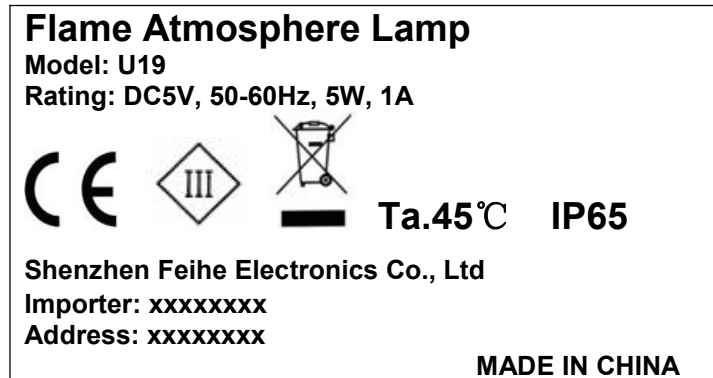


| TEST REPORT EN 60598-2-4 Luminaires - Part 2: Particular requirements Section 4: Portable general purpose luminaires | |
|---|--|
| Report reference No | LCS170509015BS |
| Tested by (name + signature)..... (Test engineer) | Shelly Wu |
| Check by (name + signature)..... (Director) | Eko Yang |
| Approved by (name + signature)..... (Manager) | Jesse Liu |
| Date of issue | May 22, 2017 |
| Contents | 36 pages |
| Testing laboratory | |
| Name | Shenzhen Southern LCS Compliance Testing Laboratory Ltd. |
| Address | B Area, 1-2F, Building B, Zhongyu Green High-tech Industrial Park, Wenge Road, Heshuikou, Gongming Street, Guangming New District, Shenzhen, China |
| Testing location | Same as above |
| Client | |
| Name | Shenzhen Feihe Electronics Co., Ltd |
| Address | 3/F, Bldg 3, Hongfa Innovative Park, Jiuwei, Bao'an District, Shenzhen, China |
| Manufacturer | |
| Name | Shenzhen Feihe Electronics Co., Ltd |
| Address | 3/F, Bldg 3, Hongfa Innovative Park, Jiuwei, Bao'an District, Shenzhen, China |
| Test specification | |
| Standard | EN 60598-2-4: 1997; EN 60598-1: 2015; EN 62031: 2008+A1: 2013+A2: 2015; EN 62493: 2015; EN 62471: 2008 |
| Test procedure | Compliance with EN 60598-2-4: 1997; EN 60598-1: 2015; EN 62031: 2008+A1: 2013+A2: 2015; EN 62493: 2015; EN 62471: 2008 |
| Non-standard test method | N/A |
| Test item Description | Flame Atmosphere Lamp |
| Trademark | N/A |
| Model and/or type reference | U19 |
| Rating(s) | DC5V, 50-60Hz, Max. 5W, 1A, IP65, Class III |



Copy of marking plate



All Labels are similar except rating and model name.

Label testing

Rubbing for 15 s with a piece of cloth soaked with water. And a further 15 s with a piece of cloth soaked with petroleum.

| EN 60598-2-4 | | | |
|------------------|---|--|----------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| 4.1 (0) | SCOPE (GENERAL INTRODUCTION) | | P |
| 4.1 (0.1) | Scope | | -- |
| | Information for luminaires design considered | Yes [<input checked="" type="checkbox"/>] No [<input type="checkbox"/>] | P |
| | Supply voltage | | P |
| 4.1 (0.2) | Normative references | | -- |
| 4.2 (0.3) | GENERAL REQUIREMENTS | | P |
| 4.2 (0.4) | General test requirements and verification | | P |
| 4.3 (1) | TERMS AND DEFINITIONS | | P |
| 4.4 (2) | CLASSIFICATION | | P |
| 4.4 (2.1) | General | | -- |
| 4.4 (2.2) | Type of protection | Class III | P |
| 4.4 (2.3) | Degree of protection | IP65 | P |
| 4.4 (2.4) | Luminaire suitable for direct mounting on normally flammable surfaces | Yes | P |
| | Luminaire not suitable for direct mounting on normally flammable surfaces | No | N |
| 4.4 (2.5) | Luminaire for normal use | Yes | P |
| | Luminaire for rough service | No | N |
| 4.5 (3) | MARKING | | P |
| 4.5 (3.1) | General | | -- |
| 4.5 (3.2) | Markings on luminaires | See marking label | P |
| | a)Marking to be observed when replacing lamps or other replaceable components | | N |
| | b)Marking to be observed during installation | The height of symbols more than 5mm, text more than 2mm | P |
| | c)Marking to be observed after installation | | N |
| | Format of symbols/text | The height of symbols more than 5mm, except for symbols for class II and class III classification minimum of 3 mm, and symbols of not suitable for direct mounting on normally flammable surfaces minimum 25mm; text more than 2mm | P |

| EN 60598-2-4 | | | |
|----------------|---|---|----------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| 4.5 (3.3) | Additional information | | P |
| | Language of instructions | In official language | P |
| 4.5 (3.3.1) | Combination luminaires | Not combination luminaire | N |
| 4.5 (3.3.2) | Nominal frequency in Hz | | N |
| 4.5 (3.3.3) | Operating temperature | | N |
| 4.5 (3.3.4) | Symbol or warning notice | | N |
| 4.5 (3.3.5) | Wiring diagram | See the manual | N |
| 4.5 (3.3.6) | Special conditions | No such special conditions | N |
| 4.5 (3.3.7) | Metal halid lamp luminaire – warning | | N |
| 4.5 (3.3.8) | Limitation for semi-luminaires | | N |
| 4.5 (3.3.9) | Power factor and supply current for supply information | | P |
| 4.5 (3.3.10) | Suitability for use indoors | | P |
| 4.5 (3.3.11) | Luminaires with remote control | Not such construction | N |
| 4.5 (3.3.12) | Clip-mounted luminaire - warning | | N |
| 4.5 (3.3.13) | Specifications of protective shields | | N |
| 4.5 (3.3.14) | Symbol for nature of supply | DC | P |
| 4.5 (3.3.15) | Rated current of socket outlet | No socket outlet | N |
| 4.5 (3.3.16) | Rough service luminaire | Normal service luminaire | N |
| 4.5 (3.3.17) | Mounting instruction for type Y, Type Z and some type X attachments | | N |
| 4.5 (3.3.18) | Non-ordinary luminaires with PVC cable | | N |
| 4.5 (3.3.19) | Protective conductor current in instruction if applicable | | N |
| 4.5 (3.3.20) | Provided with information if not intended to be mounted within arms reach | | N |
| 4.5 (3.3.21) | Luminaires with non replaceable and non-user replaceable light source | | N |
| 4.5 (3.3.22) | Controllable luminaires | | N |
| 4.5 (3.4) | Test with water and petroleum spirit | 15s | P |
| | Legible after test | Labels still be legible, marking labels not be easily removable and no curling. | P |
| 4.6 (4) | CONSTRUCTION | | P |
| 4.6 (4.1) | General | | -- |
| 4.6 (4.2) | Components replaceable without difficulty | | N |

| EN 60598-2-4 | | | |
|--------------|--|-----------------------|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| 4.6 (4.3) | Wireways smooth and free from sharp edges | | P |
| 4.6 (4.4) | Lampholders | No lampholder | N |
| 4.6 (4.4.1) | Integral lampholder | | N |
| 4.6 (4.4.2) | Wiring connection | | N |
| 4.6 (4.4.3) | Lampholder for end-to-end mounting | No such lampholder | N |
| 4.6 (4.4.4) | Positioning | | N |
| | Lampholders for a fluorescent lamp | | N |
| | - pressure test (N).....: | | N |
| | After test the lampholder comply with relevant standard sheets and show no damage | | N |
| | After test on signal-capped lampholder the lampholder have not moved form its position and show no permanent deformation | | N |
| | Edison screw or bayonet-capped lampholders | | N |
| | - bending test (Nm).....: | | N |
| | After test the lamholder have not moved from its position and show no permanent deformation | | N |
| 4.6 (4.4.5) | Luminaires with ignitor | Not ignitor | N |
| 4.6 (4.4.6) | Centre contact | Not ignitor | N |
| 4.6 (4.4.7) | Parts in rough service luminaires resistant to tracking | Not for rough service | N |
| 4.6 (4.4.8) | Lamp connectors | No lamp connector | N |
| 4.6 (4.4.9) | Caps and bases correctly used | | N |
| 4.6 (4.4.10) | Lampholder or connector according to IEC60061 | | N |
| 4.6 (4.5) | Starter holders | No such parts | N |
| | Starter holder in luminaries other than Class II | | N |
| | Starter holder Class II construction | | N |
| 4.6 (4.6) | Terminal blocks | | N |
| | Tails | | N |
| | Unsecured blocks | | N |
| 4.6 (4.7) | Terminals and supply connections | | P |
| | Luminaries type | | N |



| EN 60598-2-4 | | | |
|---------------|---|--|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| 4.6 (4.7.1) | Taken to prevent metal parts from becoming live due to a detached wire or screw | | N |
| 4.6 (4.7.2) | Supply terminals | | N |
| | 8 mm test live conductor | | N |
| 4.6 (4.7.3) | Terminals for supply cords | | N |
| 4.6 (4.7.3.1) | Welding method and material | | N |
| | - stranded or solid wire of copper materials | | N |
| | - spot welding | | N |
| | - welding of wire and plate | | N |
| | - welded connections are used in type Z attachments only | | 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 |
| 4.6 (4.7.4) | Terminals other than supply connection | | N |
| | - comply with the requirements of Sections 14 and 15 | | N |
| 4.6 (4.7.5) | Heat-resistant wiring/sleeves | The external wiring or supply cord is unsuitable for the temperatures reached inside the luminaire | N |
| 4.6 (4.7.6) | Multi-pole plug and socket | | N |
| | - test at 30 N | | N |
| 4.6 (4.8) | Switches: | | N |
| | - adequate rating | | N |
| | - adequate fixing | | N |
| | - degree of protection | | N |
| | - polarized supply | | N |
| | - compliance with 61058-1 for electronic switches | | N |
| 4.6 (4.9) | Insulating lining and sleeves | | N |
| 4.6 (4.9.1) | Reliably retained in position | | N |
| 4.6 (4.9.2) | Adequate mechanical, electrical and thermal strength | | N |
| | Resistant to temperature >20°C to the wire temperature or | | N |
| | a) & c) insulation resistance and electric | | N |

| EN 60598-2-4 | | | |
|--------------|--|-----------------|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | strength | | |
| | b)roast test. Temperature (°C) | | N |
| 4.6 (4.10) | Insulation of Class II luminaires | | N |
| 4.6 (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 60384-14and their connection accordance with 8.6 of IEC60065:2001 | | N |
| 4.6 (4.10.2) | Assembly gaps: | | N |
| | - not coincidental | | N |
| | - no straight access with test probe | | N |
| 4.6 (4.10.3) | Supplementary insulation or reinforced insulation: | | N |
| | - fixed | | N |
| | - unable to be replaced; luminaire inoperative | | N |
| | - sleeves retained in position | | N |
| | - lining in lampholder | | N |
| 4.6 (4.10.4) | Protective impedance device | | N |
| | Y1, Y2 capacitors according to IEC 60384-14and their connection accordance with 8.6 of IEC60065 | | N |
| 4.6 (4.11) | Electrical connections and current-carrying parts | | P |
| 4.6 (4.11.1) | Contact pressure | | N |
| 4.6 (4.11.2) | Screws: | | N |
| | - Self-tapping screws | | N |
| | - thread-cutting screws | | N |
| 4.6 (4.11.3) | Screw locking: | | N |
| | - spring washer | | N |
| | - rivets | | N |
| 4.6 (4.11.4) | Material of current-carrying parts | > 50% copper | P |
| 4.6 (4.11.5) | No contact to wood or mounting surface | No wood | P |
| 4.6 (4.11.6) | Electro-mechanical contact systems | | N |
| | -test | | N |
| 4.6 (4.12) | Screws and connections (mechanical) and | | N |

| EN 60598-2-4 | | | |
|--------------|--|--|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | glands | | |
| 4.6 (4.12.1) | Screw not made of soft metal | | P |
| | Screws made of insulating material | Impair supplementary or reinforced insulation if replacement by a metal screw | N |
| | Screws used to provide earthing continuity | | N |
| | Fixing screws for ballasts and other components | at least one screw retaining the ballast will have a mechanical and electrical function. | N |
| | - not considered to be maintenance | | N |
| | Screws of insulating material used in cord anchorages | | N |
| | Torque test: torque (Nm); part | Fixed Enclosure: 0.6Nm | P |
| | Torque test: torque (Nm); part | Fixed Translucent cover: 0.6Nm | N |
| | Torque test: torque (Nm); part | Fixed LED PCB: 0.5Nm | N |
| 4.6 (4.12.2) | Screws transmitting contact pressure and screws | | N |
| | Screw with diameter < 3 mm screw into metal | | N |
| 4.6 (4.12.3) | Not used | | -- |
| 4.6 (4.12.4) | Screwed and other fixed connections between different parts of luminaires | | N |
| | - locked connections; torque (Nm) | | N |
| | - locked lampholder during lamp replacement; torque (Nm) | | N |
| | - push-button switches; torque (Nm) | No such switches | N |
| 4.6 (4.12.5) | Screwed glands; force (N) | | N |
| 4.6 (4.13) | Mechanical strength | | P |
| 4.6 (4.13.1) | Impact tests: | | P |
| | - fragile parts; energy (Nm) | 0.2Nm, no damage | P |
| | - other parts; energy (Nm) | | N |
| | 1) live parts not have become accessible | | P |
| | 2) effectiveness of insulating linings and barriers not have been impaired | | P |
| | 3) degree of protection | IP65 | P |
| | 4) possible to remove and to replace external covers | | N |
| 4.6 (4.13.2) | Metal parts enclosing live parts have | | P |

| EN 60598-2-4 | | | |
|--------------|---|---|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | adequate mechanical strength | | |
| 4.6 (4.13.3) | Straight test finger with a force of 30 N | metal parts not touch live parts, not be excessively deformed and continue to meet the requirements of Section 11 | P |
| 4.6 (4.13.4) | Rough service luminaires | Normal service luminaires | N |
| | IP 54 or higher | | N |
| | a) fixed rough service luminaires and portable rough service luminaires (not hand-held) | | N |
| | b) hand-held luminaires | | N |
| | c) luminaires delivered with a stand | | N |
| | d) luminaires for temporary installations and suitable for mounting on a stand | | N |
| 4.6 (4.13.5) | Not used | | -- |
| 4.6 (4.13.6) | Plug-ballast/transformers and mains socket-outlet-mounted luminaires | | N |
| | Tumbling barrel test | | N |
| | - sample does not exceed 250 g | 50 times | N |
| | - sample exceeds 250 g | 25 times | N |
| 4.6 (4.14) | Suspensions, fixings and means of adjustment | | N |
| 4.6 (4.14.1) | Adequate factors of safety | | N |
| | Test A) four times the weight.....: | | N |
| | - suspended or fixed luminaire | | N |
| | - external parts fixed to the luminaire | | N |
| | Test B) for rigid suspension luminaires: torque 2.5 Nm.....: | | N |
| | Test C) for rigid suspension brackets: bracket arm; force (N) | | N |
| | a) for heavy-duty brackets | | N |
| | b) for light-duty brackets | 10N for support translucent cover | N |
| | D) for load track-mounted luminaires | | N |
| | E) for clip-mounted luminaires: | | N |
| 4.6 (4.14.2) | Load to flexible cables: | No flexible cable | N |
| | mass (kg) | | N |
| | stress in conductors (N/mm ²) | | N |

| EN 60598-2-4 | | | |
|--------------|--|-----------------------------------|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | Mass (kg) of semi-luminaires | | N |
| | Bending moment (Nm) of semi-luminaires : | | N |
| 4.6 (4.14.3) | Adjusting devices: | | P |
| | a) adjusting devices and means of adjustment | | P |
| | - flexing test; number of cycles | 1500 cycles | P |
| | - not more than 50 % of the strands in a conductor are broken | | P |
| | - insulation resistance and high-voltage tests afterwards | | P |
| | b) luminaires with a means of adjustment intended to be installed within arm's reach | | P |
| | c) luminaires intended to be mounted within arm's reach | | N |
| 4.6 (4.14.4) | Telescopic tubes: cords not fixed to tube; no strain on conductors | No such tubes | N |
| 4.6 (4.14.5) | Guide pulleys | No such construction | N |
| 4.6 (4.14.6) | Plug-ballast/transformers and mains socket-outlet-mounted luminaires | Not such unit | N |
| 4.6 (4.15) | Flammable materials: | | P |
| | - glow-wire test 650°C | | P |
| | - spacing \geq 30 mm | | N |
| | - screen withstanding test of 13.3.1 | | N |
| | - screen dimensions | Spacing from heated parts min 3mm | N |
| | - no fiercely burning material | | N |
| | - thermal protection | | N |
| | - electronic circuits exempted | | N |
| 4.6 (4.15.2) | Luminaires made of thermoplastic material | | N |
| | a) construction | | N |
| | b) temperature sensing control | | N |
| | c) surface temperature | | N |
| 4.6 (4.16) | Luminaires for mounting on normally flammable surfaces | | P |
| | Lamp control gear | | N |
| 4.6 (4.16.1) | Lamp control gear shall spacing: | | N |
| | - spacing 10 mm | | N |
| | - spacing 35 mm | | N |
| 4.6 (4.16.2) | Thermal protection: | No such component | N |

| EN 60598-2-4 | | | |
|--------------|--|---|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | - external | | N |
| | -fixed position | | N |
| | - class P" thermally protected ballast/transformer, |  | N |
| | - temperature declared thermally protected ballast/transformer, |  | N |
| 4.6 (4.16.3) | Design to satisfy the test of 12.6 | | N |
| 4.6 (4.17) | Drain holes | No drain holes | N |
| | Clearance at least 5 mm | | N |
| 4.6 (4.18) | Resistance to corrosion: | | N |
| 4.6 (4.18.1) | - more than IPX1 luminaires | | N |
| 4.6 (4.18.2) | - season cracking in copper | | N |
| 4.6 (4.18.3) | - corrosion of aluminium | | N |
| 4.6 (4.19) | Ignitors | No ignitors used | N |
| 4.6 (4.20) | Rough service vibration : | No such appliance | N |
| 4.6 (4.21) | Protective shield | | N |
| 4.6 (4.21.1) | Shield fitted | | N |
| | Shield of glass if tungsten halogen lamps | | N |
| 4.6 (4.21.2) | Particles from a shattering lamp not impair safety | | N |
| 4.6 (4.21.3) | No direct path | | N |
| 4.6 (4.21.4) | Impact test on shield | | N |
| | Glow-wire test on lamp compartment | | N |
| 4.6 (4.22) | Attachments to lamps | | N |
| 4.6 (4.23) | Semi-luminaires comply with Class II | No semi-luminaires | N |
| 4.6 (4.24) | Photobiological hazards | | P |
| 4.6 (4.24.1) | No excessive UV radiation if tungsten halogen lamps and metal halide lamps | | N |
| 4.6 (4.24.2) | Retinal blue light hazard | Exempt: RG0 | P |
| | Luminaires with Ethr: | | 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 200mm according to IEC/TR 62778 | | N |
| | Portable luminaires for children IEC 60598- | | N |

| EN 60598-2-4 | | | |
|--------------|--|--|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | 2-20 and Mains socket outlet nightlights IEC 60598-2-12 not exceed RG1 at 200mm according to IEC/TR 62778 | | |
| 4.6 (4.25) | Mechanical hazard | No sharp points or edges | P |
| 4.6 (4.26) | Short-circuit protection | | N |
| 4.6 (4.26.1) | uninsulated accessible SELV parts | | N |
| 4.6 (4.26.2) | Short circuit test | | N |
| 4.6 (4.26.3) | Test chain according to figure 29 | | N |
| 4.6 (4.27) | Terminal blocks with integrated screwless earthing contacts | | N |
| | Test according Annex V | | N |
| | Pull test of terminal fixing (20N) | | 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 |
| 4.6 (4.28) | Fixing of thermal sensing controls | | 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 (°C) | | N |
| | 100 cycles between t min and t max | | N |
| | Temperature sensing control still in position | | N |
| 4.6 (4.29) | Luminaire 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 |
| 4.6 (4.30) | Luminaires with non-user replaceable light sources | | N |
| | If protective cover provide protection against electric shock and marked with "caution, electric shock risk" symbol: |  | N |
| | Minimum two fixing means | | N |
| 4.6 (4.31) | Insulation between circuits | | N |
| | Circuits insulated from LV supply fulfil | | N |

| EN 60598-2-4 | | | |
|--------------|---|-----------------|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | requirements according 4.31.1 – 4.31.3 | | |
| | 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 |
| 4.6 (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 |
| 4.6 (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 |
| 4.6 (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 |

| EN 60598-2-4 | | | |
|--------------|---|-----------------|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | - conductive parts are connected together | | N |
| | - test according 7.2.3 of above | | 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 luminaire constructed as class I | | N |
| 4.6 (4.32) | Overvoltage protective devices | | N |
| | Comply with IEC 61643-11 | | N |
| | External to control gear and connected to earth: | | N |
| | - only in fixed luminaires | | N |
| | - only connected to protective earth | | N |
| 4.6.1 (--) | Flexible cables and cords be unlikely to be damaged | | P |
| 4.6.2 (--) | Adjust equipment | | N |
| 4.6.3 (--) | Adequate stability | | P |
| | -Test at 6° | | P |
| | -Test at 15° | | P |
| 4.6.4 (--) | Candlestick luminaires shall be provided with a switch | | N |
| 4.6.5 (--) | E5 lampholders used | | N |

| | | | |
|-----------------|--|--------------------------------------|----------|
| 4.7 (11) | CREEPAGE DISTANCES AND CLEARANCES | | P |
| | Working voltage (V) | | P |
| | Voltage form | Sinusoidal [√] Non-sinusoidal [] | P |
| | PTI | < 600 [√] ≥ 600 [] | P |
| | Impulse withstand category (normal category II) (category III annex U) | | |
| | Rated pulse voltage (kV) | | N |
| | (1) Current-carrying parts of different polarity: cr (mm); cl (mm) | | N |
| | (2) Current-carrying parts and accessible parts: cr (mm); cl (mm) | | N |
| | (3) Parts becoming live due to breakdown of basic insulation and metal parts: cr | | N |

| EN 60598-2-4 | | | |
|---------------------|--|-----------------|----------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | (mm); cl (mm) | | |
| | (4) Outer surface of cable where it is clamp and metal parts: cr (mm); cl (mm) | | N |
| | (5)not used | | N |
| | (6) Current-carrying parts and supporting surface: cr (mm); cl (mm) | | N |
| 4.8 (7) | PROVISION FOR EARTHING | | N |
| 4.8 (7.2.1 + 7.2.3) | Accessible Metal parts | | N |
| | metal parts in contact with supporting surface | | N |
| | Resistance < 0.5 Ω | | N |
| | Self-tapping screws used | | N |
| | Thread-forming screws | | N |
| | Thread-forming screws used in a groove | | N |
| | Earth marks contact first | | N |
| 4.8 (7.2.2 +7.2.3) | Earth continuity in joints etc. | | N |
| 4.8 (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 |
| 4.8 (7.2.5) | Earth terminal integral part of Connector socket | | N |
| 4.8 (7.2.6) | Earth terminal adjacent to mains terminals | | N |
| 4.8 (7.2.7) | Electrolytic corrosion of the earth terminal | | N |
| 4.8 (7.2.8) | Material of earth terminal | | N |
| | Contact surface bare metal | | N |
| 4.8 (7.2.10) | Class II luminaire for looping-in | | N |
| | Double or reinforced insulation to functional earth | | N |
| 4.8 (7.2.11) | Earthing core coloured green-yellow | | N |
| | Length of earth conductor | | N |
| 4.9 (14) | SCREW TERMINALS | | N |
| | Separately approved: component list | See annex 1 | N |
| | Part of the luminaire | | N |

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|-----------------|---|-------------------|----------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| 4.9 (15) | SCREWLESS TERMINALS and electrical connections | | N |
| | Separately approved: component list | See annex 1 | N |
| | Part of the luminaire | | N |
| 4.10 (5) | EXTERNAL AND INTERNAL WIRING | | P |
| 4.10 (5.2) | Supply connection and other external wiring | | N |
| 4.10 (5.2.1) | Means of connection..... : | | N |
| 4.10 (5.2.2) | Type of supply cord..... : | | N |
| | Nominal cross-section area (mm ²) | | N |
| | Cables equal to IEC 60227 and IEC 60245 | | N |
| 4.10 (5.2.3) | Type of attachment, X ,Y or Z | | N |
| 4.10 (5.2.5) | Type Z not connected to screws | | N |
| 4.10 (5.2.6) | Cable entries | | N |
| | - suitable for introduction | | N |
| | - adequate degree of protection | | N |
| 4.10 (5.2.7) | Cable entries through rigid material have rounded edges | Not cable entries | N |
| 4.10 (5.2.8) | Insulating bushings in class II luminaires, in settable and adjustable luminaires or in portable luminaires other than those for wall mounting: | | N |
| | - suitably fixed | | N |
| | - material in bushings | | N |
| | - material not likely to deteriorate | | N |
| | - tubes or guard made of insulating material | | N |
| 4.10 (5.2.9) | Bushing locking of screw bushings | No such component | N |
| 4.10 (5.2.10) | Cord anchorage: | | N |
| | - covering protected from abrasion | | N |
| | - clear how to be effective | | N |
| | - no mechanical or thermal stress | | N |
| | - no tying of cables into knots etc. | | N |
| | - insulating material or lining | | N |
| 4.10 (5.2.10.1) | Cord anchorage for type X attachment cord | | N |
| | a) at least one part fixed | | N |
| | b) types of cable | | N |
| | c) no damaging of the cable | | N |

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|-----------------|--|--------------------------|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | 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 anchorage | | N |
| 4.10 (5.2.10.2) | Adequate cord anchorages for type Y and type Z attachments | | N |
| 4.10 (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 |
| 4.10 (5.2.11) | External wiring passing into luminaire | | N |
| 4.10 (5.2.12) | Looping-in terminals | Not looping-in appliance | N |
| 4.10 (5.2.13) | Wire ends not tinned | | N |
| | Wire ends tinned: no cold flow | | N |
| 4.10 (5.2.14) | Mains plug same protection | Not plug | N |
| | Class III luminaire plug | | N |
| 4.10 (5.2.16) | Appliance inlets (IEC 60320) | No appliance inlet | N |
| | Appliance couplers of class II type | | N |
| 4.10 (5.2.17) | No standardized in interconnecting cables assembled | | N |
| 4.10 (5.2.18) | Used plug in accordance with | | N |
| | - IEC 60083 | | N |
| | - other standard | | N |
| 4.10 (5.3) | Internal wiring | | P |
| 4.10 (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.....: | | N |
| | Green-yellow for earth only | | N |

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|-----------------|--|-----------------|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| 4.10 (5.3.1.1) | Internal wiring connected directly to fixed wiring | | N |
| | Cross-Sectional area (mm ²) | | N |
| | Insulation thickness | | N |
| | Extra insulation added where necessary | | N |
| 4.10 (5.3.1.2) | Internal wiring connected to fixed wiring via internal current-limited device | | N |
| | Adequate cross-section area and insulation thickness | | N |
| 4.10 (5.3.1.3) | Double or reinforced insulation for class II | | N |
| 4.10 (5.3.1.4) | Conductors without insulation | Not used | N |
| 4.10 (5.3.1.5) | SELV current-carrying parts | | P |
| 4.10 (5.3.1.6) | Insulation thickness other than PVC or rubber | | N |
| 4.10 (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° | | P |
| 4.10 (5.3.3) | Insulating bushings on class II luminaires, in settable and adjustable luminaires, or in portable luminaires other than those for wall mounting, | | N |
| | - suitable fixed | | N |
| | - material in bushings | | N |
| | - material not likely to deteriorate | | N |
| | - cables with protective sheath | | N |
| 4.10 (5.3.4) | Joints and Junctions effectively insulated | | N |
| 4.10 (5.3.5) | Strain on internal wiring | | N |
| 4.10 (5.3.6) | Wire carriers | | N |
| 4.10 (5.3.7) | Wire ends not tinned | | N |
| | Wire ends tinned: no cold flow | | N |
| 4.11 (8) | PROTECTION AGAINST ELECTRIC SHOCK | | P |
| 4.11 (8.2.1) | Live parts not accessible with standard test finger | | N |
| | Basic insulated parts not used on the outer surface without appropriate protection | | N |

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|----------------|---|-----------------|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | Basic insulated parts not accessible with standard test finger on portable and adjustable luminaires | | N |
| | Basic insulated parts not accessible with $\varnothing 50\text{mm}$ probe from outside, within arms reach, on wall-mounted luminaires | | N |
| | Lamp and starholders in portable and adjustable luminaires comply with double or reinforced insulation requirements | | N |
| | Basic insulation only accessible under lamp or starter replacement | | N |
| | Double-ended tungsten filament lamp | | N |
| | Insulation lacquer not reliable | | N |
| | Double-ended high pressure discharge lamp | | N |
| | Relevant warming according to 3.2.18 fitted to the luminaire | | N |
| 4.11 (8.2.2) | Portable luminaire adjusted in most unfavourable position | Fixed luminaire | N |
| 4.11 (8.2.3 a) | Class II luminaire: | | N |
| | - basic insulated metal parts not accessible during starter or lamp replacement | | N |
| | - basic insulated not accessible other than during starter or lamp replacement | | N |
| | - glass protective shields not used as supplementary insulation | No such parts | N |
| 4.11 (8.2.3b) | BC lampholder of metal in class I luminaires shall be earthed | | N |
| 4.11 (8.2.3c) | Class III luminaires with expose SELV parts: | | P |
| | Ordinary luminaire : | | P |
| | - touch current | | P |
| | - no-load voltage | | P |
| | - other than ordinary luminaire: | | P |
| | - nominal voltage | | P |
| 4.11 (8.2.4) | Portable luminaire: | Fixed luminaire | N |
| | - protection independent of supporting surface | | N |
| | - terminal block completely covered | | N |
| 4.11 (8.2.5) | Compliance with the standard test finger or relevant probe | | N |

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|------------------|---|-------------------------------------|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| 4.11 (8.2.6) | Covers reliably secured | | N |
| 4.11 (8.2.7) | Discharging of capacitors >0.5 μ F | | N |
| | Portable plug connected luminaire with capacitor | | N |
| | Discharge device on or within capacitor | | N |
| | Discharge device mounted separately | | N |
| 4.11.1(--) | Portable Class I luminaires incorporating lampholders for bayonet cap lamps | | N |
| | -lamp cap is not accessible to the standard test finger | | N |
| | -provided with a metal lampholder which is earthed | | N |
| 4.12 (12) | ENDURANCE TEST AND THERMAL TEST | | P |
| 4.12 (12.3) | Endurance test: | | P |
| | - mounting- position | On table | P |
| | - test temperature ($^{\circ}$ C) | 55 $^{\circ}$ C | P |
| | - total duration (h) | 240hrs. Totally 10 cycles, each 24h | P |
| | - supply voltage: Un factor; calculated voltage (V) | | P |
| | - lamp used | LED lamp | P |
| 4.12 (12.3.2) | After endurance test: | | P |
| | - no part unserviceable | | P |
| | - luminaire not unsafe | | P |
| | - no damage to track system | | N |
| | - marking legible | | P |
| | - no cracks, deformation etc. | | P |
| 4.12 (12.4) | Thermal test (normal operation) | (see table 12.4) | P |
| 4.12 (12.5) | Thermal test (abnormal operation) | | N |
| | Short-circuit of starter contacts | | N |
| | Lamps removed and not replaced | | N |
| 4.12 (12.6) | Thermal test (failed lamp control gear condition): | | N |
| 4.12 (12.6.1) | Through wiring or looping-in wiring loaded by a current of (A) | | N |
| | - case of abnormal conditions | | N |
| | - electronic ballast | | N |

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|-----------------|--|-----------------|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | - 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 |
| 4.12 (12.6.2) | Temperature sensing control: | | N |
| | - manual reset cut-out | | N |
| | - auto reset cut-out | | N |
| | - track-mounted luminaires | | N |
| 4.12 (12.7) | Thermal test (failed ballast or transformer in plastic luminaires): | | N |
| 4.12 (12.7.1) | Luminaire without temperature sensing control | | N |
| 4.12 (12.7.1.1) | Luminaire with fluorescent lamp ≤ 70W | | N |
| | Test method 12.7.1.1 or Annex V | | N |
| | Test according to 12.7.1.1: | | N |
| | - case of abnormal conditions | | N |
| | - Ballast failure at supply voltage (V) | | N |
| | - Components retained in place after the test | | N |
| | - Test with standard test finger after the test | | N |
| | Test according to Annex V: | | N |
| | - case of abnormal conditions | | N |
| | - measured winding temperature (°C): at 1.1 Un.. : | | N |
| | - measured temperature of fixing point/exposed part (°C): at 1.1Un.....: | | N |
| | - calculated temperature of fixing point/exposed part (°C) | | N |
| | Ball-pressure test: | | N |
| | - part tested; temperature (°C)..... : | | N |
| | - part tested; temperature (°C)..... : | | N |
| 4.12 (12.7.1.2) | Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA | | -- |
| | - case of abnormal conditions | | N |

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|-----------------|--|-----------------|----------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | - measured winding temperature (°C): at 1.1 Un.....: | | N |
| | - measured temperature of fixing point/exposed part (°C): at 1.1 Un..... : | | N |
| | - calculated temperature of fixing point/exposed part (°C) | | N |
| | Ball-pressure test: | | N |
| | - part tested; temperature (°C)..... : | | N |
| | - part tested; temperature (°C)..... : | | N |
| 4.12 (12.7.1.3) | Luminaire with short circuit proof transformers ≤ 10 VA | | N |
| | - case of abnormal conditions | | N |
| | - Components retained in place after the test | | N |
| | - Test with standard test finger after the test | | N |
| 4.12 (12.7.2) | Luminaire with temperature sensing control | | N |
| | - thermal link | | N |
| | - manual reset cut-out | | N |
| | - auto reset cut-out | | N |
| | - case of abnormal conditions | | N |
| | - highest measured temperature of fixing point/exposed part (°C):..... : | | N |
| | Ball-pressure test: | | N |
| | - part tested; temperature (°C)..... : | | N |
| | - part tested; temperature (°C)..... : | | N |
| 4.12(--) | Overturn at an angle of 15° to the horizontal | | N |
| 4.13 (9) | RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE | | P |
| 4.13 (9.2) | Tests for ingress of dust, solid objects and moisture: | | P |
| | - classification according to IP | IP65 | P |
| | - mounting position during test | | N |
| | - fixing screws tightened; torque (Nm) | | N |
| | - tests according to clauses | | N |
| | - electric strength | | P |
| | a) no deposit in dust-proof luminaire | | N |
| | b) no talcum in dust-tight luminaire | | N |

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|--------------|--|---|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | c) no trace of water on current-carrying parts or SELV parts or where it could become a hazard | | N |
| | d) i) For luminaires without drain holes – no water entry | | N |
| | d) ii) For luminaires with drain holes – no hazardous water entry | | N |
| | e) no water in watertight luminaire | | N |
| | f) no contact with live parts (IP 2X) | IP65 | N |
| | f) no entry into enclosure (IP 3X and IP 4X) | | N |
| | f) no contact with live parts (IP3X and IP4X) | | N |
| | g) no trace of water on part of lamp requiring protection from splashing water | | N |
| | h) no damage of protective shield or glass envelope | | N |
| 4.13 (9.3) | Humidity test 48h | Relative humidity 93%, temperature 45°C, 48h, followed by hi-pot test | P |

| | | | |
|------------------|--|-------------------------------------|----|
| 4.14 (10) | INSULATION RESISTANCE AND ELECTRIC STRENGTH | | P |
| 4.14 (10.2.1) | Insulation resistance test: | | P |
| | Cable or cord covered by metal foil or replaced by a metal rod of mm Ø.....: | | P |
| | Insulation resistance: | | P |
| | SELV: | | -- |
| | - between current-carrying parts of different polarity..... : | | N |
| | - between current-carrying parts and mounting surface | 100M Ω , limit: 1 M Ω | P |
| | - between current-carrying parts and metal parts of the luminaire | 100M Ω , limit: 1 M Ω | P |
| | Other than SELV: | | |
| | - between live parts of different polarity | | N |
| | - between live parts and mounting surface.: | | N |
| | - between live parts and accessible parts.. : | | N |
| | - between live parts of different polarity through action of a switch | | N |
| 4.14 (10.2.2) | Electric strength test: | | P |

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|------------------|--|--|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| | Dummy lamp | | N |
| | Luminaires with ignitors after 24 h test | | N |
| | Luminaires with manual ignitors | | N |
| | Test voltage (V): | | P |
| | SELV: | | -- |
| | - between current-carrying parts of different polarity..... : | | N |
| | - between current-carrying parts and mounting surface : | 500Vac, no breakdown | P |
| | - between current-carrying parts and metal parts of the luminaire : | 500Vac, no breakdown | P |
| | Other than SELV: | | -- |
| | - between live parts of different polarity: | | N |
| | - between live parts and mounting surface.....: | | N |
| | - between live parts and accessible parts...: | | N |
| | - between live parts of different polarity through action of a switch : | | N |
| 4.14 (10.3) | Touch current (mA): | | N |
| | Protective conductor current (mA) : | | N |
| 4.15 (13) | RESISTANCE TO HEAT, FIRE AND TRACKING | | P |
| 4.15 (13.2.1) | Ball-pressure test: | | P |
| | - part tested; temperature (°C): | Plastic enclosure, 120°C, 1.1mm | P |
| | - part tested; temperature (°C): | PCB, 130°C, 0.9mm | P |
| | - part tested; temperature (°C): | Translucent cover, 80°C, 0.9mm | P |
| 4.15 (13.3.1) | Needle flame test (10 s): | | P |
| | - part tested: | PCB | P |
| 4.15 (13.3.2) | Glow- wire test: | | P |
| | - part tested: | Plastic enclosure, Translucent cove, 650°C, no burning | P |
| 4.15 (13.4.2) | Tracking test: part tested : | | N |
| Annex A | TEST TO ESTABLISH WHETHER A CONDUCTIVE PART MAY CAUSE AN ELECTRIC SHOCK | | P |

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|----------------|--|-----------------|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| A.2 | Voltage not exceed 35 V a.c. peak or 60 V ripple free d.c. | | N |
| A.3 | Touch-current not exceed: | | P |
| | - for a.c.: 0,7 mA (peak); | | P |
| | - for d.c.: 2,0 mA | | N |
| Annex B | TEST LAMP | | N |
| Annex C | ABNORMAL CIRCUIT CONDITIONS | | N |
| | a) Short-circuit of starter contacts | | N |
| | b) Lamp rectification | | N |
| | c) Lamps removed and not replaced | | N |
| | d) One electrode of lamp open-circuited | | N |
| | e) Lamp will not start, but both electrodes are intact | | N |
| | f) Blockage of the motor(s) contained in the luminaire | | N |
| Annex D | DRAUGHT-PROOF ENCLOSURE | | N |
| Annex E | DETERMINATION OF WINDING TEMPERATURE RISES BY THE INCREASE—IN-RESISTANCE METHOD | | N |
| Annex F | TEST FOR RESISTANCE TO STRESS CORROSION OF COPPER AND COPPER ALLOYS | | N |
| Annex G | MEASUREMENT OF TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT | | N |
| | CENELEC COMMON MODIFICATIONS (EN) | | -- |
| 3 | MARKING | | -- |
| | Adequate warning on the package | | -- |
| 5 | EXTERNAL AND INTERNAL WIRING | | -- |
| 5.2.1 | Connecting leads | | N |
| | - without a means for connection to the supply | | N |
| | - terminal block specified | | N |
| | - relevant information provided | | N |
| | - compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2,12 and 13.2 of Part 1 | | N |

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|--------------|--|-----------------|---------|
| Clause | Requirement - Test | Result - Remark | Verdict |
| 5.2.2 | Cables equal to HD21 S2 or HD22 S2 | | N |
| ZB | ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN) | | N |
| 3.3 | DK: power supply cord with label | | N |
| | IT: warning label on Class 0 luminaire | | N |
| 4.5.1 | DK: socket-outlets | | N |
| 5.2.1 | CY, DK, FI, SE, GB: type of plug | | N |
| ZC | ANNEX ZC, NATIONAL DEVIATIONS (EN) | | N |
| 4&5 | FR: Shuttered socket-outlets 10/16A | | N |
| 13.3 | GB: Requirements according to United Kingdom Building Regulation | | N |
| 13.3.2 | FR: Glow-wire test 850°C alt. 750°C for luminaires in premises open to public or 960°C for luminaires in emergency exits | | N |

Tables

| | ANNEX 1: components | | | | | P |
|-------------------|---------------------|---|------------|-----------------------|-----------------|--------------------------------------|
| object/part No. | Code | manufacturer/trademark | type/model | technical data | standard | mark(s) of conformity |
| Plastic enclosure | B | SABIC JAPAN LLC | 943(f1) | 120°C, V-0 | UL 746 UL94 | E45587 Test with appliance |
| Translucent cover | B | SUMIKA STYRON POLYCARBONATE LTD | LD205(w)# | V-2, 80°C | UL 94 UL 746 | UL E123529 Test with appliance |
| LED PCB | B | RONG HUI ELECTRONICS (HUIZHOU) CO LT | RH-4 | V-0, 130°C | UL796 | UL E252098 |
| Internal wire | B | DONGGUAN CHENG XING ELECTRONIC CO LTD | 1007 | 24AWG, 80°C, VW-1 | UL 758 | UL E249743 |
| PCB | B | NING BO ENLE ELECTRONIC CO LTD | CR-1008 | V-0, 130°C | UL 94 | UL E321517 |
| Battery | B | Shenzhen Feihe Electronics Co., Ltd | U19 | capacity=1800 mA/h | -- | Test with appliance |

The codes above have the following meaning:

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

| | ANNEX 2: temperature measurements, thermal tests of Section 12 | | P |
|--|---|-------------------------|---|
| | Type reference | U19 | P |
| | Lamp used | LED lamp | P |
| | Lamp control gear used..... | LED lamp controlgear | P |
| | Mounting position of luminaire..... | See user manual | P |
| | Supply wattage (W) | 6.5W | P |
| | Supply current (A) | 1.3A | P |
| | Calculated power factor..... | | P |
| | Table: measured temperatures corrected for ta = 25°C: | | P |
| | - abnormal operating mode..... | | N |
| | - test 1: rated voltage..... | | N |
| | - test 2: 1,06 times rated voltage or 1,05 times Rated wattage | | P |

Tables

| | - test 3: Load on wiring to socket-outlet, 1.06 times voltage or 1,05 times wattage | -- | N | | | |
|----------------------------|---|--------|--------|--------|------------------------|-------|
| | - test 4: 1,1 times rated voltage or 1,05 times Rated wattage | | N | | | |
| | Through wiring or looping-in wiring loaded by a current of A during the test | | N | | | |
| Temperature(°C) of part | Clause 12.4 – normal | | | | Clause 12.5 – abnormal | |
| | Test 1 | Test 2 | Test 3 | Limits | Test 4 | Limit |
| Internal wire near LED | -- | 28.8 | -- | 80 | -- | -- |
| LED PCB | -- | 46.2 | -- | 130 | -- | -- |
| Plastic part near LED | -- | 28.6 | -- | Ref | -- | -- |
| Translucent cover near LED | -- | 34.7 | -- | Ref. | -- | -- |
| Mounting surface | -- | 24.6 | -- | 90 | -- | -- |
| Ambient | -- | 45.0 | -- | -- | -- | -- |

| | | |
|-----------|---|----|
| | ANNEX 3: screw terminals (part of the luminaire) | -- |
| 14 | SCREW TERMINALS | -- |
| 14.2 | Type of terminal..... : | -- |
| | Rated current (A)..... : | -- |
| 14.3.2.1 | One or more conductors | N |
| 14.3.2.2 | Special preparation | N |
| 14.3.2.3 | Terminal size | N |
| | Cross-sectional area (mm ²)..... : | N |
| 14.3.3 | Conductor space (mm)..... : | N |
| 14.4 | Mechanical tests | N |
| 14.4.1 | Minimum distance | N |
| 14.4.2 | Cannot slip out | N |
| 14.4.3 | Special preparation | N |
| 14.4.4 | Nominal diameter of thread (metric ISO thread)..... : | N |
| | External wiring | N |
| | No soft metal | N |
| 14.4.5 | Corrosion | N |
| 14.4.6 | Nominal diameter of thread (mm)..... : | N |
| | Torque (Nm)..... : | N |
| 14.4.7 | Between metal surfaces | N |
| | Lug terminal | N |
| | Mantle terminal | N |
| | Pull test; pull (N)..... : | N |

Tables

| | | | |
|--------|----------------------|--|---|
| 14.4.8 | Without undue damage | | N |
|--------|----------------------|--|---|

| | | | |
|-----------|--|--|----|
| | ANNEX 4: screwless terminals (part of the luminaire) | | -- |
| 15 | SCREWLESS TERMINALS | | -- |
| 15.2 | Type of terminal..... : | | — |
| | Rated current (A)..... : | | — |
| 15.3.1 | Material | | N |
| 15.3.2 | Clamping | | N |
| 15.3.3 | Stop | | N |
| 15.3.4 | Unprepared conductors | | N |
| 15.3.5 | Pressure on insulating material | | N |
| 15.3.6 | Clear connection method | | N |
| 15.3.7 | Clamping independently | | N |
| 15.3.8 | Fixed in position | | N |
| 15.3.10 | Conductor size | | N |
| | Type of conductor | | N |
| 15.5.1 | Terminals internal wiring | | N |
| 15.5.1.1 | Pull test spring-type terminals (4 N, 4 samples) | | N |
| 15.5.1.2 | Pull test pin or tab terminals (4 N, 4 samples) | | N |
| | Insertion force not exceeding 50 N | | N |
| 15.5.2 | Permanent connections: pull-off test (20 N) | | N |
| 15.6 | Electrical tests | | -- |
| | Voltage drop (mV) after 1 h (4 samples)..... : | | N |
| | Voltage drop of two inseparable joints | | N |
| | Number of cycles..... : | | N |
| | Voltage drop (mV) after 10th alt. 25th cycle (4 samples)..... : | | N |
| | Voltage drop (mV) after 50th alt. 100th cycle (4 samples)..... : | | N |
| | After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples)..... : | | N |
| | After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples)..... : | | N |
| 15.7 | Terminals external wiring | | N |
| | Terminal size and rating | | N |
| 15.8.1 | Pull test spring-type terminals (4 samples); pull (N) | | N |
| | Pull test pin or tab terminals (4 samples); pull (N) | | N |

Tables

| | | | | | | | | | | | |
|-------------------|--|---|---|---|---|---|---|---|---|----|---|
| 15.9 | Contact resistance test | | | | | | | | | | N |
| | Voltage drop (mV) after 1 h | | | | | | | | | | N |
| terminal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| voltage drop (mV) | | | | | | | | | | | |
| | Voltage drop of two inseparable joints | | | | | | | | | | |
| | Voltage drop after 10th alt. 25th cycle | | | | | | | | | | |
| | Max. allowed voltage drop (mV)..... : | | | | | | | | | | — |
| terminal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| voltage drop (mV) | | | | | | | | | | | |
| | Voltage drop after 50th alt. 100th cycle | | | | | | | | | | |
| | Max. allowed voltage drop (mV)..... : | | | | | | | | | | — |
| terminal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| voltage drop (mV) | | | | | | | | | | | |
| | Continued ageing: voltage drop after 10th alt. 25th cycle | | | | | | | | | | |
| | Max. allowed voltage drop (mV)..... : | | | | | | | | | | — |
| terminal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| voltage drop (mV) | | | | | | | | | | | |
| | Continued ageing: voltage drop after 50th alt. 100th cycle | | | | | | | | | | |
| | Max. allowed voltage drop (mV)..... : | | | | | | | | | | — |
| terminal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | |
| voltage drop (mV) | | | | | | | | | | | |

| | | | | | |
|-------|---|-------------------------|------------|-----------|---------|
| | ANNEX 5: EMF test result according to EN 62493: 2015 | | | | P |
| 4.2.d | MEASUREMENT RESULTS | | | | P |
| | Measuring with “Van der Hoofden” test head | | | | P |
| | EUT operation model: <input checked="" type="checkbox"/> Normal operation <input type="checkbox"/> Other operation: | | | | P |
| | Voltage: | 5VDC | Frequency: | 50-60Hz | -- |
| | Temperature: | 25°C | Humidity: | 55% R.H. | -- |
| | Location of EuT | Measuring distance (cm) | Result (F) | Limit (F) | Verdict |
| | U19 | 50 | 0.0712 | 0.85 | P |

Attachment No.1**Summary of requirements and test clause of:****EN 62031: 2008+A1: 2013+A2: 2015: LED modules for general lighting - Safety specifications**

| | | | |
|---------|--|-----------|-----|
| 6 | Classification | | --- |
| | Built-in.....: | | N |
| | Independent.....: | | N |
| | Integral.....: | | P |
| 7 | Marking | | N |
| 7.1 | Mandatory marking for built-in or independent modules | | N |
| 7.2 | Location of marking | | N |
| 7.3 | Durability and legibility of marking | | N |
| 8 | Terminals | | N |
| 9 | Provisions for protective earthing | | N |
| 10 | Protection against accidental contact with live parts | | N |
| 11 | Moisture resistance and insulation | | P |
| 12 | Electric strength | | P |
| 13 | Fault conditions | | P |
| 13.1 | Fault conditions according to IEC 61347-1, Clause 14 | | P |
| 13.2 | Overpower condition | No damage | P |
| 14 | Conformity testing during manufacture | | N |
| 15 | Construction | | P |
| | Non Wood, cotton, silk, paper and similar fibrous material used as insulation. | | P |
| 16 | Creepage distances and clearances | | N |
| 17 | Screws, current-carrying parts and connections | | N |
| 18 | Resistance to heat, fire and tracking | | N |
| 19 | Resistance to corrosion | | N |
| 20 | Information for luminaire design | | N |
| 21 | Heat management | | N |
| 22 | Photobiological safety | | P |
| 22.1 | UV radiation | | P |
| 22.2 | Blue light hazard | | P |
| 22.3 | Infrared radiation | | N |
| Annex A | Test | | -- |
| Annex C | Conformity testing during manufacture | | -- |
| Annex D | Information for luminaire design | | -- |

Attachment No.2

Summary of requirements and test clause of: EN 62471: 2008: Photobiological safety of lamps and lamp systems

| | | | |
|----------|---|--|------------|
| 4 | EXPOSURE LIMITS (EL'S) | | --- |
| 4.2 | Specific factors involved in the determination and application of retinal exposure limits | | P |
| 4.2.1 | Pupil diameter | | P |
| 4.2.2 | Angular subtense of source and measurement field-of-view | | P |
| 4.3 | Hazard exposure limits | | P |
| 4.3.1 | Actinic UV hazard exposure limit for the skin and eye | | N |
| 4.3.2 | Near-UV hazard exposure limit for the eye | | N |
| 4.3.3 | Retinal blue light hazard exposure limit | | P |
| 4.3.4 | Retinal blue light hazard exposure limit - small source | | P |
| 4.3.5 | Retinal thermal hazard exposure limit | | N |
| 4.3.6 | Retinal thermal hazard exposure limit – weak visual stimulus | | P |
| 4.3.7 | Infrared radiation hazard exposure limits for the eye | | N |
| 4.3.8 | Thermal hazard exposure limit for the skin | | P |
| 5 | MEASUREMENT OF LAMPS AND LAMP SYSTEMS | | P |
| 5.1 | Measurement conditions | | P |
| 5.1.1 | Lamp ageing (seasoning) | | P |
| 5.1.2 | Test environment | | P |
| 5.1.3 | Extraneous radiation | | P |
| 5.1.4 | Lamp operation | | P |
| 5.1.5 | Lamp system operation | | P |
| 5.2 | Measurement procedure | | P |
| 5.2.1 | Irradiance measurements | | P |
| 5.2.2 | Radiance measurements | | P |
| 5.2.3 | Measurement of source size | | P |
| 5.2.4 | Pulse width measurement for pulsed sources | | N |
| 5.3 | Analysis methods | | P |
| 5.3.1 | Weighting curve interpolations | | P |
| 5.3.2 | Calculations | | P |
| 5.3.3 | Measurement uncertainty | | P |
| 6 | LAMP CLASSIFICATION | | P |
| 6.1 | Continuous wave lamps | | P |
| 6.1.1 | Exempt group | | P |
| 6.1.2 | Risk Group 1 (Low-Risk) | | N |
| 6.1.3 | Risk Group 2 (Moderate-Risk) | | N |

| | | | |
|-------|--------------------------|--|---|
| 6.1.4 | Risk Group 3 (High-Risk) | | N |
| 6.2 | Pulsed lamps | | N |

| | | |
|----------------|--------------------------------------|----|
| Annex A | SUMMARY OF BIOLOGICAL EFFECTS | -- |
|----------------|--------------------------------------|----|

| | | |
|----------------|---------------------------|----|
| Annex B | MEASUREMENT METHOD | -- |
|----------------|---------------------------|----|

| | | |
|----------------|-----------------------------|----|
| Annex C | UNCERTAINTY ANALYSIS | -- |
|----------------|-----------------------------|----|

| | | |
|----------------|---------------------------|----|
| Annex D | GENERAL REFERENCES | -- |
|----------------|---------------------------|----|

| Table 6.1 | | Emission limits for risk groups of continuous wave lamps(based on EU directive 2006/25/EC) | | | | | | | P | |
|---|------------------|--|-------------------------------------|---------------------------|-------------------------|---------------------|--------|-----------------|--------|--|
| Risk | Action spectrum | Symbol | Units | Emission Measurement | | | | | | |
| | | | | Exempt | | Low risk | | Mod risk | | |
| | | | | Limit | Result | Limit | Result | Limit | Result | |
| Actinic UV | SUV(λ) | E _s | W•m ⁻² | 0,001 | 1.43 × 10 ⁻⁴ | - | - | - | - | |
| Near UV | | E _{UVA} | W•m ⁻² | 0.33 | 1.51 × 10 ⁻⁴ | - | - | - | - | |
| Blue light | B(λ) | L _B | W•m ⁻² •sr ⁻¹ | 100 | 0.56 × 10 ¹ | 1000 0 | - | 4000000 | - | |
| Blue light, small source | B(λ) | E _B | W•m ⁻² | 0.01* | - | 1,0 | - | 400 | - | |
| Retinal thermal | R(λ) | L _R | W•m ⁻² •sr ⁻¹ | 28000/ α | 5.87 × 10 ³ | 2800 0/ α | - | 71000/ α | - | |
| Retinal thermal, weak visual stimulus** | R(λ) | L _{IR} | W•m ⁻² •sr ⁻¹ | 545000 | - | - | - | - | - | |
| | | | | 0.0017 ≅ α ≅ 0.011 | - | - | - | - | - | |
| | | | | 6000/ α | - | - | - | - | - | |
| | | | | 0.011 ≅ α ≅ 0.1 | - | - | - | - | - | |
| IR radiation, eye | | E _{IR} | W•m ⁻² | 100 | 0.0062 | 570 | - | 3200 | - | |

* Small source defined as one with $\alpha < 0,011$ radian. Averaging field of view at 10000 s is 0,1 radian.
 ** Involves evaluation of non-GLS source
 Note: The action functions: see Table 4.1 and Table 4.2
 The applicable aperture diameters: see 4.2.1
 The limitations for the angular subtenses: see 4.2.2
 The related measurement condition 5.2.3 and the range of acceptance angles: see Table 5.5

ATTACHMENT 3

Photo Documentation

View:
Model:
U19

- General
- Front
- Rear
- Internal
- Top
- Bottom
- PWB

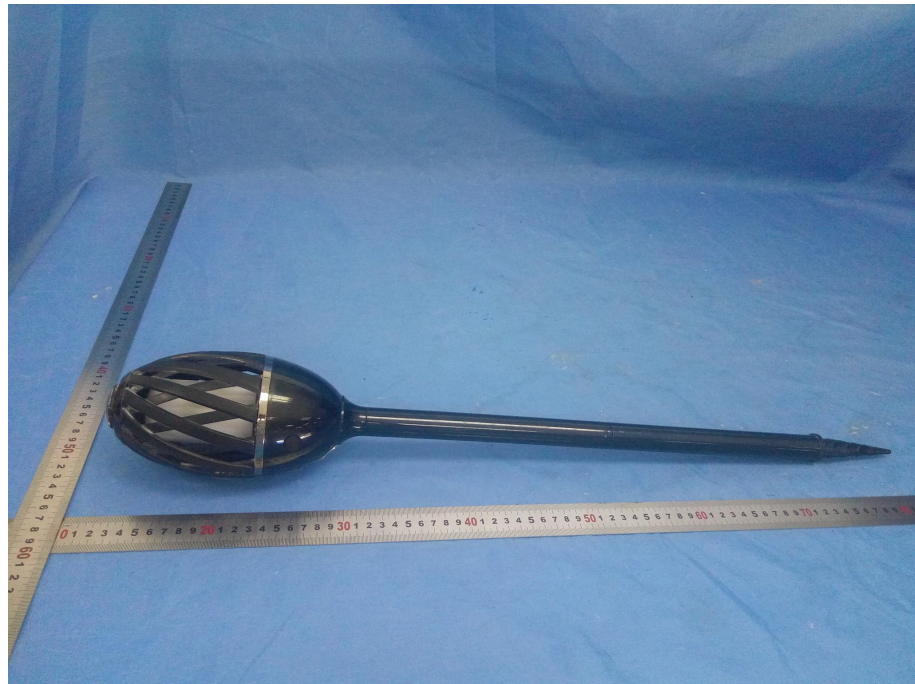


Figure 1

View:

- General
- Front
- Rear
- Internal
- Top
- Bottom
- PWB



Figure 2

ATTACHMENT 3

Photo Documentation

View:

- General
- Front
- Rear
- Internal
- Top
- Bottom
- PWB



Figure 3

View:

- General
- Front
- Rear
- Internal
- Top
- Bottom
- PWB

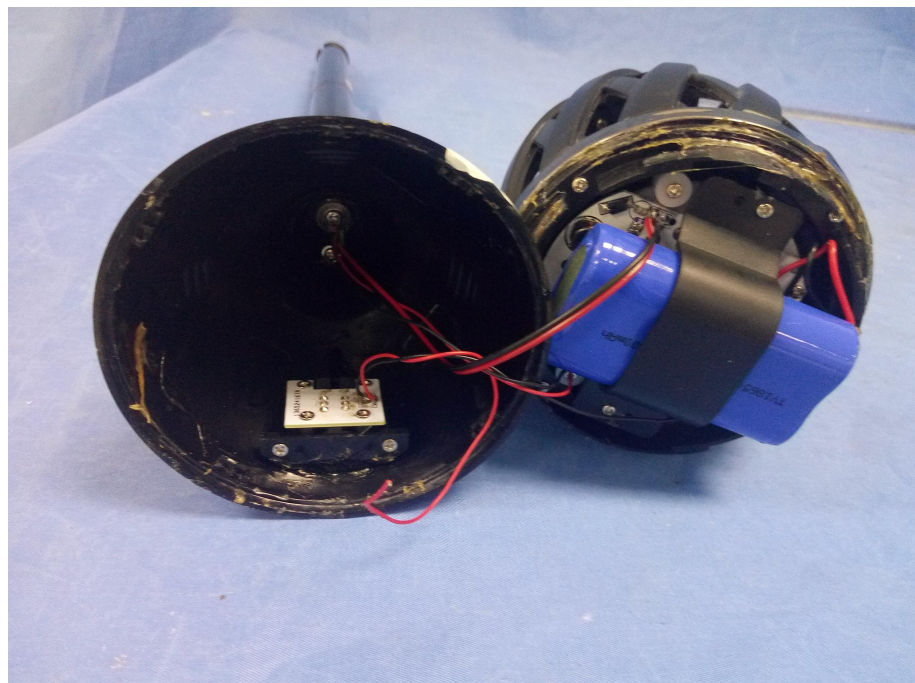


Figure 4

-----END OF TEST REPORT-----