

Test Report

Client Name : AOK Industrial Company Limited

Address : Building 1, Shengzuozhi Technology Industrial Park,
Shajing Street, Shenzhen City, Guangdong Province,
China

Product Name : SE Series solar street light

Date : Feb. 25, 2021



Shenzhen Anbotech Compliance Laboratory Limited

Shenzhen Anbotech Compliance Laboratory Limited

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TEST REPORT**J60598-2-3(H26)****Part 2: Particular requirements****Section Three – Luminaires for road and street lighting****Report**

Report reference No.: 18240SC10002901

Tested by: Owen Luo

Approved by: Jeff Zhu

Date of issue: Feb. 25, 2021

Contents: 45 pages report

Owen Luo
Jeff Zhu**Testing laboratory**

Name: Shenzhen Anbotech Compliance Laboratory Limited

Address: 1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China. 518102

Testing location: Same as above

Applicant:

Name: AOK Industrial Company Limited

Address: Building 1, Shengzuozhi Technology Industrial Park, Shajing Street, Shenzhen City, Guangdong Province, China

Test specificationStandard: IEC 60598-2-3:2002+A1:2011 used in conjunction with
IEC 60598-1:2014+A1: 2017

Procedure deviation: N.A.

Non-standard test method: N.A.

Test item

Description: SE Series solar street light

Trademark: AOK

Model and/or type reference: AOK-XXWSe-DC-XX-XX-XXXX-XX-P

The first "XX" which can be any lamp bead brand and lamp bead type, followed by "XXXX" which can be any numbers for temperature colors and color rendering index, followed by "BN" which can be any letters or digits for beam angles, The "P" can be "-A", "-B", "-C", "-D" or "-E" for mounting means)

Manufacturer.....: same as Applicant

Address.....: same as Applicant

Factory.....: same as Manufacturer

Address.....: same as Manufacturer

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Rating(s) : DC48V, 1.25A, Max.60W, Ta:45°C, IP66

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Test item particulars

Classification of installation and use : fixed luminaire

Supply Connection : Non-detachable power cord without plug

Classification of installation and use : Class I

Degree of protection : IP66

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)

Testing

Date of receipt of test item : Jan. 18, 2021

Date(s) of performance of test : Jan. 18, 2021 to Jan. 29, 2021

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 tested.

Clause numbers between brackets refer to clauses in IEC 60598-1.

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

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

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

According to the EU directives which have been aligned with EU NLF (new legislative framework), both of manufacturer and importer's name and address shall be affixed on the product or, where that is not possible, on its packaging or in a document accompanying the product before the product is placed on the EU market.

Tests performed

- IEC 60598-1:2014+A1: 2017
- IEC 60598-2-3:2002+A1:2011
- J 60598-1(H29)
- J 60598-2-3(H26)
- IEC 62031: 2008+A1: 2012+A2: 2014

The submitted samples were found to comply with the requirement of IEC 62493:2015 without testing because they are LED-lightsource technology.

The submitted samples were found to comply with the above specification.

Attachment to test report

Attachment 1: Test report of IEC 62031: 2008+A1: 2012+A2: 2014

Attachment 2: Photo documentation

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Copy of marking plate

SE Series solar street light
Model No.: AOK-60WsE-DC-AP-L5-5070-T3-P
Rating: DC48V, 1.25A, 60W, Ta:45°C



IP66

Manufacturer: AOK Industrial Company Limited
Address: Building 1, Shengzuozhi Technology Industrial Park,
Shajing Street, Shenzhen City, Guangdong Province, China
Importer: xxxxxx
Address: xxxxxx

Rating label is stuck on the enclosure of SE Series solar street light (Size: height of WEEE mark at least 7mm, height of PSE mark at least 5mm, height of letters and numbers at least 2mm)

General product information

All models have the similar mechanical and electrical construction, main differences among them are size, wattage and current of output.
 Unless otherwise specified, models AOK-60WsE-DC-AP-L5-5070-T3-P were selected as representative models to perform all tests.

Remark:

N/A

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| J 60598-2-3 | | | |
|-------------|--------------------|-----------------|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |

| | | | |
|----------------|---|---|-----|
| 3.2 (0) | GENERAL TEST REQUIREMENTS | | --- |
| 3.2 (0.1) | Information for luminaire design considered.....: | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | --- |
| 3.2 (0.3) | More sections applicable.....: | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | --- |

| | | | |
|----------------|---|---|-----|
| 3.4 (2) | CLASSIFICATION OF LUMINAIRES | | --- |
| 3.4 (2.2) | Type of protection | Class III | --- |
| 3.4 (2.3) | Degree of protection | IP66 | --- |
| 3.4 (2.4) | Luminaire suitable for direct mounting on normally flammable surfaces.....: | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | --- |
| 3.4 (2.5) | Luminaire for normal use | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | --- |
| | Luminaire for rough service | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | --- |
| 3.4 (-) | Modes of installation of road or street lighting | | --- |
| | a) on a pipe | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | --- |
| | b) on a mast arm | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | --- |
| | c) on a post top | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | --- |
| | d) on span or suspension wires | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | --- |
| | e) on a wall | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | --- |

| | | | |
|----------------|---------------------------------------|----------------------|-----|
| 3.5 (3) | MARKING | | --- |
| 3.5 (3.2) | Mandatory markings | | P |
| | Position of the marking | On the enclosure | P |
| | Format of symbols/text | | P |
| 3.5 (3.3) | Additional information | | P |
| | Language of instructions | English | P |
| 3.5 (3.3.1) | Combination luminaires | | N |
| 3.5 (3.3.2) | Nominal frequency in Hz | | N |
| 3.5 (3.3.3) | Operating temperature | | P |
| 3.5 (3.3.4) | Symbol or warning notice | | N |
| 3.5 (3.3.5) | Wiring diagram | | P |
| 3.5 (3.3.6) | Special conditions | | N |
| 3.5 (3.3.7) | Metal halide lamp luminaire – warning | | N |
| 3.5 (3.3.8) | Limitation for semi-luminaires | | N |
| 3.5 (3.3.9) | Power factor and supply current | See the label | P |
| 3.5 (3.3.10) | Suitability for use indoors | Indoors and outdoors | P |

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| Clause | Requirement - Test | Result - Remark | Verdict |
|--------------|---|---|---------|
| 3.5 (3.3.11) | Luminaires with remote control | | N |
| 3.5 (3.3.12) | Clip-mounted luminaire – warning | | N |
| 3.5 (3.3.13) | Specifications of protective shields | | N |
| 3.5 (3.3.14) | Symbol for nature of supply | DC | P |
| 3.5 (3.3.15) | Rated current of socket outlet | | N |
| 3.5 (3.3.16) | Rough service luminaire | | N |
| 3.5 (3.3.17) | Mounting instruction for type Y, type Z and some type X attachments | type Y | P |
| 3.5 (3.3.18) | Non-ordinary luminaires with PVC cable | | N |
| 3.5 (3.3.19) | Protective conductor current in instruction if applicable | | N |
| 3.5 (3.3.20) | Provided with information if not intended to be mounted within arm's reach | | N |
| 3.5 (3.3.21) | Non replaceable and non-user replaceable light sources information provided | Non replaceable light sources | P |
| | Cautionary symbol | | P |
| 3.5 (3.3.22) | Controllable luminaires, classification of insulation provided | | P |
| 3.5 (3.4) | Test with water | Rubbed lightly for 15 s with a piece of cloth soaked with water | P |
| | Test with hexane | For a further 15 s | P |
| | Legible after test | | P |
| | Label attached | | P |
| 3.5 (-) | Additional information in instruction leaflet | See below | P |
| | a) Design attitude | | P |
| | b) Weight | | P |
| | c) Overall dimensions | | P |
| | d) Maximum projected area if applicable | | P |
| | e) Cross-sectional area of wires if applicable | | P |
| | f) Suitability for indoors use | | N |
| | g) Dimensions of the compartment | | N |
| | h) Torque setting to be applied to bolts or screws | | P |
| | i) Maximum mounting height | See instruction manual | P |

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| Clause | Requirement - Test | Result - Remark | Verdict |
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| | | | |
|------------------|--|--|-----|
| 3.6 (4) | CONSTRUCTION | | --- |
| 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 | | --- |
| 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 |
| | - pressure test (N) | | 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 (N) | | N |
| | After test the lampholder have not moved from its position and show no permanent deformation | | N |
| 3.6 (4.4.5) | Peak pulse voltage | | --- |
| 3.6 (4.4.6) | Centre contact | | N |
| 3.6 (4.4.7)* | Parts in rough service luminaires resistant to tracking | | N |
| 3.6 (4.4.8) | Lamp connectors | | N |
| 3.6 (4.4.9) | Caps and bases correctly used | | N |
| 3.6 (4.4.10) | Light source for lampholder or connection according IEC 60061 not connected another way | | 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 | | N |
| | Tails | | N |
| | Unsecured blocks | | N |
| 3.6 (4.7) | Terminals and supply connections | | --- |
| 3.6 (4.7.1) | Contact to metal parts | | P |
| 3.6 (4.7.2) | Test 8 mm live conductor | | N |
| | Test 8 mm earth conductor | | N |
| 3.6 (4.7.3) | Terminals for supply conductors | | N |

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| | | | |
|-------------------|--|--|------------|
| 3.6 (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 |
| 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 |
| | - test at 30 N | | N |
| 3.6 (4.8) | Switches | | N |
| | - adequate rating | | N |
| | - adequate fixing | | N |
| | - polarized supply | | N |
| | - compliance with IEC 61058-1 for electronic switches | | N |
| 3.6 (4.9) | Insulating lining and sleeves | | --- |
| 3.6 (4.9.1) | Retainment | | P |
| | Method of fixing: Form part of luminaire | | P |
| 3.6 (4.9.2) | Insulated linings and sleeves: | | --- |
| | Resistant to a temperature > 20 °C to the wire temperature or | | N |
| | a) & c) Insulation resistance and electric strength | | N |
| | b) Ageing test. Temperature (°C): | | N |
| 3.6 (4.10) | Double or reinforced insulation | | --- |
| 3.6 (4.10.1) | No contact, mounting surface – accessible metal parts – wiring of basic insulation | | N |
| | Safe installation fixed luminaires | | N |
| | Capacitors and switches | | N |
| | Interference suppression capacitors according to IEC 60384-14 | | N |
| 3.6 (4.10.2) | Assembly gaps: | | --- |
| | - not coincidental | | N |
| | - no straight access with test probe | | N |

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| | | | |
|---------------|--|-----------------------------|-----|
| 3.6 (4.10.3) | Retainment of insulation: | | --- |
| | - fixed | | N |
| | - unable to be replaced; luminaire inoperative | | N |
| | - sleeves retained in position | | N |
| | - lining in lampholder | | 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 |
| 3.6 (4.11) | Electrical connections and current-carrying parts | | --- |
| 3.6 (4.11.1) | Contact pressure | | P |
| 3.6 (4.11.2) | Screws: | | --- |
| | - self-tapping screws | | P |
| | - thread-cutting screws | | N |
| 3.6 (4.11.3) | Screw locking: | | --- |
| | - spring washer | | P |
| | - rivets | | N |
| 3.6 (4.11.4) | Material of current-carrying parts | | P |
| 3.6 (4.11.5) | No contact to wood or mounting surface | | P |
| 3.6 (4.11.6)* | Electro-mechanical contact systems | | N |
| 3.6 (4.12) | Screws and connections (mechanical) and glands | | --- |
| 3.6 (4.12.1) | Screws not made of soft metal | | P |
| | Screws of insulating material | | P |
| | Torque test: torque (Nm); part | 0.8Nm for fixed LED cover | P |
| | Torque test: torque (Nm); part | 0.5Nm for fixed LED PCB | P |
| | Torque test: torque (Nm); part | 8Nm for fixed Mounting pole | P |
| 3.6 (4.12.2) | Screws with diameter < 3 mm screwed into metal | | N |
| 3.6 (4.12.4) | Locked connections: | | --- |
| | - fixed arms; torque (Nm) | | N |
| | - lampholder; torque (Nm) | | N |
| | - push-button switches; torque 0,8 Nm | | N |

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|-------------------|---|------------------------|----------|
| 3.6 (4.12.5) | Screwed glands; force (Nm) | Metal glands: 7.5Nm | P |
| 3.6 (4.13) | Mechanical strength | | P |
| 3.6 (4.13.1) | Impact tests: | | P |
| | - fragile parts; energy (Nm)..... | 0.35Nm, LED cover | P |
| | - other parts; energy (Nm) | 0.5Nm, Metal enclosure | P |
| | a) live parts | | P |
| | b) linings | | N |
| | c) protection | | P |
| | d) covers | | P |
| 3.6 (4.13.3) | Straight test finger | | N |
| 3.6 (4.13.4)* | Rough service luminaires | | N |
| | - IP54 or higher | | N |
| | 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 |
| 3.6 (4.13.6) | Tumbling barrel | | N |
| 3.6 (4.14) | Suspensions, fixings and means of adjusting | | P |
| 3.6 (4.14.1)* | Mechanical load: | | P |
| | A) four times the weight | 7.65x4=30.6Kg | P |
| | B) torque 2,5 Nm | | P |
| | C) bracket arm; bending moment (Nm)..... | | P |
| | D) load track-mounted luminaires | | N |
| | E) clip-mounted luminaires, glass-shelve. Thickness (mm) | | N |
| | Metal rod. diameter (mm) | | N |
| | Fixed luminaire or independent control gear without fixing devices | | --- |
| 3.6 (4.14.2) | Load to flexible cables | | N |
| | Mass (kg) | | N |
| | Stress in conductors (N/mm ²) | | N |
| | Mass (kg) of semi-luminaire | | N |
| | Bending moment (Nm) of semi-luminaire | | N |

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| 3.6 (4.14.3) | Adjusting devices: | | --- |
| | - flexing test; number of cycles | | 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 | | N |
| 3.6 (4.14.5) | Guide pulleys | | N |
| 3.6 (4.14.6) | Strain on socket-outlets | | N |
| 3.6 (4.15) | Flammable materials | | --- |
| | - glow-wire test 650°C | See Test Table 3.15 (13.3.2) | P |
| | - spacing ≥ 30 mm | | N |
| | - screen withstanding test of 13.3.1 | | N |
| | - screen dimensions | | N |
| | - no fiercely burning material | | P |
| | - thermal protection | | N |
| | - electronic circuits exempted | | N |
| 3.6 (4.15.2) | Luminaires made of thermoplastic material with lamp control gear | | --- |
| | a) construction | | N |
| | b) temperature sensing control | | N |
| | c) surface temperature | | N |
| 3.6 (4.16) | Luminaires for mounting on normally flammable surfaces | | P |
| | No lamp control gear | (compliance with Section 12) | N |
| 3.6 (4.16.1) | Lamp control gear spacing: | | --- |
| | - spacing 35 mm | | N |
| | - spacing 10 mm | | N |
| 3.6 (4.16.2) | Thermal protection: | | --- |
| | - in lamp control gear | | N |
| | - external | | N |
| | - fixed position | | N |
| | - temperature marked lamp control gear | | N |
| 3.6 (4.16.3) | Design to satisfy the test of 12.6 | (see clause 12.6) | N |
| 3.6 (4.17) | Drain holes | | N |
| | Clearance at least 5 mm | | N |

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| | | | |
|-------------------|--|------------------------------|------------|
| 3.6 (4.18) | Resistance to corrosion | | --- |
| 3.6 (4.18.1) | - rust-resistance | | N |
| 3.6 (4.18.2)* | - season cracking in copper | | N |
| 3.6 (4.18.3) | - corrosion of aluminium | | N |
| 3.6 (4.19) | Igniters compatible with ballast | | N |
| 3.6 (4.20)* | Rough service vibration | | N |
| 3.6 (4.21) | Protective shield | | --- |
| 3.6 (4.21.1) | Shield fitted if tungsten halogen lamps or metal halide lamps | | N |
| | Shield of glass if tungsten halogen lamps | | N |
| 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.....: | See Test Table 3.15 (13.3.2) | N |
| 3.6 (4.22) | Attachments to lamps not cause overheating or damage | | N |
| 3.6 (4.23) | Semi-luminaires comply Class II | | N |
| 3.6 (4.24) | Photobiological hazards | | N |
| 3.6 (4.24.1)* | No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P) | | --- |
| 3.6 (4.24.2)* | Retinal blue light hazard | | |
| | Class of risk group assessed according to IEC/TR 62778 | | — |
| | Luminaires with E_{thr} : | | N |
| | a) Fixed luminaires | | N |
| | - distance x m, borderline between RG1 and RG2....: | | 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 |
| 3.6 (4.25) | Mechanical hazard | | P |
| | No sharp point or edges | | P |
| 3.6 (4.26) | Short-circuit protection | | N |

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| J 60598-2-3 | | | |
|-------------------|--|-----------------|----------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| 3.6 (4.26.1) | Adequate means of uninsulated accessible SELV parts | | N |
| 3.6 (4.26.2) | Short-circuit test with test chain according 4.26.3 | | N |
| | Test chain not melt through | | N |
| | Test sample not exceed values of Table 12.1 and 12.2 | | N |
| 3.6 (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 |
| 3.6 (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 lamp can degrade the fixing | | N |
| | Not outside the luminaire enclosure | | N |
| | Test of adhesive fixing: | | N |
| | Max. temperature on adhesive material ($^{\circ}\text{C}$): | | N |
| | 100 cycles between t min and t max | | N |
| | Temperature sensing control still in position | | N |
| 3.6 (4.29) | Luminaires with non-replaceable light source | | P |
| | Not possible to replace light source | | P |
| | Live part not accessible after parts have been opened by hand or tools | | P |
| 3.6 (4.30) | Luminaires 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 |
| 3.6 (4.31) | Insulation between circuits | | P |
| | Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3 | | P |

J 60598-2-3

| Clause | Requirement - Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
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| | | | |
|--------------|---|--|---|
| | 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 | | P |
| 3.6 (4.31.1) | SELV circuits | | P |
| | Used SELV source | | P |
| | Voltage ≤ ELV | | P |
| | Insulating of SELV circuits from LV supply | | N |
| | Insulating of SELV circuits from other non SELV circuits | | P |
| | 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 | | P |
| | 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 |
| 3.6 (4.31.2) | FELV circuits | | N |
| | Used FELV source | | N |
| | Voltage ≤ 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 |
| 3.6 (4.31.3) | Other circuits | | N |
| | Other circuits insulated from accessible parts according Table X.1 | | N |
| | Class II 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 |

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J 60598-2-3

| Clause | Requirement - Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
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| | | | |
|-------------------|---|------|----------|
| | - 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 luminaire constructed as class I | | N |
| 3.6 (4.32) | Overvoltage protective devices | | P |
| | Comply with IEC 61643-11 | | P |
| | External to controlgear and connected to earth: | | P |
| | - only in fixed luminaires | | P |
| | - only connected to protective earth | | P |
| 3.6.1 (-) | At least IP X3 or X5 respectively. IP : | IP66 | P |
| | Column-integrated luminaires: | | N |
| | - parts below 2,5 m. IP : | | N |
| | - parts above 2,5 m. IP : | | P |
| 3.6.2 (-) | Suspension on span wires | | N |
| 3.6.3 (-) | Means for attaching the luminaire or external parts to its support appropriate to the weight | | P |
| 3.6.3.1 (-) | Static load test | | P |
| | - drag coefficient : | | P |
| | - loaded area (m ²) : | | P |
| | - used load (N) : | | P |
| | - measured deformation (cm/m) : | <1° | P |
| | - no rotation | | P |
| 3.6.4 (-) | Adjustable lampholders | | N |
| 3.6.5 (-) | Luminaires installed above 5 m, glass covers shall be: | | N |
| | a) glass that fractures into small pieces (test according to 3.6.5.1), or | | N |
| | b) glass having a high impact shock resistance (test according to 3.6.5.2), or | | N |
| | c) protected by any means to retain glass fragments | | N |
| | For tunnel luminaires 3.6.5.1 apply | | N |
| | Method of protection declared by the manufacturer | | N |
| 3.6.5.1 (-) | Protection by the use of glass that fractures into small pieces | | N |
| | - number of particles is more than 40 : | | N |

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J 60598-2-3

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|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

| | | | |
|---------------|---|--|---|
| 3.6.5.2 (-) | Protection by the use of high impact resistant glass | | N |
| 3.6.5.2.1 (-) | Glass covers have high mechanical strength | | N |
| | Test according IEC 62262 with test apparatus according IEC 60068-2-75 with impact energy of 5J on preconditioned sample | | N |
| 3.6.5.2.2 (-) | Glass covers not break into large pieces | | N |
| | - test according 3.6.5.1, number of particles is more than 20 | | N |
| 3.6.6 (-) | Connection compartment of column-integrated luminaire | | N |
| | - provides adequate space | | N |
| | - means for attachment | | N |
| | - means for attachment of metal corrosion-resistant | | N |
| 3.6.7 (-) | Compliance with ISO standard or other | | N |
| 3.6.8 (-) | Doors of column-integrated luminaires: | | N |
| | - corrosion-resistant | | N |
| | - opening only possible for an authorized person | | N |
| | - impact test 5 Nm | | N |
| | - sample show no damage | | N |
| 3.6.9 (-) | Column-integrated luminaire: | | N |
| | - dimension of the cable entry slot (mm) | | N |
| | - cable path from the slot to the connection compartment (mm) | | N |
| | - cable path free from obstruction that might cause abrasion of the cable | | N |

| | | | |
|-----------------|---|---|-----|
| 3.7 (11) | CREEPAGE DISTANCES AND CLEARANCES | | P |
| 3.7 (11.2) | Creepage distances and clearances | See Table 3.7 (11.2) | --- |
| | Impulse withstand category (Normal category II) (Category III Annex U, Table U.1) | Category II <input checked="" type="checkbox"/> Category III <input type="checkbox"/> | — |

| | | | |
|---------------------|--|----------------|---|
| 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 | 0.037 Ω | P |
| | Self-tapping screws used | | P |

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J 60598-2-3

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|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

| | | | |
|---------------------|--|--|---|
| | Thread-forming screws | | N |
| | Thread-forming screw used in a grove | | 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 | | N |
| 3.8 (7.2.2 + 7.2.3) | Earth continuity in joints, etc. | | P |
| 3.8 (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 |
| 3.8 (7.2.5) | Earth terminal integral part of connector socket | | N |
| 3.8 (7.2.6) | Earth terminal adjacent to mains terminals | | N |
| 3.8 (7.2.7) | Electrolytic corrosion of the earth terminal | | N |
| 3.8 (7.2.8) | Material of earth terminal | | N |
| | Contact surface bare metal | | N |
| 3.8 (7.2.10) | Class II luminaire for looping-in | | N |
| | Double or reinforced insulation to functional earth | | N |
| 3.8 (7.2.11) | Earthing core coloured green-yellow | | P |
| | Length of earth conductor | | P |
| 3.8.1 (-) | Attachment prevented from rotation | | N |

| | | | |
|-----------------|-------------------------------------|---------------|-----|
| 3.9 (14) | SCREW TERMINALS | | --- |
| | Separately approved; component list | (see Annex 1) | N |
| | Part of the luminaire | (see Annex 3) | N |

| | | | |
|-----------------|---|---------------|-----|
| 3.9 (15) | SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS | | --- |
| | Separately approved; component list | (see Annex 1) | N |
| | Part of the luminaire | (see Annex 4) | N |

| | | | |
|-------------------|--|--|----------|
| 3.10 (5) | EXTERNAL AND INTERNAL WIRING | | --- |
| 3.10 (5.2) | Supply connection and external wiring | | P |
| 3.10 (5.2.1) | Means of connection | | P |

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|--------|--------------------|-----------------|---------|
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| | | | |
|-----------------|---|-----------------------|-----|
| | Outdoor luminaire 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 | | P |
| 3.10 (5.2.2) | Type of cable | | P |
| | Nominal cross-sectional area (mm ²)..... | 3*1.0 mm ² | P |
| | Cables equal to IEC 60227 or IEC 60245 | IEC 60227 | P |
| 3.10 (5.2.3) | Type of attachment, X, Y or Z | Type 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 |
| 3.10 (5.2.8) | Insulating bushings: | | P |
| | - suitably fixed | | P |
| | - material in bushings | | N |
| | - material not likely to deteriorate | | N |
| | - tubes or guards made of insulating material | | N |
| 3.10 (5.2.9) | Locking of screwed bushings | | N |
| 3.10 (5.2.10) | Cord anchorage: | | P |
| | - covering protected from abrasion | | P |
| | - clear how to be effective | | N |
| | - 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: | | --- |
| | 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 |

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J 60598-2-3

| Clause | Requirement - Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

| | | | |
|-------------------|--|---------------|-----|
| | Labyrinth type anchorages | | N |
| 3.10 (5.2.10.2) | Adequate cord anchorage for type Y and type Z attachment | Type Y | P |
| 3.10 (5.2.10.3) | Tests: | | -- |
| | - impossible to push cable; unsafe | | P |
| | - pull test: 25 times; pull (N) | 80N | P |
| | - torque test: torque (Nm) | 0.25Nm | P |
| | - displacement 2 mm | 0.76 | P |
| | - no movement of conductors | | N |
| | - no damage of cable or cord | | N |
| | - function independent of electrical connection | | N |
| 3.10 (5.2.11) | External wiring passing into luminaire | | N |
| 3.10 (5.2.12) | Looping-in terminals | | N |
| 3.10 (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 |
| | No unsafe compatibility | | N |
| 3.10 (5.2.16) | Appliance inlets (IEC 60320) | | N |
| | Installation couplers (IEC 61535) | | N |
| | Other appliance inlet or connector according relevant IEC standard | | N |
| 3.10 (5.2.17) | No standardized interconnecting cables properly assembled | | N |
| 3.10 (5.2.18) | Used plug in accordance with | | N |
| | - IEC 60083 | | N |
| | - other standard | | N |
| 3.10 (5.3) | Internal wiring | | --- |
| 3.10 (5.3.1) | Internal wiring of suitable size and type | | P |
| | Through wiring | | N |
| | - not delivered/ mounting instruction | | N |
| | - factory assembled | | P |
| | - socket outlet loaded (A) | | N |
| | - temperatures | (see Annex 2) | N |

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|--------|--------------------|-----------------|---------|
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| | | | |
|----------------|--|--|---|
| | Green-yellow for earth only | | P |
| 3.10 (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 | | N |
| 3.10 (5.3.1.2) | Internal wiring connected to fixed wiring via internal current-limiting device | | P |
| | Adequate cross-sectional area and insulation thickness | | P |
| 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 |
| 3.10 (5.3.1.6) | Insulation thickness other than PVC or rubber | | N |
| 3.10 (5.3.2) | Sharp edges etc. | | N |
| | No moving parts of switches etc. | | N |
| | Joints, raising/lowering devices | | N |
| | Telescopic tubes etc. | | N |
| | No twisting over 360° | | P |
| 3.10 (5.3.3) | Insulating bushings: | | P |
| | - suitable fixed | | N |
| | - material in bushings | | N |
| | - material not likely to deteriorate | | N |
| | - cables with protective sheath | | P |
| 3.10 (5.3.4) | Joints and junctions effectively insulated | | P |
| 3.10 (5.3.5) | Strain on internal wiring | | N |
| 3.10 (5.3.6) | Wire carriers | | N |
| 3.10 (5.3.7) | Wire ends not tinned | | N |
| | Wire ends tinned: no cold flow | | N |
| 3.10.1 (-) | Cord anchorage if applicable | | N |
| | - pull test: 25 times; pull (N) | | N |
| | - torque test: torque (Nm) | | N |

| | | | |
|-----------------|--|--|-----|
| 3.11 (8) | PROTECTION AGAINST ELECTRIC SHOCK | | --- |
| 3.11 (8.2.1) | Live parts not accessible | | P |

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| | | | |
|----------------|--|--|-----|
| | 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 luminaires | | N |
| | Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires | | P |
| | Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements | | N |
| | Basic insulation only accessible under lamp or starter replacement | | N |
| | Protection in any position | | N |
| | Double-ended tungsten filament lamp | | N |
| | Insulation lacquer not reliable | | N |
| | Double-ended high pressure discharge lamp | | N |
| | Relevant warning according to 3.2.18 fitted to the luminaire | | N |
| 3.11 (8.2.2) | Portable luminaire adjusted in most unfavourable position | | N |
| 3.11 (8.2.3.a) | Class II luminaire: | | --- |
| | - 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 |
| 3.11 (8.2.3.b) | BC lampholder of metal in class I luminaires shall be earthed | | N |
| 3.11 (8.2.3.c) | SELV circuits with exposed current carrying parts: | | N |
| | Ordinary luminaire: | | 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 luminaire: | | N |
| | - nominal voltage (V) | | N |
| | Class III luminaire only for connection to SELV | | N |

J 60598-2-3

| Clause | Requirement - Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

| | | | |
|--------------|---|--|---|
| | Class III luminaire not provided with means for protective earthing | | N |
| 1.11 (8.2.4) | Portable luminaire have protection independent of supporting surface | | N |
| 3.11 (8.2.5) | Compliance with the standard test finger or relevant probe | | P |
| 3.11 (8.2.6) | Covers reliably secured | | N |
| 3.11 (8.2.7) | Luminaire other than below with capacitor > 0,5 μ F not exceed 50 V 1 min after disconnection | | N |
| | Portable luminaire with capacitor > 0,1 μ F (0.25) not exceed 34 V 1 s after disconnection | | N |
| | Other luminaires with capacitor > 0,1 μ F (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection | | N |

| | | | |
|------------------|---|--|-----|
| 3.12 (12) | ENDURANCE TEST AND THERMAL TEST | | --- |
| 3.12.2 (-) | If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 3.13 | | --- |
| 3.12 (12.3) | Endurance test: | | P |
| | - mounting-position | Mounting according to the suggestion of manufacturer | --- |
| | - test temperature (°C) | 55°C | --- |
| | - total duration (h) | 240 h | --- |
| | - supply voltage: Un factor; calculated voltage (V) | 48V*1.1 | --- |
| | - lamp used | LED module | --- |
| 3.12 (12.3.2) | After endurance test: | | --- |
| | - no part unserviceable | | P |
| | - luminaire not unsafe | | P |
| | - no damage to track system | | N |
| | - marking legible | | P |
| | - no cracks, deformation etc. | | P |
| 3.12 (12.4) | Thermal test (normal operation) | (see Annex 2) | P |
| 3.12 (12.5) | Thermal test (abnormal operation) | (see Annex 2) | N |
| 3.12 (12.6) | Thermal test (failed lamp control gear condition): | | N |
| 3.12 (12.6.1) | Through wiring or looping-in wiring loaded by a current of (A) | | N |

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J 60598-2-3

| Clause | Requirement - Test | Result - Remark | Verdict |
|-----------------|--|-------------------------|---------|
| | - case of abnormal conditions.....: | | N |
| | - electronic lamp control gear | | N |
| | - measured winding temperature (°C): at 1,1 Un | | N |
| | - 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 | | --- |
| | - case of abnormal conditions.....: | | N |
| | - thermal link | | N |
| | - manual reset cut-out | | N |
| | - auto reset cut-out | | N |
| | - measured mounting surface temperature (°C).....: | | N |
| | - track-mounted luminaires | | N |
| 3.12 (12.7) | Thermal test (failed lamp control gear in plastic luminaires): | | --- |
| 3.12 (12.7.1) | Luminaire without temperature sensing control | | N |
| 3.12 (12.7.1.1) | Luminaire 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.....: | See Table 3.15 (13.2.1) | N |
| 3.12 (12.7.1.2) | Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA | | N |
| | - case of abnormal conditions.....: | | — |

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J 60598-2-3

| Clause | Requirement - Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

| | | | |
|-----------------|--|--|---|
| | - 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.....: | See Table 3.15 (13.2.1) | N |
| 3.12 (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 |
| 3.12 (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.....: | See Table 3.15 (13.2.1) | N |
| 3.12.1 (-) | Temperature reduction if for outdoor use only | | N |
| 3.12.2 (-) | (See above) | | — |
| 3.12.3 (-) | Glass covers used within the thermal limits declared by the glass manufacturer | | N |

| | | | |
|-----------------|--|---------------------|-----|
| 3.13 (9) | RESISTANCE TO DUST AND MOISTURE | | --- |
| 3.13.1 (-) | If IP > IP 20 the order of tests as specified in clause 3.12 | | --- |
| 3.13 (9.2)* | Tests for ingress of dust, solid objects and moisture: | | --- |
| | - classification according to IP | IP66 | — |
| | - mounting position during test | Normal installation | — |
| | - fixing screws tightened; torque (Nm).....: | 8Nm | — |
| | - tests according to clauses | 9.2.2 and 9.2.7 | — |
| | - electric strength test afterwards | | P |
| | a) no deposit in dust-proof luminaire | | N |
| | b) no talcum in dust-tight luminaire | | P |

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J 60598-2-3

| Clause | Requirement - Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

| | | | |
|------------|--|----------------|---|
| | c) no trace of water on current-carrying parts or on insulation where it could become a hazard | | P |
| | c.1) For luminaires without drain holes – no water entry | | P |
| | c.2) For luminaires with drain holes – no hazardous water entry | | N |
| | d) no water in watertight or pressure watertight luminaire | | 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 lamp requiring protection from splashing water | | N |
| | g) no damage of protective shield or glass envelope | | N |
| 3.13 (9.3) | Humidity test 48 h | 25°C; 93% R.H. | P |

| | | | |
|------------------|--|--------|-----|
| 3.14 (10) | INSULATION RESISTANCE AND ELECTRIC STRENGTH | | --- |
| 3.14 (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)..... | | — |
| | SELV | | P |
| | - between current-carrying parts of different polarity : | 100 MΩ | P |
| | - between current-carrying parts and mounting surface | 100 MΩ | P |
| | - between current-carrying parts and metal parts of the luminaire | 100 MΩ | P |
| | - between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts | 100 MΩ | P |
| | - Insulation bushings as described in Section 5 | | N |
| | Other than SELV | | --- |
| | - between live parts of different polarity..... | | N |
| | - between live parts and mounting surface..... | | N |
| | - between live parts and metal parts..... | | N |
| | - between live parts of different polarity through action of a switch..... | | N |

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| Clause | Requirement - Test | Result - Remark | Verdict |
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| | | | |
|---------------|--|--------------------|-----|
| | - 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 |
| 3.14 (10.2.2) | Electric strength test | | --- |
| | Dummy lamp | | N |
| | Luminaires with ignitors after 24 h test | No ignitor | N |
| | Luminaires with manual ignitors | As above | N |
| | Test voltage (V) | | --- |
| | SELV | | --- |
| | - between current-carrying parts of different polarity : | 500V | P |
| | - between current-carrying parts and mounting surface | 500V | P |
| | - between current-carrying parts and metal parts of the luminaire | 500V | P |
| | - between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts | 2192V | P |
| | - Insulation bushings as described in Section 5 | | N |
| | Other than SELV | | --- |
| | - between live parts of different polarity..... | | N |
| | - between live parts and mounting surface..... | | N |
| | - between live parts and metal parts..... | | N |
| | - 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 |
| 3.14 (10.3) | Touch current or protective conductor current (mA): | Max.0.16 mA <3.5mA | P |

| | | | |
|------------------|--|------------------------------|-----|
| 3.15 (13) | RESISTANCE TO HEAT, FIRE AND TRACKING | | --- |
| 3.15 (13.2.1) | Ball-pressure test..... | See Test Table 3.15 (13.2.1) | P |
| 3.15 (13.3.1) | Needle-flame test (10 s) | See Test Table 3.15 (13.3.1) | N |
| 3.15 (13.3.2) | Glow-wire test (650°C) | See Test Table 3.15 (13.3.2) | P |
| 3.15 (13.4) * | Proof tracking test (IEC 60112) | See Test Table 3.15 (13.4) | N |

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| Clause | Requirement - Test | Result - Remark | Verdict |

| | | | | | | | | |
|---|--|-----|-----|------|-----|-----|------|-----|
| 3.7 (11.2) | TABLES: Creepage distances and clearances | | | | | | P | |
| Table 11.1 | Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages | | | | | | P | |
| RMS working voltage (V) not exceeding | | 50 | 150 | 250 | 500 | 750 | 1000 | |
| Creepage distances | | | | | | | | |
| Required basic insulation, PTI ≥ 600 | | 0,6 | 0,8 | 1,5 | 3 | 4 | 5,5 | |
| Measured | | --- | --- | --- | --- | --- | --- | |
| Required basic insulation, PTI < 600 | | 1,2 | 1,6 | 2,5 | 5 | 8 | 10 | |
| Between current-carrying parts and mounting surface | | --- | --- | >2.5 | --- | --- | --- | |
| Required supplementary insulation PTI ≥ 600 | | - | 0,8 | 1,5 | 3 | 4 | 5,5 | |
| Measured | | --- | --- | --- | --- | --- | --- | |
| Required supplementary insulation PTI < 600 | | - | 1,6 | 2,5 | 5 | 8 | 10 | |
| Measured | | --- | --- | --- | --- | --- | --- | |
| Required reinforced insulation | | - | 3,2 | 5 | 6 | 8 | 11 | |
| Measured | | --- | --- | --- | --- | --- | --- | |
| Clearances | | | | | | | | |
| Required basic insulation | | 0,2 | 0,8 | 1,5 | 3 | 4 | 5,5 | |
| Between current-carrying parts and mounting surface | | --- | --- | >1.5 | --- | --- | --- | |
| Required supplementary insulation | | - | 0,8 | 1,5 | 3 | 4 | 5,5 | |
| Measured | | --- | --- | --- | --- | --- | --- | |
| Required reinforced insulation | | - | 1,6 | 3 | 6 | 8 | 11 | |
| Measured | | --- | --- | --- | --- | --- | --- | |
| Table 11.2 | Minimum distances (mm) for non-sinusoidal pulse voltages | | | | | | | |
| Rated pulse voltage (peak Kv) | | 2,0 | 2,5 | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 |
| Required clearances | | 1,0 | 1,5 | 2 | 3 | 4 | 5,5 | 8 |
| Measured | | --- | --- | --- | --- | --- | --- | --- |
| Rated pulse voltage (peak kV) | | 10 | 12 | 15 | 20 | 25 | 30 | 40 |
| Required clearances | | 11 | 14 | 18 | 25 | 33 | 40 | 60 |
| Measured | | --- | --- | --- | --- | --- | --- | --- |
| Rated pulse voltage (peak kV) | | 50 | 60 | 80 | 100 | - | - | - |
| Required clearances | | 75 | 90 | 130 | 170 | - | - | - |
| Measured | | --- | --- | --- | --- | --- | --- | --- |

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| J 60598-2-3 | | | |
| Clause | Requirement - Test | Result - Remark | Verdict |

| | | | | |
|--|---|-----------------------|--------------------------|---|
| 3.15 (13.2.1) | TABLE: Ball Pressure Test of Thermoplastics | | | P |
| Allowed impression diameter (mm) : | | | | — |
| Object/ Part No./ Material | Manufacturer/ trademark | Test temperature (°C) | Impression diameter (mm) | |
| LED cover | -- | 75 | 1.11 | |
| LED PCB | -- | 125 | 0.65 | |
| Connector | -- | 125 | 1.23 | |
| Supplementary information: | | | | |

| | | | | | |
|-------------------------------|--|---|--|------------------------------------|----------|
| 3.15 (13.3.1) | TABLE: Needle-flame test (IEC 60695-11-5) | | | | N |
| Object/ Part No./ Material | Manufacturer/ trademark | Duration of application of test flame (ta); (s) | Ignition of specified layer Yes/No | Duration of burning (tb) (s) | Verdict |
| --- | --- | --- | --- | --- | --- |
| Supplementary information: | | | | | |

| | | | | | |
|---|--|--|--|------------------------------------|---------|
| 3.15 (13.3.2) | TABLE: Glow-wire test (IEC 60695-2-11) | | | | P |
| Glow wire temperature : | | | 650°C | | — |
| Object/ Part No./ Material | Manufacturer/ trademark | | Ignition of specified layer Yes/No | Duration of burning (tb) (s) | Verdict |
| LED cover | --- | | NO | 0 | pass |
| LED PCB | --- | | NO | 0 | pass |
| Connector | --- | | NO | 0 | pass |
| Any flame or glowing of the sample extinguished within 30 s of withdrawing the glow-wire, and any burning or molten drop did not ignite the underlying parts (Yes/No) : | | | | | |
| Supplementary information: | | | | | |

| | | | | | |
|-------------------------------|---|--|-----|-------|----------|
| 3.15 (13.4)* | TABLE: Proof tracking test (IEC 60112) | | | | N |
| Test voltage PTI | | | | 175 V | — |
| Object/ Part No./ Material | Manufacturer/ trademark | Withstand 50 drops without failure on three places or on three specimens | | | Verdict |
| --- | --- | --- | --- | --- | --- |

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| Clause | Requirement - Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

| ANNEX 1 | TABLE: Critical components information | | | | | P |
|---------------------------------------|---|--------------|---|-----------------------------|-------------------------------------|---|
| Object / part No. | Manufacturer/ trademark | Type / model | Technical data | standard | Mark(s) of conformity ¹⁾ | |
| Supply cord | Zhongshan Rifeng Electric Cable Co., Ltd. | H05RN-F | 3x1.0mm ² | VDE 0282 | VDE | |
| Alt. | Various | H05RN-F | 3x1.0mm ² | VDE 0282 | VDE | |
| Solar LED constant current controller | Various | 9115A6 | Max. 60VDC, 2.5A | EN 61347-1 EN 61347-2-11 | VDE | |
| Solar panel | Various | Various | Voc:22.9V, Vmp:17.5V, Imp:2.9A, Isc:2.97A, Pmp:50W | IEC 61730-1 IEC 61730-2 | TUV | |
| Battery | AOK | LiFePO4 | 12.8VDC, 42Ah, 537.6Wh | IEC 62133 | TUV | |
| Connector | ZHONGSHAN YONGLIAN ELECTRICAL APPLIANCES CO. LTD. | XZ-3 | 250V, 10A, T100 | VDE 0613 | VDE | |
| Alt. | Various | Various | 250V, 10A, T100 | VDE 0613 | VDE | |
| Photocell Sensor | FOSHAN KAICHENG LIGHTING CO., LTD | PS-265 | Input:100-277VAC, 50/60Hz, 5A | IEC 61643-11 | CE | |
| LED cover | SAMSUNG TOTAL PETROCHEMICALS CO LTD | FB51+ | V-0, 130°C | UL 94 | UL | |
| Alt. | Various | Various | V-0, 130°C | UL 94 | UL | |
| LED PCB | ZHAOYUAN JINBAO ELECTRONICS CO LTD | ZD-9F | V-0, 130°C | UL 796 | UL | |
| Alt. | Various | Various | V-0, 130°C | UL 796 | UL | |
| LED | FOSHAN KAICHENG LIGHTING CO., LTD | Various | Vf: 2.8-6.2V, If: 0.15A, 2700-6500K | EN 60598-1 EN 60598-2-3 | Tested with appliance | |

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| Clause | Requirement - Test | Result - Remark | Verdict |

| ANNEX 2 | TABLE: Temperature measurements, thermal tests of Section 12 | | P | | | |
|--------------------------------|---|------------------------------|--------|-------|------------------------|-------|
| | Type reference : | AOK-60WsE-DC-AP-L5-5070-T3-P | — | | | |
| | Lamp used : | LED | — | | | |
| | Lamp control gear used : | -- | — | | | |
| | Mounting position of luminaire : | As in normal use | — | | | |
| | Supply wattage (W)..... : | 63.4W | — | | | |
| | Supply current (A) : | 1.26A | — | | | |
| | Calculated power factor : | -- | — | | | |
| | Table: measured temperatures corrected for ta = 45°C: | | P | | | |
| | - abnormal operating mode : | -- | — | | | |
| | - test 1: rated voltage : | | — | | | |
| | - test 2: 1,06 times rated voltage or 1,05 times rated wattage..... : | 48Vx1.06=50.88V | — | | | |
| | - 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..... : | -- | — | | | |
| | Through wiring or looping-in wiring loaded by a current of A during the test : | -- | — | | | |
| Temperature measurements, (°C) | | | | | | |
| Part | Clause 12.4 – normal | | | | Clause 12.5 – abnormal | |
| | test 1 | test 2 | test 3 | limit | test 4 | limit |
| Supply cord | -- | 52.4 | -- | 105 | -- | -- |
| Photocell Sensor surface | -- | 47.9 | -- | Ref. | -- | -- |
| Photocell Sensor cover | -- | 48.7 | -- | 90 | -- | -- |
| Battery surface | -- | 52.9 | -- | Ref. | -- | -- |
| Solar panel surface | -- | 47.2 | -- | Ref. | -- | -- |
| Metal enclosure | -- | 53.5 | -- | Ref. | -- | -- |
| LED PCB | -- | 76.9 | -- | 130 | -- | -- |
| LED | -- | 84.7 | -- | Ref. | -- | -- |
| LED cover | -- | 59.8 | -- | 105 | -- | -- |
| Mounting surface | -- | 49.3 | -- | 90 | -- | -- |

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| Clause | Requirement - Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
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| | | | |
|----------------|---|--|----------|
| 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 |

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| Clause | Requirement - Test | Result - Remark | Verdict |

| | | | |
|----------------|---|--|---|
| 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 (4 N, 4 samples) | | N |
| (15.5.1.1.2) | Pull test pin or tab terminals (4 N, 4 samples) | | 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 |

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| | | | | | | | | | | | |
|----------------------------|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|
| | 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 (4 samples); pull (N) : | | | | | | | | | | N |
| (15.6.3) | Electrical tests | | | | | | | | | | N |
| | Tests according 15.6.3.1 + 15.6.3.2 in IEC 60598-1 | | | | | | | | | | N |
| (15.6.3.2) | TABLE: Contact resistance test | | | | | | | | | | N |
| | 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: | | | | | | | | | | | |

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| Clause | Requirement - Test | Result - Remark | Verdict |
|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

| | | | |
|----------|---|--|-----|
| 4 | GENERAL REQUIREMENTS | | --- |
| 4.4 | Integral modules tested assembled in the luminaire | | P |
| 4.5 | Independent modules complies with requirements in IEC 60598-1 | | N |

| | | | |
|----------|---|---------------|----|
| 5 | GENERAL TEST REQUIREMENTS | | -- |
| 5.5 | SELV-operated LED modules comply with Annex I of IEC 61347-2-13 | (see Annex 1) | N |
| | General conditions for tests in Annex A | (see Annex A) | P |

| | | | |
|----------|--|---|-----|
| 6 | CLASSIFICATION | | --- |
| | Built-in module | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | --- |
| | Independent module | Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> | --- |
| | Integral module | Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> | --- |
| | For Integral module; Note to 1.2.1 in IEC 60598-1 applies. | | --- |

| | | | |
|----------|---|--|-----|
| 7 | MARKING | | N |
| | Requirements not applicable to the evaluated product. | | --- |

| | | | |
|----------|--|--|-----|
| 8 | TERMINALS | | --- |
| | Screw terminals according section 14 of IEC 60598-1: | | N |
| | Separately approved; component list | | N |
| | Part of the luminaire | | N |
| | Screwless terminals according section 15 of IEC 60598-1: | | N |
| | Separately approved; component list | | N |
| | Part of the luminaire | | N |
| | Connectors according IEC 60838-2-2: | | N |
| | Separately approved; component list | | N |

| | | | |
|--------------|---|--|-----|
| 9 (9) | PROVISION FOR PROTECTIVE EARTHING | | N |
| | Requirements not applicable to the evaluated product. | | --- |

| | | | |
|----------------|--|--|----|
| 10 (10) | PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS | | N |
| | Requirements not applicable to the evaluated product. | | -- |

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|--------|--------------------|-----------------|---------|

| | | | |
|----------------|--|-----------------|------------|
| 11 (11) | MOISTURE RESISTANCE AND INSULATION | | --- |
| | After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ): | | P |
| | For basic insulation $\geq 2 \text{ M}\Omega$ | | N |
| | For double or reinforced insulation $\geq 4 \text{ M}\Omega$ | More than 100MΩ | P |
| | Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1 | | N |

| | | | |
|----------------|--|-------|------------|
| 12 (12) | ELECTRIC STRENGTH | | --- |
| | Immediately after clause 11 electric strength test for 1 min | | P |
| | Basic insulation for SELV, test voltage 500 V | | N |
| | Working voltage $\leq 50 \text{ V}$, test voltage 500 V | | N |
| | Working voltage $> 50 \text{ V} \leq 1000 \text{ V}$, test voltage (V): | | N |
| | Basic insulation, $2U + 1000 \text{ V}$ | 1096V | P |
| | Supplementary insulation, $2U + 1000 \text{ V}$ | | N |
| | Double or reinforced insulation, $4U + 2000 \text{ V}$ | | N |
| | No flashover or breakdown | | P |
| | Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1 | | N |

| | | | |
|----------------|---|--|------------|
| 13 (14) | FAULT CONDITIONS | | --- |
| - (14) | When operated under fault conditions the controlgear: | | N |
| | - does not emit flames or molten material | | N |
| | - does not produce flammable gases | | N |
| | - protection against accidental contact not impaired | | N |
| | Thermally protected controlgear does not exceed the marked temperature value | | N |
| | Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected | | N |
| - (14.1) | Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (except between live parts and accessible metal parts) | | N |

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| Clause | Requirement - Test | Result - Remark | Verdict |
|----------------|--|-----------------|------------|
| | Creepage distances on printed boards less than specified in clause 16 in Part 1 provided with coating according to IEC 60664-3 | | N |
| - (14.2) | Short-circuit or interruption of semiconductor devices | | N |
| - (14.3) | Short-circuit across insulation consisting of lacquer, enamel or textile | | N |
| - (14.4) | Short-circuit across electrolytic capacitors | | N |
| - (14.5) | After the tests has been carried out on three samples: | | N |
| | The insulation resistance $\geq 1 \text{ M}\Omega$ | | N |
| | No flammable gases | | N |
| | No accessible parts have become live | | N |
| | During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite | | N |
| - (14.6) | Relevant fault condition tests with high-power supply | | N |
| 13.2 | Overpower condition | | P |
| | Module withstands overpower condition >15 min. | | P |
| | Module with automatic protective device or power limiter, test performed 15 min. at limit. | | N |
| | No fire, smoke or flammable gas is produced | | P |
| | Molten material does not ignite tissue paper, spread below the module | | P |
| 15 | CONSTRUCTION | | --- |
| | Wood, cotton, silk, paper and similar fibrous material not used as insulation | | P |
| 16 (16) | CREEPAGE DISTANCES AND CLEARANCES | | --- |
| - (16) | Creepage and distances and clearances in compliance with IEC 61347-1 | | N |
| | Insulating lining of metallic enclosures | | N |
| | Basic insulation on printed boards tested according to clause 14 | | N |
| | Distances subjected to both sinusoidal voltage as non-sinusoidal pulses not less than value in Table 16 | | N |
| | Creepage distances not less than minimum clearance | | N |

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| 16 (-) | Conductive accessible parts in compliance with applicable parts of IEC 60598-1 | | N |
| 17 (17) | SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS | | --- |
| | Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1) | | P |
| 18 (18) | RESISTANCE TO HEAT, FIRE AND TRACKING | | --- |
| - (18.1) | Ball-pressure test | | N |
| - (18.3) | Glow-wire test (650°C) | | N |
| - (18.4) | Needle-flame test (10 s) | | N |
| - (18.5) | Proof tracking test | | N |
| 19 (19)* | RESISTANCE TO CORROSION | | --- |
| | - test according 4.18.1 of IEC 60598-1 | | N |
| | - adequate varnish on the outer surface | | N |
| 20* | INFORMATION FOR LUMINAIRE DESIGN | | N |
| | Information in Annex D (informative) | | — |
| 21* | HEAT MANAGEMENT | | --- |
| 21.1 | General | | N |
| | Exchangeability is safeguarded by cap or base | | N |
| 21.2 | Heat-conducting foil and paste | | N |
| | Heat-conducting foil delivered with the module if necessary | | N |
| 22* | PHOTOBIOLOGICAL SAFETY | | --- |
| 22.1 | UV radiation | | N |
| | Luminous radiation not exceed 2mW/klm | | N |
| 22.2 | Blue light hazard | | N |
| | Assessed according to IEC TR 62778 | | N |
| 22.3 | Infrared radiation | | N |
| | Requirements for infrared radiation when required | | N |

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|--------|--------------------|-----------------|---------|
|--------|--------------------|-----------------|---------|

| | | | |
|----------|--|--|-----|
| A | ANNEX A - TESTS | | --- |
| | All tests performed in accordance with the advice given in Annex H of IEC 61347-1, if applicable | | N |

| | | | |
|--|--|--|-----|
| | ANNEX 1 - SELV-operated LED modules | | --- |
| | SELV-operated LED modules in compliance with Annex I of IEC 61347-2-13 | | N |

Attachment 2: Photo documentation

Photo 1



Photo 2



Attachment 2: Photo documentation

Photo 3



Photo 4



Attachment 2: Photo documentation

Photo 5



Photo 6



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Attachment 2: Photo documentation

Photo 7



Photo 8



-END REPORT-