- between live parts of different polarity through action of a switch.....:		N
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....:		N
	- Insulation bushings as described in Section 5		N
1.14 (10.3)	Touch current or protective conductor current (mA):		P

1.15 (13)	RESISTANCE TO HEAT, FIRE AND TRACKING		P
1.15 (13.2.1)	Ball-pressure test:		P
	- part tested; temperature (°C).....:	Enclosure . 125°C, 1.0mm	P
1.15 (13.3.1)	Needle flame test (10 s):		N
	- part tested.....:		N
1.15 (13.3.2)	Glow wire test (650°C):		P
	- part tested.....:	Enclosure	P
1.15 (13.4.1)	Tracking test: part tested.....:		N



ANNEX 1: components					P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity
PCB	-	-	Aluminium 94V-0,	UL E337137	UL

ANNEX 2	TABLE: Temperature measurements, thermal tests of Section 12					P	
	Type reference.....	See page 2			—		
	SPD used.....	Mechanical trip device			—		
	SPD control gear used.....	Driver			—		
	Mounting position of luminaire.....	Normal position			—		
	Supply wattage (W).....				—		
	Supply current (A).....				—		
	Calculated power factor.....				—		
	Table: measured temperatures corrected for $t_a = 25\text{ }^\circ\text{C}$:				P		
	- abnormal operating mode.....				—		
	- test 1: rated voltage.....				—		
	- test 2: 1,06 times rated voltage or 1,05times rated wattage.....				—		
	- test 3: Load on wiring to socket-outlet, 1,06times voltage or 1,05 times wattage.....				—		
	- test 4: 1,1 times rated voltage or 1,05times rated wattage.....				—		
	Through wiring or looping-in wiring loaded by a current of A during the test				—		
Temperature measurements, ($^\circ\text{C}$)							
Part	Ambient	Clause 12.4 – normal				Clause 12.5 – abnormal	
		test 1	test 2	test 3	limit	test 4	limit
Enclosure (receiver) inside			54.8		125		
Enclosure (receiver)outside			42.6		90		
Ambient			26		Ref		
Supplementary information:							

ANNEX 3	Screw terminals (part of the luminaire)	N
----------------	--	---



(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 (mm ²)..... :		—
(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..... :		—
	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)	Terminals and connections for internal wiring		N
(15.5.1)	Mechanical tests		N
(15.5.1.1.1)	Pull test spring-type terminals (4N, 4samples).....:		N
(15.5.1.1.2)	Pull test pin or tab terminals (4N, 4samples).....:		N
	Insertion force not exceeding 50 N		N
(15.5.1.2)	Permanent connections: pull-off test (20 N)		N
(15.5.2)	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
(15.6)	Terminals and connections for external wiring		N
(15.6.1)	Conductors		N
	Terminal size and rating		N
15.6.2	Mechanical tests		N
(15.6.2.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N)		N
(15.6.2.2)	Pull test pin or tab terminals (4samples); pull (N)		N
(15.6.3)	Electrical tests		N
	Tests according 15.6.3.1 + 15.6.3.2 in IEC 60598-1		N

(15.6.3.1)	TABLE: Contact resistance test / Heating tests										N
(15.6.3.2)	Voltage drop (mV) after 1 h										—
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)												
Supplementary information:												



ANNEX A:
Photo-documentation



Photo 1 EUT





Photo 2 EUT





Photo 3 EUT





Photo 4 EUT





Photo 5 EUT



End of the report