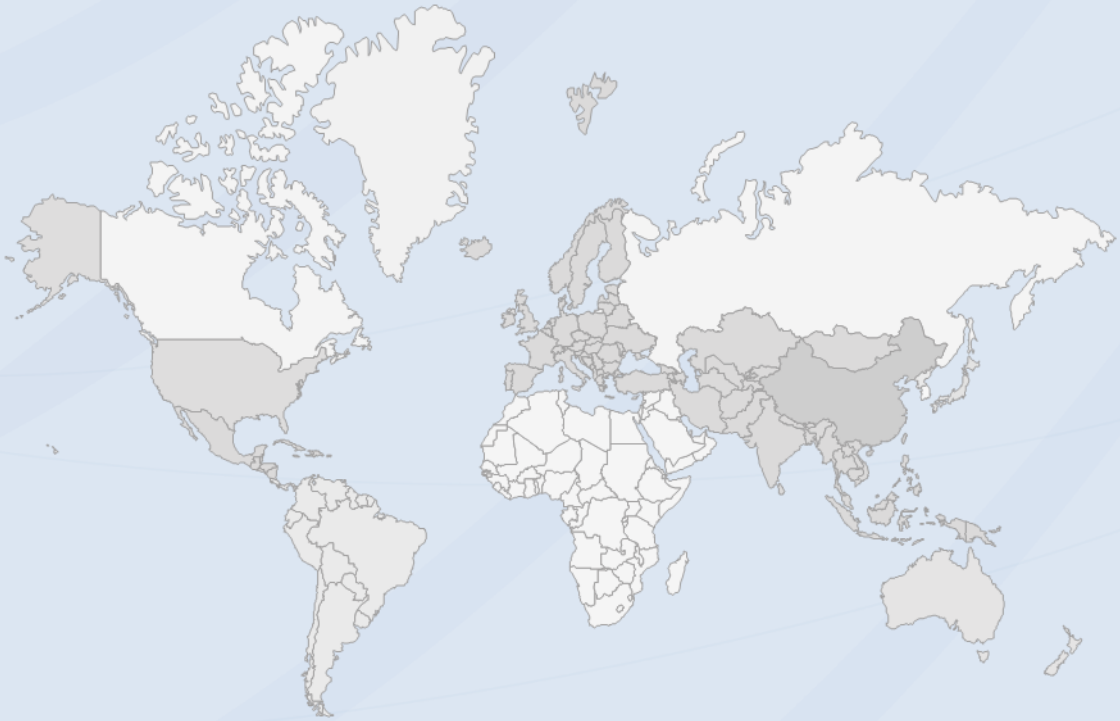
# SAFETY TEST REPORT

**Report No**..... : NTC-SR2308022

**Applicant's name** ..... : LEDlife ApS

Address..... : Nordkajen 5 6000 Kolding Denmark




**DONGGUAN NEW TESTING CENTRE CO., LTD**

**◎Address: 1F & 3F, No. 1 the 1st North Industry Road Songshan Lake Science & Technology Park Dongguan, People's Republic of China 523808**

**☎Tel: +86-769-22212079 ❁Web: http://www.ntc-cert.com ✉E-mail: dave@ntc-cert.com**

# TEST REPORT
**IEC 60598-2-1**
## Luminaires
## Part 2: Particular requirements
## Section 1: Fixed general purpose luminaires

| | |
|---|---|
| **Report Reference No. ..... :** | NTC-SR2308022 |
| Date of issue.....: | September 5, 2023 |
| Total number of pages.....: | 79 Pages |
| **Testing Laboratory ..... :** | Dongguan New Testing Centre Co., Ltd |
| Address.....: | 1F & 3F, No. 1 the 1st North Industry Road Songshan Lake Science & Technology Park Dongguan, People's Republic of China 523808 |
| Tested by (name + signature) .....: | Jack Zhang |
| Approved by (+ signature) .....: | Neil Zhong |
| **Applicant's name ..... :** | LEDlife ApS |
| Address.....: | Nordkajen 5 6000 Kolding Denmark |
| **Manufacturer's name ..... :** | Shenzhen Opte Lighting Co Ltd |
| Address.....: | No108 Zhongxin Road Xinqiao Baoan District Shenzhen |
| **Test specification:** | |
| **Standard ..... :** | **IEC 60598-2-1:2020 used in conjunction with IEC 60598-1:2020** |
| **Test procedure..... :** | **Safety test report** |
| **TRF template used ..... :** | IECEE OD-2020-F1:2020, Ed.1.3 |
| **Test Report Form No. ..... :** | IEC60598_2_1H |
| **Test Report Form(s) Originator.... :** | Intertek Semko AB |
| **Master TRF ..... :** | Dated 2021-05-21 |

| | |
|---|---|
| **Test item description ..... :** | LED Strip Drum |
| Trade Mark……: | LEDlife |
| Model/Type reference.....: | LL.IP67.180.xy |
| Ratings..... : | Rated Voltage: 220-240VAC<br>Rated Frequency: 50/60Hz<br>Rated Power: 800W<br>Protection Class: II<br>Degree of Protection: IP65 for luminaire, IP44 for Plug<br>Blue Light Risk Group: RG1<br>ta: 45°C |

**Copy of marking plate:**

LEDlife

**LED Strip Drum**
**Model:** LL.IP67.180.xy
**Input:** 220-240V~, 50/60Hz, Max.800W
IP65 for luminaire, IP44 for Plug **ta: 45°C**

IK08

**Made in China**

**For European market, the manufacturer name & address, importer name & address will be pasted on the products.**

Caution, risk of electric shock

**Note:**

- The above markings are the minimum requirements required by the safety standard. For the final production, the additional markings which do not give rise to misunderstanding may be added.
- The CE marking and WEEE symbol (if any) should be at least 5,0 mm and 7,0 mm respectively in height.
- 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.
- Attached near the LED module

- The height of symbol "▬" was not less than 7mm.
- The height of the other graphical symbols was not less than 5mm.

| | |
|---|---|
| **Test item particulars** .....: | LED Strip Drum |
| Classification of installation and use .....: | Class II |
| Supply Connection ……..: | Plug Power cord |

**Possible test case verdicts:**

| | |
|---|---|
| - test case does not apply to the test object .....: | N/A (Not applicable) |
| - test object does meet the requirement .....: | Pass (P) |
| - test object does not meet the requirement .....: | Fail (F) |

**Testing:**

| | |
|---|---|
| Date of receipt of test items .....: | Aug. 03, 2023 |
| Date(s) of performance of tests .....: | Aug. 03, 2023 to Aug. 18, 2023 |

**General remarks:**

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report, a point (coma) is used as the decimal separator.
List of test equipment must be kept on file and available for review.

**List of Attachments (including a total number of pages in each attachment):**
**This report includes:**
Test report of IEC 60598-2-1.
Attachment 1: European group differences and national differences.
Attachment 2: Acceptance test of LED module according to IEC/EN 62031+A1+A2.
Attachment 3: Photo biological safety of lamps and lamp systems were according to standard IEC 62471:2006, EN 62471:2008.
Attachment 4: Assessment of Blue light hazard to light sources and luminaires according to IEC TR 62778:2014.
Attachment 5: Particular requirements —Luminaires with limited surface temperatures IEC/EN 60598-2-24:2013
Attachment 6: Photo documentation.

**General product information:**

N/A

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **1.4 (0)** | **GENERAL TEST REQUIREMENTS** | | — |
| 1.4 (0.3) | More sections applicable .....: | Yes ☐ No ☒ | — |
| 1.4 (0.5) | Components | (see Annex 1) | — |
| **1.4 (0.7)** | **Information for luminaire design in light sources standards** | | — |
| 1.4 (0.7.2) | Light source safety standard .....: | IEC 62031; EN IEC 62031 | — |
| | Luminaire design in the light source safety standard | | P |
| **1.5 (2)** | **CLASSIFICATION OF LUMINAIRES** | | — |
| 1.5 (2.2) | Type of protection .....: | Class II | P |
| 1.5 (2.3) | Degree of protection.....: | IP65 for luminaire, IP44 for Plug | — |
| 1.5 (2.4) | Luminaire suitable for direct mounting on normally flammable surfaces .....: | Yes ☒ No ☐ | — |
| 1.5 (2.5) | Luminaire for normal use .....: | Yes ☒ No ☐ | — |
| | Luminaire for rough service .....: | Yes ☐ No ☒ | — |
| **1.6 (3)** | **MARKING** | | P |
| 1.6 (3.2) | Mandatory markings | | P |
| | Position of the marking | | P |
| | Format of symbols/text | | P |
| 1.6 (3.3) | Additional information | | P |
| | Language of instructions | English | P |
| 1.6 (3.3.1) | Combination luminaires | | N/A |
| 1.6 (3.3.2) | Nominal frequency in Hz | 50/60Hz | P |
| 1.6 (3.3.3) | Operating temperature | | N/A |
| 1.6 (3.3.5) | Wiring diagram | | P |
| 1.6 (3.3.6) | Special conditions | | N/A |
| 1.6 (3.3.7) | Metal halide lamp luminaire – warning | | N/A |
| 1.6 (3.3.8) | Limitation for semi-luminaires | | N/A |
| 1.6 (3.3.9) | Power factor and supply current | | N/A |
| 1.6 (3.3.10) | Suitability for use indoors | | N/A |
| 1.6 (3.3.11) | Luminaires with remote control | | N/A |
| 1.6 (3.3.12) | Clip-mounted luminaire – warning | | N/A |
| 1.6 (3.3.13) | Specifications of protective shields | | N/A |
| 1.6 (3.3.14) | Symbol for nature of supply | ~ | P |
| 1.6 (3.3.15) | Rated current of socket outlet | | N/A |
| 1.6 (3.3.16) | Rough service luminaire | | N/A |
| 1.6 (3.3.17) | Mounting instruction for type Y, type Z and some type X attachments | type Y | P |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 1.6 (3.3.18) | Non-ordinary luminaires with PVC cable | | N/A |
| 1.6 (3.3.19) | Protective conductor current in instruction if applicable | | N/A |
| 1.6 (3.3.20) | Provided with information if not intended to be mounted within arm's reach | | P |
| 1.6 (3.3.21) | Non replaceable and non-user replaceable light sources information provided | Non-user replaceable | P |
| 1.6 (3.3.22) | Controllable luminaires, classification of insulation provided | | N/A |
| 1.6 (3.3.23) | Luminaires without control gear provided with necessary information for selection of appropriate component | | N/A |
| 1.6 (3.3.24) | If not supplied with terminal block, information on the packaging | | P |
| 1.6 (3.3.25) | Luminaires employing light sources emitting UV on mains wiring, information provided | | P |
| 1.6 (3.3.26) | Wall mounted luminaire using external flexible cable or cord longer than 0.3 m, information provided | | P |
| 1.6 (3.4) | Test with water | | P |
| | Test with hexane | 15s | P |
| | Legible after test | 15s | P |
| | Label attached | No legible and curling | P |
| **1.7 (4)** | **CONSTRUCTION** | | P |
| 1.7 (4.2) | Components replaceable without difficulty | Plug Power cord | P |
| 1.7 (4.3) | Wireways smooth and free from sharp edges | | P |
| **1.7 (4.4)** | **Lamp holders** | | **N/A** |
| 1.7 (4.4.1) | Integral lamp holder | | N/A |
| 1.7 (4.4.2) | Wiring connection | | N/A |
| 1.7 (4.4.3) | Lamp holder for end-to-end mounting | | N/A |
| 1.7 (4.4.4) | Positioning | | N/A |
| | - pressure test (N) ..... : | | — |
| | After test the lamp holder comply with relevant standard sheets and show no damage | | N/A |
| | After test on single-capped lamp holder the lamp holder has not moved from its position and show no permanent deformation | | N/A |
| | - bending test (N) ..... : | | — |
| | After test the lamp holder has not moved from its position and show no permanent deformation | | N/A |
| 1.7 (4.4.5) | Peak pulse voltage | | N/A |
| 1.7 (4.4.6) | Centre contact | | N/A |
| 1.7 (4.4.7) | Parts in rough service luminaires resistant to tracking | | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 1.7 (4.4.8) | Lamp connectors | | N/A |
| 1.7 (4.4.9) | Caps and bases correctly used | | N/A |
| 1.7 (4.4.10) | Light source for lamp holder or connection according IEC 60061 not connected another way | | N/A |
| **1.7 (4.5)** | **Starter holders** | | N/A |
| | Starter holder in luminaires other than class II | | N/A |
| | Starter holder class II construction | | N/A |
| **1.7 (4.6)** | **Terminal blocks** | | N/A |
| | Tails | | N/A |
| | Unsecured blocks | | N/A |
| **1.7 (4.7)** | **Terminals and supply connections** | | N/A |
| 1.7 (4.7.1) | Contact to metal parts | | N/A |
| 1.7 (4.7.2) | Test 8 mm live conductor | | N/A |
| | Test 8 mm earth conductor | | N/A |
| 1.7 (4.7.3) | Terminals for supply conductors | | N/A |
| 1.7 (4.7.3.1) | Welded method and material | | N/A |
| | - stranded or solid conductor | | N/A |
| | - spot welding | | N/A |
| | - welding between wires | | N/A |
| | - Type Z attachment | | N/A |
| | - mechanical test according to 15.6.2 | | N/A |
| | - electrical test according to 15.6.3 | | N/A |
| | - heat test according to 15.6.3.2.3 and 15.6.3.2.4 | | N/A |
| 1.7 (4.7.4) | Terminals other than supply connection | | N/A |
| 1.7 (4.7.5) | Heat-resistant wiring/sleeves | | N/A |
| 1.7 (4.7.6) | Multi-pole plug | | N/A |
| | - test at 30 N | | N/A |
| **1.7 (4.8)** | **Switches** | | **N/A** |
| | - adequate rating | | N/A |
| | - adequate fixing | | N/A |
| | - polarized supply | | N/A |
| | - compliance with IEC 61058-1 for electronic switches | | N/A |
| **1.7 (4.9)** | **Insulating lining and sleeves** | | N/A |
| 1.7 (4.9.1) | Retainment | | N/A |
| | Method of fixing ..... : | | N/A |
| 1.7 (4.9.2) | Insulated linings and sleeves: | | N/A |
| | Resistant to a temperature > 20 °C to the wire temperature or | | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | a) & c) Insulation resistance and electric strength | | N/A |
| | b) Ageing test. Temperature (°C) ..... : | | N/A |
| **1.7 (4.10)** | **Double or reinforced insulation** | | P |
| 1.7 (4.10.1) | No contact, mounting surface – accessible metal parts – wiring of basic insulation | | N/A |
| | Safe installation fixed luminaires | Refer to instruction, mounting by fixed clips | P |
| | Capacitors and switches | | N/A |
| 1.7 (4.10.2) | Assembly gaps: | | N/A |
| | - not coincidental | | N/A |
| | - no straight access with test probe | | N/A |
| 1.7 (4.10.3) | Retainment of insulation: | | N/A |
| | - fixed | | N/A |
| | - unable to be replaced; luminaire inoperative | | N/A |
| | - sleeves retained in position | | N/A |
| | - lining in lamp holder | | N/A |
| 1.7 (4.10.4) | Protective impedance device | | N/A |
| | Basic and supplementary insulation bridged by resistor(s) or appropriate capacitor | | N/A |
| | Double or reinforced insulation bridged by at least two separate resistors in series or appropriate capacitor(s) | | N/A |
| | Capacitors comply with IEC 60384-14 | | N/A |
| | Resistors comply with test (a) in 14.2 of IEC 60065 | | N/A |
| **1.7 (4.11)** | **Electrical connections and current-carrying parts** | | **P** |
| 1.7 (4.11.1) | Contact pressure | | N/A |
| 1.7 (4.11.2) | Screws: | | N/A |
| | - self-tapping screws | | N/A |
| | - thread-cutting screws | | N/A |
| 1.7 (4.11.3) | Screw locking: | | N/A |
| | - spring washer | | N/A |
| | - rivets | | N/A |
| 1.7 (4.11.4) | Material of current-carrying parts | Alloy containing at least 50 % copper is used for current-carrying parts | P |
| 1.7 (4.11.5) | No contact to wood or mounting surface | | P |
| 1.7 (4.11.6) | Electro-mechanical contact systems | | N/A |
| **1.7 (4.12)** | **Screws and connections (mechanical) and glands** | | N/A |
| 1.7 (4.12.1) | Screws not made of soft metal | | N/A |
| | Screws of insulating material | | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Torque test: torque (Nm); part..... : | | N/A |
| | Torque test: torque (Nm); part..... : | | N/A |
| | Torque test: torque (Nm); part..... : | | N/A |
| | Torque test: torque (Nm); part..... : | | N/A |
| | Torque test: torque (Nm); part..... : | | N/A |
| 1.7 (4.12.2) | Screws with diameter < 3 mm screwed into metal | | N/A |
| 1.7 (4.12.4) | Locked connections: | | N/A |
| | - fixed arms; torque (Nm) ..... : | | N/A |
| | - lamp holder; torque (Nm) ..... : | | N/A |
| | - push-button switches; torque 0,8 Nm ..... : | | N/A |
| 1.7 (4.12.5) | Screwed glands; force (Nm)..... : | | N/A |
| **1.7 (4.13)** | **Mechanical strength** | | P |
| 1.7 (4.13.1) | Impact tests: | | P |
| | - fragile parts; energy (Nm) ..... : | | N/A |
| | - other parts; energy (Nm)..... : | Enclosure: 0,5Nm | P |
| | 1) live parts | After test, no live parts become accessible | P |
| | 2) linings | | N/A |
| | 3) protection | | P |
| | 4) covers | | P |
| 1.7 (4.13.2) | Metal parts have adequate mechanical strength | | N/A |
| 1.7 (4.13.3) | Straight test finger | | P |
| 1.7 (4.13.4) | Rough service luminaires | | N/A |
| | - IP54 or higher | | N/A |
| | a) fixed | | N/A |
| | b) hand-held | | N/A |
| | c) delivered with a stand | | N/A |
| | d) for temporary installations and suitable for mounting on a stand | | N/A |
| 1.7 (4.13.6) | Tumbling barrel | | N/A |
| **1.7 (4.14)** | **Suspensions, fixings and means of adjusting** | | P |
| 1.7 (4.14.1) | Mechanical load: | | P |
| | A) four times the weight | | P |
| | B) torque 2,5 Nm | | N/A |
| | C) bracket arm; bending moment (Nm)..... : | | N/A |
| | D) load track-mounted luminaires | | N/A |
| | E) clip-mounted luminaires, glass-shelve. Thickness (mm) ..... : | | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Metal rod. diameter (mm) ..... : | | N/A |
| | Fixed luminaire or independent control gear without fixing devices | | N/A |
| 1.7 (4.14.2) | Load to flexible cables | | N/A |
| | Mass (kg) ..... : | | — |
| | Stress in conductors (N/mm²) ..... : | | N/A |
| | Mass (kg) of semi-luminaire ..... : | | N/A |
| | Bending moment (Nm) of semi-luminaire ..... : | | N/A |
| 1.7 (4.14.3) | Adjusting devices: | | N/A |
| | - flexing test; number of cycles..... : | | N/A |
| | - strands broken ..... : | | N/A |
| | - electric strength test afterwards | | N/A |
| 1.7 (4.14.4) | Telescopic tubes: cords not fixed to tube; no strain on conductors | | N/A |
| 1.7 (4.14.5) | Guide pulleys | | N/A |
| 1.7 (4.14.6) | Strain on socket-outlets | | N/A |
| **1.7 (4.15)** | **Flammable materials** | | P |
| | - glow-wire test 650°C ..... : | See Test Table 1.15 (13.3.2) | P |
| | - spacing ≥30 mm | | N/A |
| | - screen withstanding test of 13.3.1 | | N/A |
| | - screen dimensions | | N/A |
| | - no fiercely burning material | | P |
| | - thermal protection | | N/A |
| | - electronic circuits exempted | | N/A |
| 1.7 (4.15.2) | Luminaires made of thermoplastic material with lamp control gear | | N/A |
| | a) construction | | N/A |
| | b) temperature sensing control | | N/A |
| | c) surface temperature | | N/A |
| **1.7 (4.16)** | **Luminaires for mounting on normally flammable surfaces** | | P |
| | No lamp control gear ..... : | (compliance with Section 12) | N/A |
| | Provided with adaptor for a track meet the requirements for direct mounting on normally flammable surfaces | | N/A |
| 1.7 (4.16.1) | Lamp control gear spacing: | | N/A |
| | - spacing 35 mm | | N/A |
| | - spacing 10 mm | | N/A |
| 1.7 (4.16.2) | Thermal protection: | | N/A |
| | - in lamp control gear | | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - external | | N/A |
| | - fixed position | | N/A |
| | - temperature marked lamp control gear | | N/A |
| 1.7 (4.16.3) | Design to satisfy the test of 12.6 | (see clause 12.6) | N/A |
| **1.7 (4.17)** | **Drain holes** | | N/A |
| | Clearance at least 5 mm | | N/A |
| **1.7 (4.18)** | **Resistance to corrosion** | | P |
| 1.7 (4.18.1) | - rust-resistance | | P |
| 1.7 (4.18.2) | - season cracking in copper | | N/A |
| 1.7 (4.18.3) | - corrosion of aluminium | | N/A |
| 1.7 (4.19) | Ignitors compatible with ballast | | N/A |
| 1.7 (4.20) | Rough service vibration | | N/A |
| **1.7 (4.21)** | **Protective shield** | | N/A |
| 1.7 (4.21.1) | Shield fitted if tungsten halogen lamps or metal halide lamps | | N/A |
| | Shield of glass if tungsten halogen lamps | | N/A |
| 1.7 (4.21.2) | Particles from a shattering lamp not impair safety | | N/A |
| 1.7 (4.21.3) | No direct path | | N/A |
| 1.7 (4.21.4) | Impact test on shield | | N/A |
| | Glow-wire test on lamp compartment..... : | See Test Table 1.15 (13.3.2) | N/A |
| 1.7 (4.22) | Attachments to lamps not cause overheating or damage | | N/A |
| 1.7 (4.23) | Semi-luminaires comply Class II | | N/A |
| **1.7 (4.24)** | **Photobiological hazards** | | P |
| 1.7 (4.24.1) | No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P) | | N/A |
| 1.7 (4.24.2) | Retinal blue light hazard | | P |
| | Class of risk group assessed according to IEC/TR 62778 ..... : | RG1 | — |
| | Luminaires with $E_{thr}$ : | | N/A |
| | a) Fixed luminaires | | N/A |
| | - distance x m, borderline between RG1 and RG2 .. : | | N/A |
| | - marking and instruction according 3.2.23 | | N/A |
| | b) Portable and handheld luminaires | | N/A |
| | - marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778 | | N/A |
| | 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/A |
| **1.7 (4.25)** | **Mechanical hazard** | | P |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | No sharp point or edges | | P |
| **1.7 (4.26)** | **Short-circuit protection** | | N/A |
| 1.7 (4.26.1) | Adequate means of uninsulated accessible SELV / PELV parts | | N/A |
| 1.7 (4.26.2) | Short-circuit test with test chain according 4.26.3: | | N/A |
| | Supply source ES1 PSE | | N/A |
| | Test chain not melt through | | N/A |
| | Test sample not exceed values of Table 12.1 and 12.2 | | N/A |
| **1.7 (4.27)** | **Terminal blocks with integrated screwless protective earthing contacts** | | N/A |
| | Test according Annex V | | N/A |
| | Pull test of terminal fixing (20 N) | | N/A |
| | After test, resistance < 0,05 Ω | | N/A |
| | Pull test of mechanical connection (50 N) | | N/A |
| | After test, resistance < 0,05 Ω | | N/A |
| | Voltage drop test, resistance < 0,05 Ω | | N/A |
| **1.7 (4.28)** | **Fixing of thermal sensing control** | | N/A |
| | Not plug-in or easily replaceable type | | N/A |
| | Reliably kept in position | | N/A |
| | No adhesive fixing if UV radiations from a lamp can degrade the fixing | | N/A |
| | Not outside the luminaire enclosure | | N/A |
| | Test of adhesive fixing: | | N/A |
| | Max. temperature on adhesive material (°C) .....: | | — |
| | 100 cycles between t min and t max | | N/A |
| | Temperature sensing control still in position | | N/A |
| **1.7 (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 |
| **1.7 (4.30)** | **Luminaires with non-user replaceable light source** | | N/A |
| | If protective cover provide protection against electric shock and marked with “caution, electric shock risk” symbol: | | N/A |
| | At least one fixing means requiring use of tool | | N/A |
| **1.7 (4.31)** | **Insulation between circuits** | | N/A |
| | Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3 | | N/A |
| | 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/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 1.7 (4.31.1) | SELV or PELV circuits | | N/A |
| | Used SELV/PELV source | | N/A |
| | Voltage ≤ ELV | | N/A |
| | Insulating of SELV/PELV circuits from LV supply | | N/A |
| | Insulating of SELV/PELV circuits from other non SELV/PELV circuits | | N/A |
| | Insulating of SELV/PELV circuits from FELV | | N/A |
| | Insulating of SELV/PELV circuits from other SELV/PELV circuits | | N/A |
| | SELV/PELV circuits insulated from accessible parts according Table X.1 | | N/A |
| | Plugs not able to make any electrical contact with socket-outlets of other voltage systems | | N/A |
| | Socket outlets does not admit plugs of other voltage systems | | N/A |
| | Plugs and socket-outlets does not have protective conductor contact | | N/A |
| 1.7 (4.31.2) | FELV circuits | | N/A |
| | Used FELV source | | N/A |
| | Voltage ≤ ELV | | N/A |
| | Insulating of FELV circuits from LV supply | | N/A |
| | FELV circuits insulated from accessible parts according Table X.1 | | N/A |
| | Plugs not able to make any electrical contact with socket-outlets of other voltage systems | | N/A |
| | Socket outlets does not admit plugs of other voltage systems | | N/A |
| | Socket-outlets does not have protective conductor contact | | N/A |
| 1.7 (4.31.3) | Other circuits | | N/A |
| | Other circuits insulated from accessible parts according Table X.1 | | N/A |
| | Class II construction with equipotential bonding for protection against indirect contacts with live parts: | | N/A |
| | - conductive parts are connected together | | N/A |
| | - test according 7.2.3 | | N/A |
| | - conductive part not cause an electric shock in case of an insulation fault | | N/A |
| | - equipotential bonding in master/slave applications | | N/A |
| | - master luminaire provided with terminal for accessible conductive parts of slave luminaires | | N/A |
| | - slave luminaire constructed as class I | | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **1.7 (4.32)** | **Overvoltage protective devices** | | N/A |
| | Comply with IEC 61643-11 | | N/A |
| | External to controlgear and connected to earth: | | N/A |
| | - only in fixed luminaires | | N/A |
| | - only connected to protective earth | | N/A |
| **1.6 (4.33)** | **Luminaire powered via information technology communication cabling** | | N/A |
| | Requirements for Class III luminaire | | N/A |
| | Rated voltage within the range of ES1 and does not exceed maximum voltage of used connector | | N/A |
| | Luminaire does not create any hazard from overvoltage | (see Annex 2) | N/A |
| **1.6 (4.34)** | **Electromagnetic fields (EMF)** | | P |
| | No harmful electromagnetic fields | | P |
| **1.6 (4.35)** | **Protection against moving fan blades** | | N/A |
| | Test with a standard test finger | | N/A |
| | Test with test probe acc. to Figure 13 (IEC 61032) for portable luminaire | | N/A |
| | Blades rounded with radius ≥ 0.5 mm and: | | N/A |
| | -hardness less than D60 Shore | | N/A |
| | -peripheral speed less than 15 m/s | | N/A |
| | -input power of fan ≤ 2 W at rated voltage | | N/A |
| **1.6 (4.36)** | **Track-mounted luminaires** | | N/A |
| | Test in accordance with Annex A of IEC60570:2003/AMD2:2019 | | N/A |

| | | | |
|---|---|---|---|
| **1.8 (11)** | **CREEPAGE DISTANCES AND CLEARANCES** | | P |
| 1.8 (11.2.1) | Impulse withstand category (Normal category II) | Category II ☒ Category III ☐ | — |
| | Category III according Annex U | | N/A |
| | Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1 | | N/A |
| 1.8 (11.2.2) | Creepage distances for frequency up to 30 kHz | See Test Table 1.7 (11.2) I | P |
| | Creepage distances for frequency over 30 kHz: | | N/A |
| | - Controlgear marked with $\hat{U}_{OUT}$ and $f_{UOUT}$ according IEC 61347-1, clause 7.1, item w | See Test Table 1.7 (11.2) II | N/A |
| | - Requirements according IEC 60664-4 for controlgear not covered by IEC 61347 | See Test Table 1.7 (11.2) II | N/A |
| 1.8 (11.2.3) | Clearances for frequency up to 30 kHz | See Test Table 1.7 (11.2) I | P |
| | Clearances distances for frequency over 30 kHz: | | N/A |
| | - Controlgear marked with $U_P$ | See Test Table 1.7 (11.2) II | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - Requirements according IEC 60664-4 for controlgear not covered by IEC 61347 | See Test Table 1.7 (11.2) II | N/A |
| **1.9 (7)** | **PROVISION FOR EARTHING** | | **N/A** |
| 1.9 (7.2.1 + 7.2.3) | Accessible metal parts | | N/A |
| | Metal parts in contact with supporting surface | | N/A |
| | Resistance < 0,5 Ω..... : | | N/A |
| | Self-tapping screws used | | N/A |
| | Thread-forming screws | | N/A |
| | Thread-forming screw used in a grove | | N/A |
| | Protective earth makes contact first | | N/A |
| | Terminal blocks with integrated screwless protective earthing contacts tested according Annex V | | N/A |
| | Protective earthing of the luminaire not via built-in control gear | | N/A |
| 1.9 (7.2.2 + 7.2.3) | Protective earth continuity in joints, etc. | | N/A |
| 1.9 (7.2.4) | Locking of clamping means | | N/A |
| | Compliance with 4.7.3 | | N/A |
| 1.9 (7.2.5) | Protective earth terminal integral part of connector socket | | N/A |
| 1.9 (7.2.6) | Protective earth terminal adjacent to mains terminals | | N/A |
| 1.9 (7.2.7) | Electrolytic corrosion of the protective earth terminal | | N/A |
| 1.9 (7.2.8) | Material of protective earth terminal | | N/A |
| | Contact surface bare metal | | N/A |
| 1.9 (7.2.10) | Class II luminaire for looping-in | | N/A |
| | Double or reinforced insulation to functional earth | | N/A |
| 1.9 (7.2.11) | Protective earthing core coloured green-yellow | | N/A |
| | Length of earth conductor | | N/A |
| 1.9 (7.2.12) | PELV circuit connected to protective earth for functional purpose | | N/A |
| **1.10 (14)** | **SCREW TERMINALS** | | P |
| | Separately approved; component list | (see Annex 1) | P |
| | Part of the luminaire | (see Annex 3) | N/A |
| **1.10 (15)** | **SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS** | | N/A |
| | Separately approved; component list..... : | (see Annex 1) | N/A |
| | Part of the luminaire ..... : | (see Annex 4) | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **1.11 (5)** | **EXTERNAL AND INTERNAL WIRING** | | P |
| **1.11 (5.2)** | **Supply connection and external wiring** | | P |
| 1.11 (5.2.1) | Means of connection ..... : | Plug Power cord | P |
| | Outdoor luminaire has not PVC insulated external wiring if not Class III or SELV/PELV circuits ≤ 25 V AC/60 V DC/25 V peak interrupted DC voltage with frequency 10Hz -200 Hz or protected from outdoor environment | | N/A |
| 1.11 (5.2.2) | Type of cable ..... : | (see Annex 1) | P |
| | Nominal cross-sectional area (mm²) ..... : | (see Annex 1) | P |
| | Cables equal to IEC 60227 or IEC 60245 | | P |
| 1.11 (5.2.3) | Type of attachment, X, Y or Z | | P |
| 1.11 (5.2.5) | Type Z not connected to screws | | N/A |
| 1.11 (5.2.6) | Cable entries: | | P |
| | - suitable for introduction | | P |
| | - adequate degree of protection | | P |
| 1.11 (5.2.7) | Cable entries through rigid material have rounded edges | | N/A |
| 1.11 (5.2.8) | Insulating bushings: | | N/A |
| | - suitably fixed | | N/A |
| | - material in bushings | | N/A |
| | - material not likely to deteriorate | | N/A |
| | - tubes or guards made of insulating material | | N/A |
| 1.11 (5.2.9) | Locking of screwed bushings | | N/A |
| 1.11 (5.2.10) | Cord anchorage: | | P |
| | - covering protected from abrasion | | P |
| | - clear how to be effective | | P |
| | - no mechanical or thermal stress | | P |
| | - no tying of cables into knots etc. | | P |
| | - insulating material or lining | | P |
| 1.11 (5.2.10.1) | Cord anchorage for type X attachment: | | N/A |
| | a) at least one part fixed | | N/A |
| | b) types of cable | | N/A |
| | c) no damaging of the cable | | N/A |
| | d) whole cable can be mounted | | N/A |
| | e) no touching of clamping screws | | N/A |
| | f) metal screw not directly on cable | | N/A |
| | g) replacement without special tool | | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Glands not used as anchorage | | N/A |
| | Labyrinth type anchorages | | N/A |
| 1.11 (5.2.10.2) | Adequate cord anchorage for type Y and type Z attachment | | P |
| 1.11 (5.2.10.3) | Tests: | | P |
| | - impossible to push cable; unsafe | | P |
| | - pull test: 25 times; pull (N)..... : | 60N | P |
| | - torque test: torque (Nm) ..... : | 0.15Nm | P |
| | - displacement ≤ 2 mm | 0.2mm | P |
| | - no movement of conductors | | P |
| | - no damage of cable or cord | | P |
| | - function independent of electrical connection | | N/A |
| 1.11 (5.2.10.4) | Luminaire with/designed for use with supply cord with maximum current of 2A: | | N/A |
| | - Ordinary Class III luminaire supplied with SELV ≤ 25V RMS/60V DC | | N/A |
| | - Ordinary Class III luminaire supplied with PELV ≤12V RMS/30V DC | | N/A |
| | - Other than ordinary Class III luminaire supplied with voltage ≤12V RMS/30V DC | | N/A |
| | Pull test of 30N | | N/A |
| 1.11 (5.2.11) | External wiring passing into luminaire | | P |
| 1.11 (5.2.12) | Looping-in terminals | | N/A |
| 1.11 (5.2.13) | Wire ends not tinned | | N/A |
| | Wire ends tinned: no cold flow | | P |
| 1.11 (5.2.14) | Mains plug same protection | | P |
| | Class III luminaire plug | | N/A |
| | No unsafe compatibility | | P |
| 1.11 (5.2.15) | Connectors for Class III luminaires (IEC 60603 or IEC 62680) | | N/A |
| 1.11 (5.2.16) | Appliance inlets (IEC 60320) | | N/A |
| | Installation couplers (IEC 61535) | | N/A |
| | Appliance inlet or connector systems (IEC 61984) | | N/A |
| 1.11 (5.2.17) | No standardized interconnecting cables properly assembled | | N/A |
| 1.11 (5.2.18) | Used plug in accordance with | | P |
| | - IEC 60083 | | N/A |
| | - other standard | | P |
| **1.11 (5.3)** | **Internal wiring** | | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 1.11 (5.3.1) | Internal wiring of suitable size and type | | N/A |
| | Through wiring | | N/A |
| | - not delivered/ mounting instruction | | N/A |
| | - factory assembled | | N/A |
| | - socket outlet loaded (A) ..... : | | N/A |
| | - temperatures ..... : | (see Annex 2) | N/A |
| | Green-yellow for protective earth only | | N/A |
| 1.11 (5.3.1.1) | Internal wiring connected directly to fixed wiring | | N/A |
| | Cross-sectional area (mm²)..... : | (See Annex 1) | N/A |
| | Insulation thickness (mm) ..... : | Approved wire | N/A |
| | Extra insulation added where necessary | | N/A |
| 1.11 (5.3.1.2) | Internal wiring connected to fixed wiring via internal current-limiting device | | N/A |
| | Cross-sectional area (mm²)..... : | see Annex 1 | N/A |
| 1.11 (5.3.1.3) | Double or reinforced insulation for class II | | N/A |
| 1.11 (5.3.1.4) | Conductors without insulation | | P |
| 1.11 (5.3.1.5) | SELV/PELV current-carrying parts | | N/A |
| 1.11 (5.3.1.6) | Insulation thickness other than PVC or rubber | | N/A |
| 1.11 (5.3.2) | Sharp edges etc. | | P |
| | No moving parts of switches etc. | | P |
| | Joints, raising/lowering devices | | N/A |
| | Telescopic tubes etc. | | N/A |
| | No twisting over 360° | | P |
| 1.11 (5.3.3) | Insulating bushings: | | N/A |
| | - suitable fixed | | N/A |
| | - material in bushings | | N/A |
| | - material not likely to deteriorate | | N/A |
| | - cables with protective sheath | | N/A |
| 1.11 (5.3.4) | Joints and junctions effectively insulated | | N/A |
| 1.11 (5.3.5) | Strain on internal wiring | | N/A |
| 1.11 (5.3.6) | Wire carriers | | P |
| 1.11 (5.3.7) | Wire ends not tinned | | N/A |
| | Wire ends tinned: no cold flow | | P |
| **1.11 (5.4)** | **Test to determine suitability of conductors having a reduced cross-sectional area** | | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Under test the temperature of the luminaire wiring insulation not exceed the limits stated in Table 12.2 | | N/A |
| | No damage to luminaire wiring after test | | N/A |

| | | | |
|---|---|---|---|
| **1.12 (8)** | **PROTECTION AGAINST ELECTRIC SHOCK** | | P |
| 1.12 (8.2.1) | Live parts not accessible | | P |
| | Basic insulated parts not used on the outer surface without appropriate protection | | P |
| | Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires | | N/A |
| | Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires | | P |
| | Lamp and starter holders in portable and adjustable luminaires comply with double or reinforced insulation requirements | | N/A |
| | Basic insulation only accessible under lamp or starter replacement | | N/A |
| | Protection in any position | | P |
| | Double-ended tungsten filament lamp | | N/A |
| | Insulation lacquer not reliable | | P |
| | Double-ended high-pressure discharge lamp | | N/A |
| | Relevant warning according to 3.2.18 fitted to the luminaire | | N/A |
| 1.12 (8.2.2) | Portable luminaire adjusted in most unfavourable position | | N/A |
| 1.12 (8.2.3.a) | Class II luminaire: | | P |
| | - basic insulated metal parts not accessible during starter or lamp replacement | | N/A |
| | - basic insulation not accessible other than during starter or lamp replacement | | N/A |
| | - glass protective shields not used as supplementary insulation | | N/A |
| 1.12 (8.2.3.b) | BC lamp holder of metal in class I luminaires shall be connected to protective earth | | N/A |
| 1.12 (8.2.3.c) | SELV circuits with exposed current carrying parts: | | N/A |
| | Ordinary luminaire: | | N/A |
| | - voltage under load/ no-load AC (V)..... : | | N/A |
| | - voltage under load/ no-load DC (V)……..: | | N/A |
| | - interrupted DC voltage (V) ……..: | | N/A |
| | - touch current if applicable (mA) ..... : | | N/A |
| | One conductive part insulated if required | | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Other than ordinary luminaire: | | N/A |
| | - voltage under load/ no-load AC (V)..... : | | N/A |
| | - voltage under load/ no-load DC (V)……..…...: | | N/A |
| | - interrupted DC voltage (V) ……..: | | N/A |
| | Class III luminaire only for connection to SELV | | N/A |
| | Class III luminaire not provided with means for protective earthing | | N/A |
| 1.12 (8.2.3.d) | PELV circuits with exposed current carrying parts: | | N/A |
| | Ordinary luminaire: | | N/A |
| | - voltage under load/ no-load AC (V)..... : | | N/A |
| | - voltage under load/ no-load DC (V)…….....: | | N/A |
| | Other than ordinary luminaire: | | N/A |
| | - voltage under load/ no-load AC (V)..... : | | N/A |
| | - voltage under load/ no-load DC (V)……..…...: | | N/A |
| | One pole insulated if required | | N/A |
| 1.12 (8.2.4) | Portable luminaire has protection independent of supporting surface | | N/A |
| 1.12 (8.2.5) | Compliance with the standard test finger or relevant probe | | P |
| 1.12 (8.2.6) | Covers reliably secured | | N/A |
| 1.12 (8.2.7) | Luminaire other than below with capacitor > 0,5 μF not exceed 50 V 1 min after disconnection | | N/A |
| | Portable luminaire with capacitor > 0,1 μF (0.25) not exceed 34 V 1 s after disconnection | | N/A |
| | Other luminaires with capacitor > 0,1 μF (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection | | N/A |

| | | | |
|---|---|---|---|
| **1.13 (12)** | **ENDURANCE TEST AND THERMAL TEST** | | P |
| 1.13 (-) | If IP > IP 20 relevant test of (12.4), (12.5), (12.6) and (12.7) after (9.2) before (9.3) as specified in 1.14 | | — |
| **1.13 (12.2)** | **Selection of lamps and ballasts** | | **—** |
| | Lamp used according Annex B | (Lamp used see Annex 2) | — |
| | Control gear if separate and not supplied | (Control gear used see Annex 2) | — |
| **1.13 (12.3)** | **Endurance test** | | P |
| | a) mounting-position ..... : | Normal mounting position | — |
| | b) test temperature (°C)..... : | Ta+10°C | — |
| | c) total duration (h) ..... : | 240h | — |
| | d) supply voltage (V) ..... : | 264V | — |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | d) if not equipped with control gear, constant voltage/current (V) or (A) ..... : | LED module as delivered | — |
| 1.13 (12.3.1d) | d) Class III luminaires powered via information technology communication cable: | | N/A |
| | - voltage under normal operation (V)……..…...: | | — |
| | - voltage under abnormal operation (V)……..: | | — |
| | e) luminaire ceases to operate | | — |
| | f) luminaire with constant light output function | | N/A |
| 1.13 (12.3.2) | After endurance test: | | P |
| | - no part unserviceable | | P |
| | - luminaire not unsafe | | P |
| | - no damage to track system | | N/A |
| | - marking legible | | P |
| | - no cracks, deformation etc. | | P |
| **1.13 (12.4)** | **Thermal test (normal operation)** | (see Annex 2) | **P** |
| **1.13 (12.5)** | **Thermal test (abnormal operation)** | (see Annex 2) | **P** |
| **1.13 (12.6)** | **Thermal test (failed lamp control gear condition):** | | N/A |
| 1.13 (12.6.1) | Through wiring or looping-in wiring loaded by a current of (A) ..... : | | — |
| | - case of abnormal conditions ..... : | | — |
| | - electronic lamp control gear | | N/A |
| | - measured winding temperature (°C): at 1,1 Un .... : | | — |
| | - measured mounting surface temperature (°C) at 1,1 Un ..... : | | N/A |
| | - calculated mounting surface temperature (°C) ..... : | | N/A |
| | - track-mounted luminaires | | N/A |
| 1.13 (12.6.2) | Temperature sensing control | | N/A |
| | - case of abnormal conditions ..... : | | — |
| | - thermal link | | N/A |
| | - manual reset cut-out | | N/A |
| | - auto reset cut-out | | N/A |
| | - measured mounting surface temperature (°C) ..... : | | N/A |
| | - track-mounted luminaires | | N/A |
| **1.13 (12.7)** | **Thermal test (failed lamp control gear in plastic luminaires):** | | N/A |
| 1.13 (12.7.1) | Luminaire without temperature sensing control | | N/A |
| 1.13 (12.7.1.1) | Luminaire with fluorescent lamp ≤ 70W | | N/A |
| | Test method 12.7.1.1 or Annex W ..... : | | — |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Test according to 12.7.1.1: | | N/A |
| | - case of abnormal conditions ..... : | | — |
| | - Ballast failure at supply voltage (V) ..... : | | — |
| | - Components retained in place after the test | | N/A |
| | - Test with standard test finger after the test | | N/A |
| | Test according to Annex W: | | N/A |
| | - 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 Test Table 1.15 (13.2.1) | N/A |
| 1.13 (12.7.1.2) | Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA | | N/A |
| | - 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 Test Table 1.15 (13.2.1) | N/A |
| 1.13 (12.7.1.3) | Luminaire with short circuit proof transformers ≤ 10 VA | | N/A |
| | - case of abnormal conditions ..... : | | — |
| | - Components retained in place after the test | | N/A |
| | - Test with standard test finger after the test | | N/A |
| 1.13 (12.7.2) | Luminaire with temperature sensing control | | N/A |
| | - thermal link ..... : | Yes ☐ No ☐ | — |
| | - manual reset cut-out ..... : | Yes ☐ No ☐ | — |
| | - auto reset cut-out ..... : | Yes ☐ No ☐ | — |
| | - case of abnormal conditions ..... : | | — |
| | - highest measured temperature of fixing point/ exposed part (°C): ..... : | | — |
| | Ball-pressure test: ..... : | See Test Table 1.15 (13.2.1) | N/A |

| | | |
|---|---|---|
| **1.14 (9)** | **RESISTANCE TO DUST AND MOISTURE** | P |
| 1.14 (-) | If IP > IP 20 the order of tests as specified in clause 1.12 | N/A |
| 1.14 (9.2) | Tests for ingress of dust, solid objects and moisture: | P |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - classification according to IP ..... : | IP65 for luminaire,<br>IP44 for Plug | — |
| | - mounting position during test ..... : | Normal mounting position | — |
| | - fixing screws tightened; torque (Nm) ..... : | — | — |
| | - tests according to clauses ..... : | IP65 for luminaire (Clause 9.2.2 & 9.2.6)<br>IP44 for Plug (Clause 9.2.0 & 9.2.5) | — |
| | - electric strength test afterwards | | P |
| | a) no deposit in dust-proof luminaire | | N/A |
| | b) no talcum in dust-tight luminaire | IP65 for luminaire | P |
| | c) no trace of water on current-carrying parts or on insulation where it could become a hazard | IP65 for luminaire | P |
| | c.1) For luminaires without drain holes – no water entry | | N/A |
| | c.2) For luminaires with drain holes – no hazardous water entry | | N/A |
| | d) no water in watertight, pressure watertight, high pressure and temperature water jet-proof or high pressure and cold water jet-proof luminaire | | N/A |
| | e) no contact with live parts (IP 2X) | | N/A |
| | e) no entry into enclosure (IP 3X and IP 4X) | IP44 for Plug | P |
| | e) no contact with live parts through drain holes and ventilation slots (IP3X and IP4X) | | N/A |
| | f) no trace of water on part of lamp requiring protection from splashing water | | N/A |
| | g) no damage of protective shield or glass envelope | | N/A |
| 1.14 (9.3) | Humidity test 48 h | 25%; 93%R.H.; 48h | P |

| | | | |
|---|---|---|---|
| **1.15 (10)** | **INSULATION RESISTANCE AND ELECTRIC STRENGTH** | | P |
| 1.15 (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): | | N/A |
| | SELV/PELV: | | N/A |
| | - between current-carrying parts of different polarity : | | N/A |
| | - between current-carrying parts and mounting surface ..... : | | N/A |
| | - between current-carrying parts and metal parts of the luminaire ..... : | | N/A |
| | - between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts ..... : | | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - Insulation bushings as described in Section 5 ..... : | | N/A |
| | Other than SELV/PELV: | | P |
| | - between live parts of different polarity ..... : | 100MΩ [required 2MΩ] | P |
| | - between live parts and mounting surface ..... : | 100MΩ [required 2MΩ] | P |
| | - between live parts and metal parts ..... : | | N/A |
| | - between live parts of different polarity through action of a switch..... : | | N/A |
| | - between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... : | | N/A |
| | - Insulation bushings as described in Section 5 ..... : | | N/A |
| 1.15 (10.2.2) | Electric strength test | | P |
| | Dummy lamp | | N/A |
| | Luminaires with ignitors after 24 h test | | N/A |
| | Luminaires with manual ignitors | | N/A |
| | Test voltage (V): | | P |
| | SELV/PELV: | | N/A |
| | - between current-carrying parts of different polarity : | | N/A |
| | - between current-carrying parts and mounting surface ..... : | | N/A |
| | - between current-carrying parts and metal parts of the luminaire ..... : | | N/A |
| | - between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... : | | N/A |
| | - Insulation bushings as described in Section 5 ..... : | | N/A |
| | Other than SELV/PELV: | | P |
| | - between live parts of different polarity ..... : | 1554V | P |
| | - between live parts and mounting surface ..... : | 1554V | P |
| | - between live parts and metal parts ..... : | | N/A |
| | - between live parts of different polarity through action of a switch..... : | | N/A |
| | - between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... : | | N/A |
| | - Insulation bushings as described in Section 5 ..... : | | N/A |
| 1.15 (10.3) | Touch current (mA)……..: | Max. 0,08mA (limit 0,7mA) | P |
| | Protective conductor current (mA)..……: | Protective conductor current: Max. 0,25mA (limit 3,5mA) | P |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **1.16 (13)** | **RESISTANCE TO HEAT, FIRE AND TRACKING** | | P |
| 1.16 (13.2.1) | Ball-pressure test .....: | See Test Table 1.16 (13.2.1) | P |
| 1.16 (13.3.1) | Needle-flame test (10 s) .....: | See Test Table 1.16 (13.3.1) | P |
| 1.16 (13.3.2) | Glow-wire test (650°C) .....: | See Test Table 1.16 (13.3.2) | P |
| 1.16 (13.4) | Proof tracking test (IEC 60112) .....: | See Test Table 1.16 (13.4) | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| **1.8 (11.2)** | **TABLE I: Creepage distances and clearances** | | | | | | | **P** |
|---|---|---|---|---|---|---|---|---|
| | Minimum distances (mm) for a.c. up to 30 kHz sinusoidal voltages | | | | | | | P |
| | Applicable part of IEC 60598-1 Table 11.1.A*, 11.1.B* and 11.2* | | | | | | | P |
| | Insulation type ** | Measured clearance | Required | | Measured creepage | Required | | |
| | | | clearance | *Table | | creepage | *Table | |
| Distance 1: | B | Min. 5,4 | 3,0 | 11.1.B | Min. 5,4 | 5,0 | 11.1.A | |
| Working voltage (V) .....: | | | | | 240Vac | | | — |
| PTI .....: | | | | | < 600 ☒ | ≥ 600 ☐ | | — |
| Pulse voltage or $U_P$ if applicable (kV) .....: | | | | | N/A | | | — |
| Supplementary information: between different polarities of live parts L/N. | | | | | | | | |

**** Insulation type: B – Basic; S – Supplementary; R – Reinforced. See also IEC 60598-1 Annex M.**

| **1.8 (11.2)** | **TABLE II: Creepage distances and clearances** | | | | | | | **N/A** |
|---|---|---|---|---|---|---|---|---|
| **Minimum distances (mm) for a.c. higher than 30 kHz sinusoidal voltages** | | | | | | | | |
| **Applicable part of IEC 61347-1 Table 7 and 8* or IEC 60664-4 Table 1 and 2** | | | | | | | | |
| **Distances** | **Insulation type **** | **Measured clearance** | **Required** | | **Measured creepage** | **Required** | | |
| | | | **clearance** | ***Table** | | **creepage** | ***Table** | |
| Distance 1: | | | | | | | | |
| Working voltage (V).....: | | | | | | | | — |
| Frequency if applicable (kHz).....: | | | | | | | | — |
| PTI.....: | | | | | < 600 ☐ | ≥ 600 ☐ | | — |
| Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....: | | | | | | | | — |
| Supplementary information: | | | | | | | | |

**** Insulation type: B – Basic; S – Supplementary; R – Reinforced.**

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| **ANNEX 1** | **TABLE: Critical components information** | **P** |
|---|---|---|

| **Object / part No.** | Code | **Manufacturer/ trademark** | **Type / model** | **Technical data** | **Standard** | **Mark(s) of conformity[1)]** |
|---|---|---|---|---|---|---|
| Plug | B | Jintan Wanda Cord & Cable Co., Ltd | WD-01 | 16A, 250V, IP44 | VDE 0620-2-1 | VDE 40022498 |
| Supply cord | B | Zhongshan Guangli Electrical Appliance Co., Ltd. | H05VV-F | 2x1.0mm$^2$ | EN 50525-2-21 | VDE 40048913* |
| (Alternative) | B | Dong Guan Recheer ElectricWire & Cable Co., Ltd. | H05RN-F | 2x1.0mm$^2$ | EN 50525-2-21 | VDE 40015173* |
| (Alternative) | B | Ningbo Dabu Electric Appliance Co., Ltd. | H05RN-F | 2x1.0mm$^2$ | EN 50525-2-21 | VDE 40030691* |
| (Alternative) | B | Guangdong Rifeng Electrical Cable Co.,Ltd. | H05RN-F | 2x1.0mm$^2$ | EN 50525-2-21 | VDE 40015999* |
| (Alternative) | B | Chau's Electrical Co., Ltd. | H05RN-F | 2x1.0mm$^2$ | EN 50525-2-21 | VDE 40016331* |
| (Alternative) | B | Dong Guan Ever UnitedElectric Wire & Cable Co., Ltd. | H05RN-F | 2x1.0mm$^2$ | EN 50525-2-21 | VDE 40016757* |
| (Alternative) | B | Dong Guan Ever UnitedElectric Wire & Cable Co., Ltd. | H05RN-F | 2x1.0mm$^2$ | EN 50525-2-21 | VDE 40016378* |
| Plastic enclosure | B | Teijin Limited Resin And Plastic | LN-1250G | V-0, 125°C | IEC/EN 60598-1 IEC/EN 60598-2-1 | Tested with appliance and UL E50075 |
| (Alternative) | B | LOTTE CHEMICAL CORPORATION | PC-1100U | V-0, 125°C | IEC/EN 60598-1 IEC/EN 60598-2-1 | Tested with appliance and UL E85371 |
| External driver input connector | B | Shenzhen Lilutong Connector Corp., Ltd. | LLT-M16-15xxxyzuws series; LLT-M16-15xxxy3sY series | IP67, 105°C, 250V, 15A, Poles: 2+PE IP66 tested with appliance | EN 61984 | TUV SUD No. B 090230 0010 Rev.00 |
| Alternative | D | Shenzhen Weichat Technology Co., Ltd. | EW-M16-3P | IP68, 105°C, 400V, 17.5A, Poles: 2+PE IP66 tested with appliance | EN 60998-1; EN 60998-2-1; EN 62444 | TUV SUD No. B 104275 0001 Rev.01 |
| LED PCB | B | Shenzhen ZYD Electronic Technology Co Ltd | ZYD-L | V-0, 130°C, metal base | IEC/EN 60598-1 IEC/EN 60598-2-1 | Tested with appliance and UL E483786 |

| IEC 60598-2-1 | | | | | | |
|---|---|---|---|---|---|---|
| Clause | Requirement + Test | | | Result - Remark | | Verdict |
| (Alternative) | B | ShenZhen HYY Sci-Tech Co Ltd | HYY-01 | V-0, 130°C, metal base | IEC/EN 60598-1 IEC/EN 60598-2-1 | Tested with appliance and UL E467377 |
| (Alternative) | B | GOLDENMAX INTERNATIONAL TECHNOLOGY (ZHUHAI) LTD | GF432 | V-0; 130oC | IEC/EN 60598-1 IEC/EN 60598-2-1 | Tested with appliance and UL E330731 |
| (Alternative) | B | SHENZHEN YIFANG ELECTRONICS CO LTD | YF-5 | V-0; 130oC | IEC/EN 60598-1 IEC/EN 60598-2-1 | Tested with appliance and UL E320003 |
| (Alternative) | B | INTERNATIONAL LAMINATE MATERIAL LTD | DLC3 | V-0; 130oC | IEC/EN 60598-1 IEC/EN 60598-2-1 | Tested with appliance and UL E134893 |
| LEDs | B | MLS | E2835UX20(A) | Vf: 2,8-3.7VDC; If: 60mA CCT: 2700-6500K | IEC TR 62778 | Tested with appliance |
| Diffuser | B | Trinseo (Hong Kong) LTD | EMERGE PC 8830-(m) LT(f1) | PC, V-0, 125°C, Min.3mm thick. | UL 94 | Tested with appliance and E206114 |
| Diffuser | B | BASF CORP | 130FR(+)(f1)(t7) | PET, V-0, 125°C, Min.3mm thick. | UL 94 | Tested with appliance and E36632 |

Supplementary information:

[1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.

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 authorised by the test house

C - Integrated component tested together with the appliance

D - Alternative component

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| **ANNEX 2** | **TABLE: Thermal tests of Section 12** | | **P** |
|---|---|---|---|
| | Type reference ..... : | LL.IP67.180.XY | — |
| | Lamp used..... : | -- | — |
| | Lamp control gear used..... : | -- | — |
| | Mounting position of luminaire : | As normal use | — |
| | Supply wattage (W) : | -- | — |
| | Supply current (A) : | -- | — |
| | Temperatures in test 1 - 4 below are corrected for ta (°C) ..... : | 45 | — |
| | - abnormal operating mode ..... : | a. short-circuit one LED;<br>b. open-circuit one LED;<br>c. short-circuit LED driver output | — |
| 1.12 (12.4) | - test 1: rated voltage ..... : | -- | — |
| | - test 2: 1,06 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current ..... : | 1.06X220Vac<br>I: 2.674A; P: 592.8W; PF0.947<br>1.06X240Vac<br>I: 3.167A; P: 769.8W; PF0.955 | — |
| | - test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... : | -- | — |
| | Through wiring or looping-in wiring loaded by a current of A during the test ..... : | -- | — |
| 1.12 (12.5) | - test 4: 1,1 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current ..... : | -- | — |

Temperature measurements (°C)

| Part | Ambient | Cl. 12.4 – normal | | | | | Cl. 12.5 – abnormal | |
|---|---|---|---|---|---|---|---|---|
| | | test 1 | test 2 | | test 3 | limit | test 4 | limit |
| | | | 1 | 2 | | | | |
| Plug | 45 | -- | 46.5 | 47.5 | -- | 90 | -- | -- |
| Input wire | 45 | -- | 45.7 | 46.1 | -- | 90 | -- | -- |
| External driver input connector | 45 | -- | 48.2 | 48.9 | -- | 100 | -- | -- |
| Plastic enclosure | 45 | -- | 46.3 | 47.8 | -- | 125 | -- | -- |
| Output wire near LED | 45 | -- | 50.1 | 52.3 | -- | 90 | -- | -- |
| PWB near LED | 45 | -- | 65.4 | 68.7 | -- | 130 | -- | -- |
| Lens | 45 | -- | 62.7 | 64.2 | -- | 130 | -- | -- |
| Marking | 45 | -- | 51.5 | 50.4 | -- | 90 | -- | -- |
| Mounting surface | 45 | -- | 47.4 | 48.3 | -- | 90 | -- | -- |
| Ambient | 45 | -- | 45.0 | 45.0 | -- | -- | -- | -- |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| Supplementary information:-- | | | |

| 1.16 (13.2.1) | TABLE: Ball Pressure Test of Thermoplastics | | | P |
|---|---|---|---|---|
| Allowed impression diameter (mm): | | ≤2.0 | | |
| **Object/ Part No./ Material** | **Manufacturer/ trademark** | **Test temperature (°C )** | **Impression diameter (mm)** | |
| LED PCB | See Annex A | 125 | 1.51 | |
| Plastic lens | See Annex A | 125 | 1.32 | |
| Plastic enclosure | See Annex A | 125 | 1.35 | |
| Supplementary information: -- | | | | |

| 1.16 (13.3.1) | TABLE: Needle-Flame Test(IEC60695-11-5)) | | | | P |
|---|---|---|---|---|---|
| **Object/ Part No./ Material** | **Manufacturer/ trademark** | **Duration of application of test flame (s)** | **Ignition of specified layer (Yes/No)** | **Duration of burning(s)** | **Verdict** |
| LED Driver PCB | See Annex A | 10s | No | 0s | P |
| Plastic lens | See Annex A | 10s | No | 0s | P |
| Plastic enclosure | See Annex A | 10s | No | 0s | P |
| Supplementary information: -- | | | | | |

| 1.16 (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 Driver PCB | See Annex A | No | 0 | P |
| Plastic lens | See Annex A | No | 0 | P |
| Plastic enclosure | See Annex A | No | 0 | P |
| 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): | | | | Yes |
| Supplementary information: -- | | | | |

| 1.16 (13.4) | TABLE: Proof tracking test (IEC 60112) | | | | N/A |
|---|---|---|---|---|---|
| **Test voltage PTI ..... :** | | **175V** | | | |
| **Object/ Part No./ Material** | **Manufacturer/ trademark** | **Withstand 50 drops without failure on three places or on three specimens** | | | **Verdict** |
| | | | | | |
| **Supplementary information:** | | | | | |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | **Screw terminals (part of the luminaire)** | | **N/A** |
| **(14)** | **SCREW TERMINALS** | | **N/A** |
| (14.2) | Type of terminal..... : | VDE approved | — |
| | Rated current (A)..... : | | — |
| (14.3.2.1) | One or more conductors | | N/A |
| (14.3.2.2) | Special preparation | | N/A |
| (14.3.2.3) | Terminal size | | N/A |
| | Cross-sectional area (mm²)..... : | | N/A |
| (14.3.3) | Conductor space (mm)..... : | | N/A |
| (14.4) | Mechanical tests | | N/A |
| (14.4.1) | Minimum distance | | N/A |
| (14.4.2) | Cannot slip out | | N/A |
| (14.4.3) | Special preparation | | N/A |
| (14.4.4) | Nominal diameter of thread (metric ISO thread) . : | | N/A |
| | External wiring | | N/A |
| | No soft metal | | N/A |
| (14.4.5) | Corrosion | | N/A |
| (14.4.6) | Nominal diameter of thread (mm) ..... : | | N/A |
| | Torque (Nm) ..... : | | N/A |
| (14.4.7) | Between metal surfaces | | N/A |
| | Lug terminal | | N/A |
| | Mantle terminal | | N/A |
| | Pull test; pull (N) ..... : | | N/A |
| (14.4.8) | Without undue damage | | N/A |

| IEC 60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | **screwless terminals (part of the luminaire)** | | N/A |

| | | | |
|---|---|---|---|
| **(15)** | **SCREWLESS TERMINALS** | | **N/A** |
| (15.2) | Type of terminal.....: | | — |
| | Rated current (A).....: | | — |
| (15.3.1) | Material | | N/A |
| (15.3.2) | Clamping | | N/A |
| (15.3.3) | Stop | | N/A |
| (15.3.4) | Unprepared conductors | | N/A |
| (15.3.5) | Pressure on insulating material | | N/A |
| (15.3.6) | Clear connection method | | N/A |
| (15.3.7) | Clamping independently | | N/A |
| (15.3.8) | Fixed in position | | N/A |
| (15.3.10) | Conductor size | | N/A |
| | Type of conductor | | N/A |
| (15.5.1) | Terminals internal wiring | | N/A |
| (15.5.1.1) | Pull test spring-type terminals (4 N, 4 samples)….: | | N/A |
| (15.5.1.2) | Pull test pin or tab terminals (4 N, 4 samples)……: | | N/A |
| | Insertion force not exceeding 50 N | | N/A |
| (15.5.1.2) | Permanent connections: pull-off test (20 N) | | N/A |
| (15.6) | Electrical tests | | |
| | Voltage drop (mV) after 1 h (4 samples).....: | | N/A |
| | Voltage drop of two inseparable joints | | N/A |
| | Number of cycles.....: | | — |
| | Voltage drop (mV) after 10th alt. 25th cycle (4 samples).....: | | N/A |
| | Voltage drop (mV) after 50th alt. 100th cycle (4 samples).....: | | N/A |
| | After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples) .....: | | N/A |
| | After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples) .....: | | N/A |
| (15.7) | Terminals external wiring | | N/A |
| | Terminal size and rating | | N/A |
| (15.8.1) | Pull test spring-type terminals or welded connections (4 samples); pull (N) .....: | | N/A |
| | Pull test pin or tab terminals (4 samples); pull (N) .....: | | N/A |
| (15.9) | Contact resistance test | | N/A |
| | Voltage drop (mV) after 1 h | | N/A |

| IEC 60598-2-1 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Clause | Requirement + Test | | | | | | Result - Remark | | | Verdict |
| terminal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| voltage drop (mV) | | | | | | | | | | |
| | Voltage drop of two inseparable joints | | | | | | | | | N/A |
| | Voltage drop after 10th alt. 25th cycle | | | | | | | | | N/A |
| | 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 | | | | | | | | | N/A |
| | 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 | | | | | | | | | N/A |
| | 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 | | | | | | | | | N/A |
| | Max. allowed voltage drop (mV) ..... : | | | | | | | | | — |
| terminal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| voltage drop (mV) | | | | | | | | | | |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **4 (4)** | **GENERAL REQUIREMENTS** | | P |
| - (4) | Insulation materials for double or reinforced insulation according requirements in Annex N of IEC 61347-1 | (see Annex N) | N/A |
| - (4) | Compliance of independent controlgear enclosure with IEC 60 598-1 | | N/A |
| - (4) | Built-in electronic controlgear with double or reinforced insulation comply with Annex O of IEC 61347-1 | (see Annex Q) | N/A |
| 4 (4) | SELV controlgear comply with Annex I of this part 2 and Annex L of IEC 61347-1 | (see Annex L)<br>Dimming circuit | N/A |
| 4 (-) | Transformer comply with IEC 61558 | | N/A |
| | Dielectric strength test of insulated winding wires is limited to 3 kV if input voltage ≤ 300 V | | N/A |

| | | | |
|---|---|---|---|
| **6 (6)** | **CLASSIFICATION** | | **P** |
| | Built-in controlgear ..... : | Yes ☒ No ☐ | |
| | Independent controlgear ..... : | Yes ☐ No ☒ | |
| | Integral controlgear ..... : | Yes ☐ No ☒ | |
| 6 (-) | Auto-wound controlgear ..... : | Yes ☐ No ☒ | |
| | Separating controlgear ..... : | Yes ☐ No ☒ | |
| | Isolating controlgear ..... : | Yes ☒ No ☐ | |
| | SELV controlgear ..... : | Yes ☐ No ☒ | |

| | | | |
|---|---|---|---|
| **7 (7)** | **MARKING** | | N/A |
| **7.1 (7.1)** | **Mandatory markings** | | N/A |
| | a) mark of origin | | N/A |
| | b) model number or type reference | | N/A |
| | c) symbol for independent controlgear, if applicable | | N/A |
| | d) correlation between interchangeable parts and controlgear marked | | N/A |
| | e) rated supply voltage (V) | | N/A |
| | supply frequency (Hz) | | N/A |
| | supply current (A) | | N/A |
| | f) earthing symbol | | N/A |
| | k) wiring diagram | | N/A |
| | l) value of tc | | N/A |
| | m) symbol for declared temperature | | N/A |
| | t) LUM earthing symbol | | N/A |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | u) if not SELV maximum working voltage $U_{out}$ between: | | N/A |
| | - output terminals (V) ..... : | | N/A |
| | - output terminals and earth (V) ..... : | | N/A |
| 7.1 (-) | Constant voltage type: | Yes ☐ No ☒ | |
| | - rated output power $P_{rated}$ (W) ..... : | | N/A |
| | - rated output voltage $U_{rated}$ (V) ..... : | | N/A |
| | Constant current type: | Yes ☒ No ☐ | |
| | - rated output power $P_{rated}$ (W) ..... : | | N/A |
| | - rated output current $I_{rated}$ (A) ..... : | | N/A |
| | Indication if for LED modules only | | N/A |
| 7.1 (7.2) | Marking durable and legible | | N/A |
| | Rubbing 15 s water, 15 s petroleum; marking legible | | N/A |
| **7.2 (7.1)** | **Information to be provided, if applicable** | | N/A |
| | h) declaration of protection against accidental contact | | N/A |
| | i) cross-section of conductors (mm²) | | N/A |
| | j) number, type and wattage of lamp(s) | | N/A |
| | s) SELV symbol | | N/A |
| 7.2 (-) | - declaration of mains connected windings | | N/A |

| | | | |
|---|---|---|---|
| **8 (10)** | **PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS** | | N/A |
| - (10.1) | Controlgear protected against accidental contact with live parts | | N/A |
| - (A2) | Voltage measured with 50 k | (see Annex A) | N/A |
| - (A3) | Voltage > 35 V peak or > 60 V d.c. or protective impendance device | (see Annex A) | N/A |
| - (10.1) | Lacquer or enamel not used for protection or insulation | | N/A |
| | Adequate mechanical strength on parts providing protection | | N/A |
| - (10.2) | Capacitors > 0,5 μF: voltage after 1 min (V): < 50 V : ..... | | N/A |
| **- (10.3)** | **Controlgear providing SELV** | | N/A |
| | Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear | | N/A |
| | No connection between output circuit and the body or protective earthing circuit | | N/A |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts | | N/A |
| | SELV outputs separated by at least basic insulation | | N/A |
| | ELV conductive parts insulated as live parts | | N/A |
| | Tests according Annex L of IEC 61347-1 | (see Annex L) | N/A |
| **- (10.4)** | **Accessible conductive parts in SELV circuits** | | N/A |
| | Output voltage under load ≤ 25 V r.m.s. or ≤ 60 V d.c. | | N/A |
| | If output voltage > 25 V r.m.s. or > 60 V d.c.;<br>No load output ≤ 35 V peak or ≤ 60 V d.c and touch current does not exceed 0,7 mA (peak) or 2 mA d.c. .....: | | N/A |
| | One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V | | N/A |
| | Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor | | N/A |
| | Y1 or Y2 capacitors comply with IEC 60384-14 | | N/A |
| | Resistors comply with test (a) in 14.1 of IEC 60065 | | N/A |
| **9 (8)** | **TERMINALS** | | **N/A** |
| **- (8.1)** | **Integral terminals** | | **N/A** |
| | Screw terminals according section 14 of IEC 60598-1: | | N/A |
| | Separately approved; component list | (see Annex 1) | N/A |
| | Part of the controlgear | (see Annex 2) | N/A |
| | Screwless terminals according section 15 of IEC 60598-1: | | N/A |
| | Separately approved; component list | (see Annex 1) | N/A |
| | Part of the controlgear | (see Annex 3) | N/A |
| **- (8.2)** | **Terminals other than integral terminals** | | N/A |
| | Comply with relevant IEC standard | (see Annex 1) | N/A |
| | Suit the conditions | | N/A |
| | Satisfy additional relevant requirements of this standard | | N/A |
| **10 (9)** | **PROVISION FOR PROTECTIVE EARTHING** | | **N/A** |
| **- (9.1)** | **Provisions for protective earthing** | | N/A |
| | Terminal complying with clause 8 | | N/A |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Locked against loosening and not possible to loosen by hand | | N/A |
| | Not possible to loosen clamping means unintentionally on screwless terminals | | N/A |
| | All parts of material minimizing the danger of electrolytic corrosion | | N/A |
| | Made of brass or equivalent material | | N/A |
| | Contact surface bare metal | | N/A |
| | Test according 7.2.3 of IEC 60598-1 | | N/A |
| **- (9.2)** | **Provision for functional earthing** | | N/A |
| | Comply with clause 8 and 9.1 | | N/A |
| | Functional earth insulated from live parts by double or reinforced insulation | | N/A |
| **- (9.3)** | **Lamp controlgear with conductors for protective earthing by tracks on printed circuit board** | | N/A |
| | Test with a current of 25 A between earthing terminal or earthing contact and each of the accessible metal parts;<br>measured resistance (Ω) at ≥ 10 A according 7.2.3 of IEC 60598-1: < 0,5 Ω ..... : | | N/A |
| **- (9.4)** | **Earthing of built-in lamp controlgear** | | N/A |
| | Earth by means of fixing to earthed metal of luminaire in compliance of 7.2 of IEC 60598-1 | | N/A |
| | Earthing terminal only for earthing the built-in controlgear | | N/A |
| **- (9.5)** | **Earthing via independent controlgear** | | N/A |
| - (9.5.1) | Earth connection to other equipment | | N/A |
| | Looping or through connection, conductor min. 1,5 mm² and of copper or equivalent | | N/A |
| | Protective earthing wires in line with 5.3.1.1 and clause 7 of IEC 60598-1 | | N/A |
| - (9.5.2) | Earthing of the lamp compartments powered via the independent lamp controlgear | | N/A |
| | Test with a current of 25 A between input and output earth terminals; measured resistance (Ω) between earthing terminal or earthing contact and each of the accessible metal parts at ≥ 10 A according 7.2.3 of IEC 60598-1: < 0,5 Ω ..... : | | N/A |
| | Output earthing terminal marked as in 7.1 t) of IEC 61347-1 | | N/A |

| | | |
|---|---|---|
| **11 (11)** | **MOISTURE RESISTANCE AND INSULATION** | **P** |
| - (11) | After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance: | P |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | For basic insulation ≥ 2 MΩ ..... : | > 100 MΩ | P |
| | For double or reinforced insulation ≥ 4 MΩ ..... : | > 100 MΩ | P |
| | Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1 | | N/A |
| **12 (12)** | **ELECTRIC STRENGTH** | | **P** |
| - (12) | Immediately after clause 11 electric strength test for 1 min | | P |
| | Basic insulation for SELV, test voltage 500 V | | N/A |
| | Working voltage ≤ 50 V, test voltage 500 V | | N/A |
| | Working voltage > 50 V ≤ 1000 V, test voltage (V): | | P |
| | Basic insulation, 2U + 1000 V | 1500V | P |
| | Supplementary insulation, 2U + 1000 V | | N/A |
| | Double or reinforced insulation, 4U + 2000 V | 3000V | P |
| | 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/A |
| **14 (14)** | **FAULT CONDITIONS** | | **P** |
| - (14.1) | When operated under fault conditions the controlgear: | | P |
| | - does not emit flames or molten material | | P |
| | - does not produce flammable gases | | P |
| | - protection against accidental contact not impaired | | P |
| | Thermally protected controlgear does not exceed the marked temperature value | | N/A |
| | Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected | (see appended table) | P |
| - (14.2) | Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (after any reduction in 14.2 - 14.5) | (see appended table) | N/A |
| - (14.3) | Short-circuit or interruption of semiconductor devices | (see appended table) | N/A |
| - (14.4) | Short-circuit across insulation consisting of lacquer, enamel or textile | (see appended table) | N/A |
| - (14.5) | Short-circuit across electrolytic capacitors | (see appended table) | P |
| | Short-circuit or interruption of SPDs | (see appended table) | P |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 14 (-) | Reversed voltage polarity if d.c. supplied control gear | (see appended table) | P |
| - (14.6) | After the tests has been carried out on three samples: | | P |
| | The insulation resistance ≥ 1 MΩ ..... : | > 100 MΩ | P |
| | No flammable gases | | P |
| | No accessible parts have become live | | P |
| | During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite | | P |
| - (14.7) | Relevant fault condition tests with high-power a.c. supply and in turn to a d.c. supply | | -- |
| 14 (-) | Temperature declared thermally protected lamp controlgear fulfil requirements in Annex C | | N/A |
| **15 (-)** | **TRANSFORMER HEATING** | | **P** |
| **15.1** | **General** | | P |
| | Transformer comply with clause L.6 and L.7 of IEC 61347-1 | | P |
| | Output voltage of SELV controlgear not exceed limits in 10.4 of IEC 61347-1 during the test of 15.1 and 15.2 | | P |
| **15.2 (-)** | **Normal operation** | | P |
| | Comply with clause L.6 of IEC 61347-1 | | P |
| **15.3 (-)** | **Abnormal operation** | | **P** |
| | Comply with clause L.7 of IEC 61347-1 | | P |
| | Double LED modules or equivalent load connected in parallel to the output terminals of constant voltage type | | N/A |
| | Double LED modules or equivalent load connected in serial to the output terminals of constant current type | | N/A |
| 15 (-) | During and at the end of the tests no defect impairing safety, nor any smoke or flammable gases produced | | P |
| **16 (15)** | **CONSTRUCTION** | | **P** |
| **- (15.1)** | **Wood, cotton, silk, paper and similar fibrous material** | | **P** |
| | Wood, cotton, silk, paper and similar fibrous material not used as insulation | | P |
| **- (15.2)** | **Printed circuits** | | **P** |
| | Printed circuits used as internal connections complies with clause 14 | | P |
| **- (15.3)** | **Plugs and socket-outlets used in SELV or ELV circuits** | | N/A |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | No dangerous compatibility between output socket-outlet and a plug for socket-outlets for input circuit in relation to installation rules, voltages and frequencies | | N/A |
| | Plugs and socket-outlets for SELV comply with IEC 60906-3 and IEC 60884-2-4 | | N/A |
| | Plugs and socket-outlets for SELV ≤ 3 A, ≤ 25 V r.m.s. or ≤ 60 V d.c. and ≤ 72 W comply with IEC 60906-3 and IEC 60884-2-4 or: | | N/A |
| | - plugs not able to enter socket-outlets of other standardised system | | N/A |
| | - socket-outlets not admit plugs of other standardised system | | N/A |
| | - socket-outlets without protective earth | | N/A |
| **- (15.4)** | **Insulation between circuits and accessible parts** | | P |
| - (15.4.2) | SELV circuits | | N/A |
| | Source used to supply SELV circuits: | | N/A |
| | - safety isolating transformer in accordance with relevant part 2 of IEC 61558 | | N/A |
| | - controlgear providing SELV in accordance with relevant part 2 of IEC 61347 | | N/A |
| | - another source | | N/A |
| | Voltage in the circuit not higher than ELV | | N/A |
| | SELV circuits insulated from LV by double or reinforced insulation | | N/A |
| | SELV circuits insulated from non SELV circuits by double or reinforced insulation | | N/A |
| | SELV circuits insulated from FELV circuits by supplementary insulation | | N/A |
| | SELV circuits insulated from other SELV circuits by basic insulation | | N/A |
| | SELV circuits insulated from accessible conductive parts according Table 6 in 15.4.5 | | N/A |
| - (15.4.3) | FELV circuits | | N/A |
| | Source used to supply FELV circuits: | | N/A |
| | - separating transformer in accordance with relevant part 2 of IEC 61558 | | N/A |
| | - separating controlgear providing basic insulation between input and output circuits in accordance with relevant part 2 of IEC 61347 | | N/A |
| | - another source | | N/A |
| | - source in circuits separated by the LV supply by basic insulation | | N/A |
| | Voltage in the circuit not higher than ELV | | N/A |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | FELV circuits insulated from LV supply by at least basic insulation | | N/A |
| | FELV circuits insulated from other FELV circuits if functional purpose | | N/A |
| | FELV circuits insulated from accessible conductive parts according Table 6 in 15.4.5 | | N/A |
| | Plugs and socket-outlets for FELV system comply with: | | N/A |
| | - plugs not able to enter socket-outlets of other voltage systems | | N/A |
| | - socket-outlets not admit plugs of other voltage systems | | N/A |
| | - socket-outlets have a protective conductor contact | | N/A |
| - (15.4.4) | Other circuits | | N/A |
| | Insulation between circuits other than SELV or FELV and accessible conductive parts in according Table 6 in 15.4.5. | | N/A |
| - (15.4.5) | Insulation between circuits and accessible conductive parts | | N/A |
| | Accessible conductive parts insulated from active parts of electric circuits by insulating according Table 6 | | N/A |
| | Requirements for Class II construction with equipotential bonding for protection against indirect contact with live parts: | | N/A |
| | - all conductive parts are connected together | | N/A |
| | - conductive parts are reliably connected together according test of IEC 60598-1 cl. 7.2.3 | | N/A |
| | - conductive parts comply with requirements of Annex A in case of insulation fault | | N/A |

| | | | |
|---|---|---|---|
| **17 (16)** | **CREEPAGE DISTANCES AND CLEARANCES** | | **P** |
| **- (16.1)** | **General** | | P |
| | Creepage distances and clearances according to 16.2 and 16.3 | | N/A |
| | Controlgears providing SELV comply with additional requirements in Annex L | | N/A |
| | Insulating lining of metallic enclosures | No enclosures | N/A |
| | Controlgear protected against pollution comply with Annex P | (see Annex P) | N/A |
| **- (16.2)** | **Creepage distances** | | **P** |
| - (16.2.2) | Minimum creepage distances for working voltages | | P |
| | Creepage distances according to Table 7 | (see appended table) | P |
| - (16.2.3) | Creepage distances for working voltages with frequencies above 30 kHz | | N/A |
| | Creepage distances according to Table 8 | (see appended table) | N/A |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **- (16.3)** | **Clearances** | | P |
| - (16.3.2) | Clearances for working voltages | | P |
| | Clearances distances according to Table 9 | (see appended table) | P |
| - (16.3.3) | Clearances for ignition voltages and working voltages with higher frequencies | | N/A |
| | Clearances distances for basic or supplementary insulation according to Table 10 | (see appended table) | N/A |
| | Clearances distances for reinforced insulation according to Table 11 | (see appended table) | N/A |

| | | | |
|---|---|---|---|
| **18 (17)** | **SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS** | | **P** |
| | Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1) | | N/A |
| **(4.11)** | **Electrical connections** | | N/A |
| (4.11.1) | Contact pressure | | N/A |
| (4.11.2) | Screws: | | N/A |
| | - self-tapping screws | | N/A |
| | - thread-cutting screws | | N/A |
| (4.11.3) | Screw locking: | | N/A |
| | - spring washer | | N/A |
| | - rivets | | N/A |
| (4.11.4) | Material of current-carrying parts | | P |
| (4.11.5) | No contact to wood or mounting surface | | P |
| (4.11.6) | Electro-mechanical contact systems | | N/A |
| **(4.12)** | **Mechanical connections and glands** | | N/A |
| (4.12.1) | Screws not made of soft metal | | N/A |
| | Screws of insulating material | | N/A |
| | Torque test: torque (Nm); part..... : | | N/A |
| | Torque test: torque (Nm); part..... : | | N/A |
| | Torque test: torque (Nm); part..... : | | N/A |
| (4.12.2) | Screws with diameter < 3 mm screwed into metal | | N/A |
| (4.12.4) | Locked connections: | | N/A |
| | - fixed arms; torque (Nm) ..... : | | N/A |
| | - lampholder; torque (Nm) ..... : | | N/A |
| | - push-button switches; torque 0,8 Nm ..... : | | N/A |
| (4.12.5) | Screwed glands; force (Nm)..... : | | N/A |

| | | | |
|---|---|---|---|
| **19 (18)** | **RESISTANCE TO HEAT, FIRE AND TRACKING** | | **P** |
| - (18.1) | Ball-pressure test ..... : | See Test Table 19 (18.1) | P |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| - (18.2) | Test of printed boards ..... : | V-0, UL approved PCB | P |
| - (18.3) | Glow-wire test ..... : | See Test Table 19 (18.3) | P |
| - (18.4) | Needle flame test ..... : | See Test Table 19 (18.4) | P |
| - (18.5) | Tracking test ..... : | See Test Table 19 (18.5) | N/A |

| | | | |
|---|---|---|---|
| **20 (19)** | **RESISTANCE TO CORROSION** | | N/A |
| | - test according 4.18.1 of IEC 60598-1 | | N/A |
| | - adequate varnish on the outer surface | | N/A |

| | | | |
|---|---|---|---|
| **21 (-)** | **MAXIMUM WORKING VOLTAGE ($U_{out}$) IN ANY LOAD CONDITION** | | N/A |
| | Not exceed declared maximum working voltage $U_{out}$ in any load condition | | N/A |

| **14** | **TABLE: tests of fault conditions** | | **P** |
|---|---|---|---|
| Part | Simulated fault | | Hazard |
| R14 | SC | Unit shut down immediately, Can be recoverable. | NO |
| D81 | SC | Unit shut down immediately, Can be recoverable. | NO |
| Supplementary information:<br>*SC for short-circuit, OC for open-circuit | | | |

| **17 (16)** | **TABLE: clearance and creepage distance measurements (mm)** | | | | | | **P** |
|---|---|---|---|---|---|---|---|
| **Applicable part of IEC 61347-1 Table 7 – 11*** | | | | | | | |
| **Distances** | **Insulation type **** | **Measured clearance** | **Required** | | **Measured creepage** | **Required** | |
| | | | **clearance** | ***Table** | | **creepage** | ***Table** |
| Distance 1: | B | 2.6 | 3.0 | 9 | 3.7 | 5.0 | 7 |
| Working voltage (V) .....: | | | | | See Supplementary information | | — |
| Frequency if applicable (kHz) .....: | | | | | See Supplementary information | | — |
| PTI .....: | | | | | < 600 ☒ ≥ 600 ☐ | | — |
| Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....: | | | | | See Supplementary information | | — |
| Pulse voltage if applicable (kV) .....: | | | | | -- | | — |
| Supplementary information:<br>Distance 1: between different polarities of L and N; | | | | | | | |

**** Insulation type: B – Basic; S – Supplementary; R – Reinforced**

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **(A)** | **ANNEX A - TEST TO ESTABLISH WHETHER A CONDUCTIVE PART IS A LIVE PART WHICH MAY CAUSE AN ELECTRIC SHOCK** | | N/A |
| (A.1) | Comply with A.2 or A.3 | | N/A |
| (A.2) | Voltage ≤ 35 V peak or ≤ 60 V d.c .....: | | N/A |
| (A.3) | If voltage measured according Clause A.2 exceeds the limit value;<br>touch current does not exceed 0,7 mA (peak) or 2 mA d.c. .....: | | N/A |
| | Comply with Annex G.2 of IEC 60598-1 | | N/A |
| **(C)** | **ANNEX C – PARTICULAR REQUIREMENTS FOR ELECTRONIC LAMP CONTROLGEAR WITH MEANS OF PROTECTION AGAINST OVERHEATING** | | N/A |
| **(C3)** | **GENERAL REQUIREMENTS** | | N/A |
| (C3.1) | Thermal protection means integral with the convertor, protected against mechanical damage | | N/A |
| | Renewable only by means of a tool | | N/A |
| | If function depending on polarity, for cord-connected equipment protection means in both leads | | N/A |
| | Thermal links comply with IEC 60691 | | N/A |
| | Electrical controls comply with IEC 60730-2-3 | | N/A |
| (C3.2) | No risk of fire by breaking (clause C7) | | N/A |
| **(C5)** | **CLASSIFICATION** | | **N/A** |
| | a) automatic resetting type | | |
| | b) manual resetting type | | |
| | c) non-renewable, non-resetting type | | |
| | d) renewable, non-resetting type | | |
| | e) other type of thermal protection; description .. : | | |
| **(C6)** | **MARKING** | | N/A |
| (C6.1) | Symbol for temperature declared thermally protected ballasts | | N/A |
| (C6.2) | Declaration of the type of protection provided | | N/A |
| **(C7)** | **LIMITATION OF HEATING** | | N/A |
| **(C7.1)** | **Preselection test:** | | N/A |
| | Test sample placed for at least 12 h in an oven having temperature ($t_c$ - 5) K | | N/A |
| | No operation of the protection device | | N/A |
| **(C7.2)** | **Functioning of protection means:** | | N/A |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Normal operation of the sample in a test enclosure according to Annex D at an ambient temperature such that ($t_c$ +0; -5) °C is obtained | | N/A |
| | No operation of the protection device | | N/A |
| | Introducing of the most onerous test condition determined during test of clause 14.2 to 14.5 | | N/A |
| | Output of windings connected to the mains supply short-circuited, and other part of the controlgear operated under normal conditions | | N/A |
| | Increasing of the current through the windings continuously until operation of the protection means | | N/A |
| | Continuous measuring of the highest surface temperature | | N/A |
| | Ballasts according to C5 a) or C5 e) operated until stable conditions are achieved | | N/A |
| | Automatic-resetting thermal protectors working 3 times | | N/A |
| | Ballasts according to C5 b) working 6 times | | N/A |
| | Ballasts according to C5 c) and C5) d) working once | | N/A |
| | Highest temperature does not exceed the marked value | | N/A |
| | Any overshoot of 10% over the marked value within 15 min | | N/A |
| | After 15 min value not exceed marked value | | N/A |
| **(D)** | **ANNEX D – REQUIREMENTS FOR CARRY OUT THE HEATING TESTS OF THERMALLY PROTECTED LAMP CONTROLGEAR** | | N/A |
| | Tests in C7 performed in accordance with Annex D, if applicable | | N/A |
| **(F)** | **ANNEX F – DRAUGHT-PROOF ENCOSURE** | | N/A |
| | Draught-proof enclosure in accordance with the description | | N/A |
| | Dimensions of the enclosure | | N/A |
| | Other design; description | | N/A |
| **(H)** | **ANNEX H - TESTS** | | N/A |
| | All tests performed in accordance with the advice given in Annex H, if applicable | | N/A |
| **I (L)** | **ANNEX I IN THIS PART 2 – PARTICULAR ADDITIONAL REQUIREMENTS FOR SELV D.C. OR A.C. SUPPLIED ELECTRONIC CONTROLGEARS FOR LED MODULES** | | N/A |
| **(L.3)** | **Classification** | | N/A |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Class I | Yes ☐ No ☒ | -- |
| | Class II | Yes ☐ No ☒ | -- |
| | Class III | Yes ☐ No ☒ | -- |
| | non-inherently short circuit proof controlgear | Yes ☐ No ☒ | -- |
| | inherently short circuit proof controlgear | Yes ☐ No ☒ | -- |
| | fail safe controlgear | Yes ☐ No ☒ | -- |
| | non-short-circuit proof controlgear | Yes ☐ No ☒ | -- |
| **(L.4)** | **Marking** | | N/A |
| | Adequate symbols are used | | N/A |
| **(L.5)** | **Protection against electric shock** | | N/A |
| | Comply with clause 9.2 of IEC 61558-1 | | N/A |
| **(L.6)** | **Heating** | | N/A |
| | No excessive temperatures in normal use | | N/A |
| | Value if capacitor $t_c$ marked ..... : | See Annex 1 | -- |
| | Winding insulation classified as Class ..... : | B | -- |
| | Comply with tests of clause 14 of IEC 61558-1 with adjustments | | N/A |
| **(L.7)** | **Short-circuit and overload protection** | | N/A |
| | Comply with tests of clause 15 of IEC 61558-1 with adjustments | | N/A |
| **(L.8)** | **Insulation resistance and electric strength** | | N/A |
| (L.8.1) | Conditioned 48 h between 91 % and 95 % | | N/A |
| (L.8.2) | Insulation resistance | | N/A |
| | Between input- and output circuits not less than 5 MΩ: | >100 MΩ | N/A |
| | Between metal parts of class II convertors which are separated from live parts by basic insulation only and the body not less than 5 M ..... : | | N/A |
| | Between metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ..... : | | N/A |
| (L.8.3) | Electric strength | | N/A |
| | 1) Between live parts of input circuits and live parts of output circuits ..... : | | N/A |
| | 2) Over basic or supplementary insulation between: | | N/A |
| | a) live parts having different polarity ..... : | | N/A |
| | b) live parts and body if intended to be connected to protective earth ..... : | | N/A |
| | c) accessible metal parts and a metal rod of the same diameter as the flexible cable or cord ..... : | | N/A |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | d) live parts and an intermediate metal part ..... : | | N/A |
| | e) intermediate metal parts and the body ..... : | | N/A |
| | f) each input circuit and all other input circuits ... : | | N/A |
| | 3) Over reinforced insulation between the body and live parts ..... : | | N/A |
| **(L.9)** | **Construction** | | N/A |
| (L.9.1) | Transformer comply with 19.12 of IEC 61558-1 and 19 of IEC 61558-2-6 | | N/A |
| | HF transformer comply with 19 of IEC 61558-2-16 | | N/A |
| **(L.10)** | **Components** | | N/A |
| | Protective devices comply with 20.6 – 20.11 of IEC 61558-1 | | N/A |
| **(L.11)** | **Creepage distances, clearances and distances through insulation** | | N/A |
| | Creepage distances and clearances not less than in Clause 16 | | N/A |
| | Distance through insulation according Table L.5 in IEC 61347-1 | | N/A |
| | 1) Basic distance through insulation | | N/A |
| | Required distance (mm) ..... : | | -- |
| | Measured (mm) ..... : | | N/A |
| | Supplementary information | | -- |
| | 2) Supplementary distance through insulation | | N/A |
| | Required distance (mm) ..... : | | -- |
| | Measured (mm) ..... : | | N/A |
| | Supplementary information | | -- |
| | 3) Reinforced distance through insulation | | N/A |
| | Required distance (mm) ..... : | | -- |
| | Measured (mm) ..... : | | N/A |
| | Supplementary information | | -- |

| | | | |
|---|---|---|---|
| **J (-)** | **ANNEX J IN THIS PART 2 – PARTICULAR ADDITIONAL SAFETY REQUIREMENTS FOR A.C., A.C./D.C. OR D.C. SUPPLIED ELECTRONIC CONTROLGEAR FOR EMERGENCY LIGHTING** | | **N/A** |
| **J.1** | **General** | | N/A |
| | Intended for centralized emergency power supply | Yes ☐ No ☐ | -- |
| **J.2** | **Marking** | | N/A |
| J.2.1 | Mandatory markings | | N/A |
| | a) symbol EL | | N/A |
| | b) rated emergency supply voltage (V) | | N/A |
| J.2.2 | Information to be provided if applicable | | N/A |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | a) Limits of ambient temperature | | N/A |
| | b) Emergency output factor ($EOF_X$) | | N/A |
| | c) Information if intended for use in luminaires for high-risk task area lighting | | N/A |
| J.3 | General notes on tests | | N/A |
| | Length of output cable in tests ..... : | | N/A |
| | Load instead of LED lamps/modules ..... : | | N/A |
| J.4 | Starting conditions | | N/A |
| | Start rated load in emergency mode without adversely affecting the performance | | N/A |
| J.5 | Operating condition | | N/A |
| | Comply with the requirements of 7.2 of IEC 62384 at 90% and 110% of rated emergency supply voltage | | N/A |
| J.6 | Emergency supply current | | N/A |
| | Emergency supply current not differ more than ±15 % | | N/A |
| | Supply of low impedance and low inductance | | N/A |
| J.7 | EMC immunity | | N/A |
| | Comply with the requirements of IEC 61547 | | N/A |
| J.8 | Pulse voltage from central battery systems | | N/A |
| | Withstand pulses according Table J.1 | | N/A |
| J.9 | Tests for abnormal conditions | | N/A |
| | Comply with the requirements of 12 of IEC 62384 | | N/A |
| J.10 | Comply with the requirements of 13 of IEC 62384 | | N/A |
| J.11 | Functional safety ($EOF_x$) | | N/A |
| | Declared emergency output factor ($EOF_x$) achieved during emergency operation | | N/A |

| | | | |
|---|---|---|---|
| **(N)** | **ANNEX N: REQUIREMENTS FOR INSULATION MATERIALS USED FOR DOUBLE OR REINFORCED INSULATION** | | N/A |
| **(N.4)** | **General requirements** | | N/A |
| (N.4.1) | Material comply with IEC 60085 and IEC 60216 series | | N/A |
| **(N.4.2)** | **Solid insulation** | | N/A |
| | Electric strength test at least 5 kV or 1,35 x test voltage in Table N.1 | | N/A |
| | If not classified according IEC 60085 and IEC 60216 series: Electric strength test increased 10 % to 5,5 kV or 1,5 x test voltage in Table N.1 | | N/A |
| **(N.4.3)** | **Thin sheet insulation** | | N/A |
| (N.4.3.1) | Thickness and composition of thin sheet insulation | | N/A |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - Inside the ballast and not subjected to handling or abrasion during the production and during maintenance | | N/A |
| | - Non-separated layers: Min. 3 layers and fulfil mandrel test of 150N | | N/A |
| | - Separated layers: Min. 2 layers and each layer fulfil mandrel test of 50N | | N/A |
| | - Separated layers (alternative): Min. 3 layers and 2/3 of the layers fulfil mandrel test of 100N | | N/A |
| (N.4.3.2) | Mandrel test (electric strength test during mechanical stress) | | N/A |
| | Electric strength test after mandrel test: | | N/A |
| | - Non-separated layers: min. 5 kV or 1,35 x test voltage in Table N.1 | | N/A |
| | - 2/3 of min. 3 separated layers: min. 5 kV or 1,25 x test voltage in Table N.1 | | N/A |
| | - one of 2 separated layers: min. 5 kV or 1,25 x test voltage in Table N.1 | | N/A |
| | No flashover or breakdown occurred | | N/A |
| **(O)** | **ANNEX O: ADDITIONAL REQUIREMENTS FOR BUILT-IN ELECTRONIC CONTROLGEAR WITH DOUBLE OR REINFORCED INSULATION** | | N/A |
| **(O.6)** | **Marking** | | N/A |
| | Marking according clause 7 (7) | See clause 7 | N/A |
| | Special symbol | | N/A |
| | Meaning of the special symbol explained in catalogue | | N/A |
| **(O.7)** | **Protection against accidental contact with live parts** | | N/A |
| | Requirements of clause 8 (10) | See clause 8 | N/A |
| | Test finger not possible to make contact with basic insulated metal parts | | N/A |
| **(O.8)** | **Terminals** | | N/A |
| | Clause 9 (8) | See clause 9 | N/A |
| **(O.9)** | **Provision for earthing** | | N/A |
| | Functional earthing terminals comply with clause 9 of part 1 | | N/A |
| | No protective earthing terminal | | N/A |
| **(O.10)** | **Moisture resistance and insulation** | | N/A |
| | Clause 11 (11) | See clause 11 | N/A |
| **(O.11)** | **Electric strength** | | N/A |
| | Clause 12 (12) | See clause 12 | N/A |
| **(O.13)** | **Fault conditions** | | N/A |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Clause 14 (14) | See clause 14 | N/A |
| | End of test, between live part and accessible metal parts or external parts of insulating material in contact with the supporting surface comply with dielectric strength test according clause 12 reduced to 35 % of values according Table 3 in part 1 | | N/A |
| | Insulation resistance according to O.10 between live part and accessible metal parts or external parts of insulating material in contact with the supporting surface not less than 4 M | | N/A |
| **(O.14)** | **Construction** | | N/A |
| | Clause 17 (15) | See clause 17 | N/A |
| | Accessible metal parts insulated from live parts by double or reinforced insulation | | N/A |
| | Live part insulated from supporting surface in contact with external faces by double or reinforced insulation | | N/A |
| **(O.15)** | **Creepage distances and clearances** | | N/A |
| | Clause 18 (16) | See clause 18 | N/A |
| | Comply with corresponding values for luminaries in IEC 60598-1 | | N/A |
| **(O.16)** | **Screws, current-carrying parts and connections** | | N/A |
| | Clause 19 (17) | See clause 19 | N/A |
| **(O.17)** | **Resistance to heat and fire** | | N/A |
| | Clause 20 (18) | See clause 20 | N/A |
| **(O.18)** | **Resistance to corrosion** | | N/A |
| | Clause 21 (19) | See clause 21 | N/A |

| | | | |
|---|---|---|---|
| **(P)** | **Creepage distances and clearances and distance through isolation (DTI) for lamp controlgear which are protected against pollution by the use of coating or potting** | | N/A |
| **(P.1)** | **General** | | N/A |
| | P.2 applies if creepage distances less than the minimum in Table 7 and 8 | | N/A |
| | P.3 applies if clearance less than the minimum in Table 9, 10 and 11 | | N/A |
| **(P.2)** | **Creepage distances** | | N/A |
| (P.2.2) | Minimum creepage distances for working voltages and rated voltages with frequencies up to 30 kHz (Table P.1) | | N/A |
| | Basic or supplementary insulation: | | N/A |
| | Required creepage..... : | | -- |
| | Measured..... : | | N/A |

| IEC 61347-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Supplementary information | | -- |
| | Reinforced insulation: | | N/A |
| | Required creepage ..... : | | -- |
| | Measured..... : | | N/A |
| | Supplementary information | | -- |
| (P.2.3) | Creepage distances for working voltages with frequencies above 30 kHz (Table P.2) | | N/A |
| | Voltage $\hat{U}_{out}$ kV ..... : | | -- |
| | Frequency..... : | | -- |
| | Required distance ..... : | | -- |
| | Measured..... : | | -- |
| | Supplementary information | | -- |
| (P.2.4) | Compliance with the required creepage distances | | N/A |
| (P.2.4.1) | Compliance in accordance with 16.3.3 and test according P.2.4.2 | | N/A |
| (P.2.4.3) | Electrical tests after conditioning | | N/A |
| (P.2.4.3.1) | Insulation resistance and electric strength according Clause 11 and 12 | | N/A |
| **(P.3)** | **Distance through isolation** | | N/A |
| (P.3.4) | Electrical tests after conditioning | | N/A |
| (P.3.4.1) | Insulation resistance and electric strength according Clause 11 and 12 | | N/A |
| (P.3.4.2) | Impulse voltage dielectrical test | | N/A |
| | Basic or supplementary insulation: | | N/A |
| | Working/rated voltage ..... : | | -- |
| | Impulse voltage ..... : | | N/A |
| | Supplementary information | | -- |
| | Reinforced insulation: | | N/A |
| | Working/rated voltage ..... : | | -- |
| | Impulse voltage ..... : | | N/A |
| | Supplementary information | | -- |

| Attachment 1: EN IEC60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

**ATTACHMENT TO TEST REPORT**

**IEC 60598-2-1:2020**
**EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES**
Luminaires
Part2: Particular requirements
Section 1: Fixed general purpose luminaires

| | |
|---|---|
| **Differences according to**.....: | EN IEC 60598-2-1:2021 used in conjunction with EN IEC 60598-1:2021+A11:2022 |
| **TRF template used .....:** | IECEE OD-2020-F2:2020, Ed. 1.1 |
| **Attachment Form No**.....: | EU_GD_IEC60598_2_1H |
| **Attachment Originator .....**: | UL(Demko) |
| **Master Attachment**.....: | 2022-04-08 |



| | | | |
|---|---|---|---|
| | **CENELEC COMMON MODIFICATIONS (EN)** | | P |
| **1.7 (4)** | **CONSTRUCTION** | | N/A |
| 1.7 (4.11.6) | Electro-mechanical contact systems | | N/A |
| **1.11 (5)** | **EXTERNAL AND INTERNAL WIRING** | | N/A |
| 1.11 (5.2.2) | Cables equal to EN 50525 | | N/A |
| | Replace table 5.1 – Supply cord | | N/A |
| **1.13 (12)** | **ENDURANCE TESTS AND THERMAL TESTS** | | N/A |
| 1.13 (12.4.2c) | Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring | | N/A |
| **ZB** | **ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)** | | N/A |
| (3.3) | DK: power supply cords of class I luminaires with label | | N/A |
| (4.5.1) | DK: socket-outlets | | N/A |
| (5.2.1) | CY, DK, FI, GB: type of plug | | N/A |
| **ZC** | **ANNEX ZC, NATIONAL DEVIATIONS (EN)** | | N/A |
| (4 & 5) | FR: Shuttered socket-outlets 10/16A | | N/A |
| | FR: Safety requirements for high buildings<br>*(Decree of 30 December 2011 on safety regulations for the construction of high-rise buildings and their protection against fire and panic risks; Section VIII; Article GH 48, Lighting)*<br><br>Glow-wire test for outer parts of luminaires: | | N/A |
| | - 850°C for luminaires in stairways and horizontal travel paths | | N/A |
| | - 650°C for indoor luminaires | | N/A |

| Attachment 1: EN IEC60598-2-1 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | GB: Requirements according to United Kingdom Building Regulation | | N/A |

| Attachment 2: IEC 62031: 2008+A1+A2 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | **LED modules for general lighting – Safety specifications IEC 62031: 2008+A1+A2** | | **P** |
| **13** | **FAULT CONDITIONS** | | **P** |
| 13.1 | In compliance with EN 61347-1 (clause numbers between parentheses refer to EN 61347-1) | | P |
| | When operated under fault conditions the LED-module: | | P |
| | - does not emit flames or molten material | | P |
| | - does not produce flammable gases | | P |
| | - protection against accidental contact not impaired | | P |
| | Thermally protected controlgear does not exceed the marked temperature value | | N/A |
| | Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected | | N/A |
| - (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/A |
| | Distances on printed boards provided with coating according to IEC 60664-3 | | N/A |
| - (14.2) | Short-circuit or interruption of semiconductor devices | | N/A |
| - (14.3) | Short-circuit across insulation consisting of lacquer, enamel or textile | | N/A |
| - (14.4) | Short-circuit across electrolytic capacitors | | N/A |
| - (14.5) | During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite | | P |
| | After the tests the insulation resistance with d.c. 500 V (MΩ) are ≥ 1 MΩ ..... : | >100MΩ | P |
| | Temperature declared thermally protected LED-modules fulfil the requirements in Annex C of IEC 61437-1 | | N/A |
| 13.2 | Module withstands overpower condition >15 min. | (see appended table) | P |
| | Module with automatic protective device or power limiter, test performed 15 min. at limit. | | N/A |
| | During the tests, tissue paper, spread below module, does not ignite | | P |

| Attachment 3: IEC 62471: 2006 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | **Photobiological Safety Of Lamps And Lamp Systems IEC 62471:2006 and EN 62471: 2008** | | **P** |

**Conditions:**

1. Tests performed on LL.IP67.180.XY, supplied by 240V, 50Hz.
2. Ambient temperature: 25±1°C, Humidity: 45±10%.
3. Measurement distance:
4. Angular subtense of whole lamp:

Lamp classification group:

Test data:

| Optical hazard | Test result | Used hazard exposure limit | | Ref. |
|---|---|---|---|---|
| 1. $E_S$ | 4.611E-08 W/ m$^2$ | 0.001 W/m$^2$ | 200-800 nm | P |
| 2. $E_{UVA}$ | 1.095E-03 W/ m$^2$ | 0.33 W/m$^2$ | 200-800 nm | P |
| 3. $L_B$ | 3.638E+01 W/ m$^2$sr | 100 W/m$^2$sr | 300-700 nm | P |
| 4. $E_{B(small\ source)}$ | -- | -- | -- | N/A |
| 5. $L_R$ | 7.422E+03 W/ m$^2$sr | 1.192E+06 W/m$^2$sr | 380-1400 nm | P |
| 6. $L_{IR}$ | 8.774E-02 W/ m$^2$sr | 2.554E+05 W/m$^2$sr | 780-1400 nm | P |
| 7. $E_{IR}$ | 1.322E-01 W/ m$^2$ | 100 W/m$^2$ | 780-3000 nm | P |
| 8. $E_H$ | 3.218E+01 W/ m$^2$ | 3556.56 W/m$^2$ | 380-3000 nm | P |

| Attachment 4: IEC/TR 62778:2014 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | **Blue light hazard to light sources and luminaires of IEC/TR 62778:2014** | | **P** |
| **7** | **Measurement information flow** | | **P** |
| **7.1** | **Basic flow** | | **P** |
| | 'Law of conservation of luminance' applied | | P |
| | Use of only true luminance/radiance values | | P |
| | In case of luminaire:<br>The light source is operated in the luminaire under similar conditions as when tested as a component | | P |
| | In case $E_{thr}$ value for RG2 was established the peak value was derived from angular light distribution | | N/A |
| **7.2** | **Conditions for the radiance measurement** | | **P** |
| | Standard condition applied<br>(200mm distance, 0,011rad field of view) | | P |
| | Non-standard condition applied | | N/A |
| **7.3** | **Special cases (I): Replacement by a lamp or LED module of another type** | | **N/A** |
| | Light source is a white light source | | N/A |
| | Evaluation done based on highest luminance | | N/A |
| | Evaluation done based on CCT value | | N/A |
| **7.4** | **Special cases (II): Arrays and clusters of primary light sources** | | **P** |
| | LED package is evaluated as ..... : | ☐ RG0 unlimited<br>☒ RG1 unlimited | P |
| | $E_{thr}$ of LED package applies to array | | N/A |
| **8** | **RISK GROUP CLASSIFICATION** | | **P** |
| | Risk group achieved: | | P |
| | - .. Risk Group 0 unlimited | | P |
| | - .. Risk Group 1 unlimited | | N/A |
| | - $E_{thr}$ ..... (lx) :<br>Distance to reach RG1 ..... . (m) : | | N/A |

| | | | |
|---|---|---|---|
| | **TABLE: Spectroradiometric measurement** | | **P** |
| | Measurement performed on: | ☐ LED package<br>☐ LED module<br>☐ Lamp<br>☒ Luminaire | **P** |
| | Model number..... : | LL.IP67.180.XY | **P** |
| | Test voltage (V) ..... : | 240Vac | — |
| | Test current (mA)..... : | | — |
| | Test frequency (Hz)..... : | -- | — |
| | Ambient, t (°C) ..... : | 26.3 | — |

| Attachment 4: IEC/TR 62778:2014 | | | | | |
|---|---|---|---|---|---|
| Clause | Requirement + Test | | | Result - Remark | Verdict |
| | Measurement distance .....: | | | ☒ 20 cm<br>☐ ... cm | — |
| | Source size .....: | | | ☒ Non-small<br>☐ Small : mm | — |
| | Field of view .....: | | | ☐ 100 mrad<br>☒ 11 mrad<br>☐ 1,7 mrad (for small sources) | — |
| Item | | Symbol | Units | Result | Remark |
| Correlated colour temperature | | CCT | K | 3348 | -- |
| x/y colour coordinates | | (x,y) | -- | (0.3135,0.3435) | -- |
| Blue light hazard radiance | | $L_B$ | $W/(m^2 \cdot sr^1)$ | 1.31E+02 | -- |
| Blue light hazard irradiance | | $E_B$ | $W/m^2$ | 3.09e+01 | -- |
| Luminance | | L | $cd/m^2$ | 3.048e+006 | -- |
| Illuminance | | E | lx | 70264 | -- |
| Supplementary information: None | | | | | |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **24.3 (0)** | **GENERAL TEST REQUIREMENTS** | | P |
| 24.3 (0.3) | More sections applicable .....: | Yes ☐ No ☒<br>Section/s: IEC62031 | — |
| 24.3 (0.5) | Components | (see Annex 1) | — |
| **24.3 (0.7)** | **Information for luminaire design in light sources standards** | | — |
| 24.3 (0.7.2) | Light source safety standard ..... : | IEC62031 | — |
| | Luminaire design in the light source safety standard | | P |
| **24.5 (2)** | **CLASSIFICATION OF LUMINAIRES** | | P |
| 24.5 (2.2) | Type of protection ..... : | Class II | P |
| 24.5 (2.3) | Degree of protection..... : | IP65 for luminaire, IP44 for Plug | — |
| 24.5 (2.4) | Luminaire suitable for direct mounting on normally flammable surfaces ..... : | Yes ☒ No ☐ | — |
| 24.5 (2.5) | Luminaire for normal use ..... : | Yes ☒ No ☐ | — |
| | Luminaire for rough service ..... : | Yes ☐ No ☒ | — |
| 24.5 (-) | a) Luminaire where no unusual accumulation of dust is expected | | — |
| | b) Luminaire where an accumulation of non-conductive dust may be expected | | — |
| | c) Luminaire where an accumulation of conductive dust may be expected | | — |
| **24.6 (3)** | **MARKING** | | P |
| 24.6 (3.2) | Mandatory markings | | P |
| | Position of the marking | On the enclosure | P |
| | Format of symbols/text | See marking plate | P |
| 24.6 (3.3) | Additional information | | P |
| | Language of instructions | English | P |
| 24.6 (3.3.1) | Combination luminaires | | N/A |
| 24.6 (3.3.2) | Nominal frequency in Hz | 50/60Hz | P |
| 24.6 (3.3.3) | Operating temperature | | N/A |
| 24.6 (3.3.5) | Wiring diagram | | N/A |
| 24.6 (3.3.6) | Special conditions | | N/A |
| 24.6 (3.3.7) | Metal halide lamp luminaire – warning | | N/A |
| 24.6 (3.3.8) | Limitation for semi-luminaires | | N/A |
| 24.6 (3.3.9) | Power factor and supply current | | N/A |
| 24.6 (3.3.10) | Suitability for use indoors | | N/A |
| 24.6 (3.3.11) | Luminaires with remote control | | N/A |
| 24.6 (3.3.12) | Clip-mounted luminaire – warning | | N/A |
| 24.6 (3.3.13) | Specifications of protective shields | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 24.6 (3.3.14) | Symbol for nature of supply | ~ | P |
| 24.6 (3.3.15) | Rated current of socket outlet | | N/A |
| 24.6 (3.3.16) | Rough service luminaire | | N/A |
| 24.6 (3.3.17) | Mounting instruction for type Y, type Z and some type X attachments | Type Y | P |
| 24.6 (3.3.18) | Non-ordinary luminaires with PVC cable | | N/A |
| 24.6 (3.3.19) | Protective conductor current in instruction if applicable | | N/A |
| 24.6 (3.3.20) | Provided with information if not intended to be mounted within arm's reach | | N/A |
| 24.6 (3.3.21) | Non replaceable and non-user replaceable light sources information provided | Non-user replaceable light sources | P |
| 24.6 (3.3.22) | Controllable luminaires, classification of insulation provided | See marking plate | P |
| 24.6 (3.3.23) | Luminaires without control gear provided with necessary information for selection of appropriate component | | N/A |
| 24.6 (3.3.24) | If not supplied with terminal block, information on the packaging | | N/A |
| 24.6 (3.3.25) | Luminaires employing light sources emitting UV on mains wiring, information provided | | N/A |
| 24.6 (3.3.26) | Wall mounted luminaire using external flexible cable or cord longer than 0.3 m, information provided | | N/A |
| 24.6 (3.4) | Test with water | 15s | P |
| | Test with hexane | 15s | P |
| | Legible after test | No legible and curling | P |
| | Label attached | | P |
| 24.6.1 (-) | Symbol for luminaire with limited surface temp. | | P |
| | Marking visible |  | P |
| 24.6.2 (-) | Classification of the luminaire according 24.5 in manufacturers literature | | P |

| | | | |
|---|---|---|---|
| **24.7 (4)** | **CONSTRUCTION** | | P |
| 24.7 (4.2) | Components replaceable without difficulty | | N/A |
| 24.7 (4.3) | Wireways smooth and free from sharp edges | | P |
| **24.7 (4.4)** | **Lamp holders** | | **N/A** |
| 24.7 (4.4.1) | Integral lamp holder | | N/A |
| 24.7 (4.4.2) | Wiring connection | | N/A |
| 24.7 (4.4.3) | Lamp holder for end-to-end mounting | | N/A |
| 24.7 (4.4.4) | Positioning | | N/A |
| | - pressure test (N) ..... : | | — |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | After test the lamp holder comply with relevant standard sheets and show no damage | | N/A |
| | After test on single-capped lamp holder the lamp holder has not moved from its position and show no permanent deformation | | N/A |
| | - bending test (N) ..... : | | — |
| | After test the lamp holder has not moved from its position and show no permanent deformation | | N/A |
| 24.7 (4.4.5) | Peak pulse voltage | | N/A |
| 24.7 (4.4.6) | Centre contact | | N/A |
| 24.7 (4.4.7) | Parts in rough service luminaires resistant to tracking | | N/A |
| 24.7 (4.4.8) | Lamp connectors | | N/A |
| 24.7 (4.4.9) | Caps and bases correctly used | | N/A |
| 24.7 (4.4.10) | Light source for lamp holder or connection according IEC 60061 not connected another way | | N/A |
| **24.7 (4.5)** | **Starter holders** | | N/A |
| | Starter holder in luminaires other than class II | | N/A |
| | Starter holder class II construction | | N/A |
| **24.7 (4.6)** | **Terminal blocks** | | N/A |
| | Tails | | N/A |
| | Unsecured blocks | | N/A |
| **24.7 (4.7)** | **Terminals and supply connections** | | N/A |
| 24.7 (4.7.1) | Contact to metal parts | | N/A |
| 24.7 (4.7.2) | Test 8 mm live conductor | | N/A |
| | Test 8 mm earth conductor | | N/A |
| 24.7 (4.7.3) | Terminals for supply conductors | | N/A |
| 24.7 (4.7.3.1) | Welded method and material | | N/A |
| | - stranded or solid conductor | | N/A |
| | - spot welding | | N/A |
| | - welding between wires | | N/A |
| | - Type Z attachment | | N/A |
| | - mechanical test according to 15.6.2 | | N/A |
| | - electrical test according to 15.6.3 | | N/A |
| | - heat test according to 15.6.3.2.3 and 15.6.3.2.4 | | N/A |
| 24.7 (4.7.4) | Terminals other than supply connection | | N/A |
| 24.7 (4.7.5) | Heat-resistant wiring/sleeves | | N/A |
| 24.7 (4.7.6) | Multi-pole plug | | N/A |
| | - test at 30 N | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **24.7 (4.8)** | **Switches** | | N/A |
| | - adequate rating | | N/A |
| | - adequate fixing | | N/A |
| | - polarized supply | | N/A |
| | - compliance with IEC 61058-1 for electronic switches | | N/A |
| **24.7 (4.9)** | **Insulating lining and sleeves** | | N/A |
| 24.7 (4.9.1) | Retainment | | N/A |
| | Method of fixing ..... : | | N/A |
| 24.7 (4.9.2) | Insulated linings and sleeves: | | N/A |
| | Resistant to a temperature > 20 °C to the wire temperature or | | N/A |
| | a) & c) Insulation resistance and electric strength | | N/A |
| | b) Ageing test. Temperature (°C) ..... : | | N/A |
| **24.7 (4.10)** | **Double or reinforced insulation** | | P |
| 24.7 (4.10.1) | No contact, mounting surface – accessible metal parts – wiring of basic insulation | | N/A |
| | Safe installation fixed luminaires | Refer to instruction, mounting by fixed clips | P |
| | Capacitors and switches | | N/A |
| 24.7 (4.10.2) | Assembly gaps: | | N/A |
| | - not coincidental | | N/A |
| | - no straight access with test probe | | N/A |
| 24.7 (4.10.3) | Retainment of insulation: | | N/A |
| | - fixed | | N/A |
| | - unable to be replaced; luminaire inoperative | | N/A |
| | - sleeves retained in position | | N/A |
| | - lining in lamp holder | | N/A |
| 24.7 (4.10.4) | Protective impedance device | | N/A |
| | Basic and supplementary insulation bridged by resistor(s) or appropriate capacitor | | N/A |
| | Double or reinforced insulation bridged by at least two separate resistors in series or appropriate capacitor(s) | | N/A |
| | Capacitors comply with IEC 60384-14 | | N/A |
| | Resistors comply with test (a) in 14.2 of IEC 60065 | | N/A |
| **24.7 (4.11)** | **Electrical connections and current-carrying parts** | | P |
| 24.7 (4.11.1) | Contact pressure | | N/A |
| 24.7 (4.11.2) | Screws: | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - self-tapping screws | | N/A |
| | - thread-cutting screws | | N/A |
| 24.7 (4.11.3) | Screw locking: | | N/A |
| | - spring washer | | N/A |
| | - rivets | | N/A |
| 24.7 (4.11.4) | Material of current-carrying parts | Alloy containing at least 50 % copper is used for current-carrying parts | P |
| 24.7 (4.11.5) | No contact to wood or mounting surface | | P |
| 24.7 (4.11.6) | Electro-mechanical contact systems | | N/A |
| **24.7 (4.12)** | **Screws and connections (mechanical) and glands** | | N/A |
| 24.7 (4.12.1) | Screws not made of soft metal | | N/A |
| | Screws of insulating material | | N/A |
| | Torque test: torque (Nm); part..... : | | N/A |
| | Torque test: torque (Nm); part..... : | | N/A |
| | Torque test: torque (Nm); part..... : | | N/A |
| 24.7 (4.12.2) | Screws with diameter < 3 mm screwed into metal | | N/A |
| 24.7 (4.12.4) | Locked connections: | | N/A |
| | - fixed arms; torque (Nm) ..... : | | N/A |
| | - lamp holder; torque (Nm) ..... : | | N/A |
| | - push-button switches; torque 0,8 Nm ..... : | | N/A |
| 24.7 (4.12.5) | Screwed glands; force (Nm)..... : | | N/A |
| **24.7 (4.13)** | **Mechanical strength** | | **P** |
| 24.7 (4.13.1) | Impact tests: | | P |
| | - fragile parts; energy (Nm) ..... : | | N/A |
| | - other parts; energy (Nm)..... : | 0.5Nm | P |
| | 1) live parts | | P |
| | 2) linings | | N/A |
| | 3) protection | | P |
| | 4) covers | | P |
| 24.7 (4.13.2) | Metal parts have adequate mechanical strength | | P |
| 24.7 (4.13.3) | Straight test finger | Test finger pressed against on the metal enclosure with 30 N, not touch live parts. | P |
| 24.7 (4.13.4) | Rough service luminaires | | N/A |
| | - IP54 or higher | | N/A |
| | a) fixed | | N/A |
| | b) hand-held | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | c) delivered with a stand | | N/A |
| | d) for temporary installations and suitable for mounting on a stand | | N/A |
| 24.7 (4.13.6) | Tumbling barrel | | N/A |
| **24.7 (4.14)** | **Suspensions, fixings and means of adjusting** | | **P** |
| 24.7 (4.14.1) | Mechanical load: | | P |
| | A) four times the weight | | P |
| | B) torque 2,5 Nm | | P |
| | C) bracket arm; bending moment (Nm)..... : | | N/A |
| | D) load track-mounted luminaires | | N/A |
| | E) clip-mounted luminaires, glass-shelve. Thickness (mm) ..... : | | N/A |
| | Metal rod. diameter (mm) ..... : | | N/A |
| | Fixed luminaire or independent control gear without fixing devices | | N/A |
| 24.7 (4.14.2) | Load to flexible cables | | N/A |
| | Mass (kg) ..... : | | — |
| | Stress in conductors (N/mm²) ..... : | | N/A |
| | Mass (kg) of semi-luminaire ..... : | | N/A |
| | Bending moment (Nm) of semi-luminaire ..... : | | N/A |
| 24.7 (4.14.3) | Adjusting devices: | | N/A |
| | - flexing test; number of cycles..... : | | N/A |
| | - strands broken ..... : | | N/A |
| | - electric strength test afterwards | | N/A |
| 24.7 (4.14.4) | Telescopic tubes: cords not fixed to tube; no strain on conductors | | N/A |
| 24.7 (4.14.5) | Guide pulleys | | N/A |
| 24.7 (4.14.6) | Strain on socket-outlets | | N/A |
| **24.7 (4.15)** | **Flammable materials** | | P |
| | - glow-wire test 650°C ..... : | See Test Table 24.15 (13.3.2) | P |
| | - spacing ≥30 mm | | N/A |
| | - screen withstanding test of 13.3.1 | | N/A |
| | - screen dimensions | | N/A |
| | - no fiercely burning material | | P |
| | - thermal protection | | N/A |
| | - electronic circuits exempted | | N/A |
| 24.7 (4.15.2) | Luminaires made of thermoplastic material with lamp control gear | | N/A |
| | a) construction | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | b) temperature sensing control | | N/A |
| | c) surface temperature | | N/A |
| **24.7 (4.16)** | **Luminaires for mounting on normally flammable surfaces** | | **P** |
| | No lamp control gear ..... : | (compliance with Section 12) | N/A |
| | Provided with adaptor for a track meet the requirements for direct mounting on normally flammable surfaces | | N/A |
| 24.7 (4.16.1) | Lamp control gear spacing: | | N/A |
| | - spacing 35 mm | | N/A |
| | - spacing 10 mm | | N/A |
| 24.7 (4.16.2) | Thermal protection: | | N/A |
| | - in lamp control gear | | N/A |
| | - external | | N/A |
| | - fixed position | | N/A |
| | - temperature marked lamp control gear | | N/A |
| 24.7 (4.16.3) | Design to satisfy the test of 12.6 | (see clause 12.6) | N/A |
| **24.7 (4.17)** | **Drain holes** | | N/A |
| | Clearance at least 5 mm | | N/A |
| **24.7 (4.18)** | **Resistance to corrosion** | | N/A |
| 24.7 (4.18.1) | - rust-resistance | | N/A |
| 24.7 (4.18.2) | - season cracking in copper | | N/A |
| 24.7 (4.18.3) | - corrosion of aluminium | | N/A |
| 24.7 (4.19) | Ignitors compatible with ballast | | N/A |
| 24.7 (4.20) | Rough service vibration | | N/A |
| **24.7 (4.21)** | **Protective shield** | | N/A |
| 24.7 (4.21.1) | Shield fitted if tungsten halogen lamps or metal halide lamps | | N/A |
| | Shield of glass if tungsten halogen lamps | | N/A |
| 24.7 (4.21.2) | Particles from a shattering lamp not impair safety | | N/A |
| 24.7 (4.21.3) | No direct path | | N/A |
| 24.7 (4.21.4) | Impact test on shield | | N/A |
| | Glow-wire test on lamp compartment..... : | See Test Table 24.16 (13.3.2) | N/A |
| 24.7 (4.22) | Attachments to lamps not cause overheating or damage | | N/A |
| 24.7 (4.23) | Semi-luminaires comply Class II | | N/A |
| **24.7 (4.24)** | **Photobiological hazards** | | **P** |
| 24.7 (4.24.1) | No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P) | | N/A |
| 24.7 (4.24.2) | Retinal blue light hazard | | P |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Class of risk group assessed according to IEC/TR 62778 ..... : | | — |
| | Luminaires with $E_{thr}$ : | | P |
| | a) Fixed luminaires | | P |
| | - distance x m, borderline between RG1 and RG2 : | | P |
| | - marking and instruction according 3.2.23 | | P |
| | b) Portable and handheld luminaires | | N/A |
| | - marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778 | | N/A |
| | 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/A |
| **24.7 (4.25)** | **Mechanical hazard** | | **P** |
| | No sharp point or edges | | P |
| **24.7 (4.26)** | **Short-circuit protection** | | N/A |
| 24.7 (4.26.1) | Adequate means of uninsulated accessible SELV / PELV parts | | N/A |
| 24.7 (4.26.2) | Short-circuit test with test chain according 4.26.3: | | N/A |
| | Supply source ES1 PSE | | N/A |
| | Test chain not melt through | | N/A |
| | Test sample not exceed values of Table 12.1 and 12.2 | | N/A |
| **24.7 (4.27)** | **Terminal blocks with integrated screwless protective earthing contacts** | | **N/A** |
| | Test according Annex V | | N/A |
| | Pull test of terminal fixing (20 N) | | N/A |
| | After test, resistance < 0,05 Ω | | N/A |
| | Pull test of mechanical connection (50 N) | | N/A |
| | After test, resistance < 0,05 Ω | | N/A |
| | Voltage drop test, resistance < 0,05 Ω | | N/A |
| **24.7 (4.28)** | **Fixing of thermal sensing control** | | **N/A** |
| | Not plug-in or easily replaceable type | | N/A |
| | Reliably kept in position | | N/A |
| | No adhesive fixing if UV radiations from a lamp can degrade the fixing | | N/A |
| | Not outside the luminaire enclosure | | N/A |
| | Test of adhesive fixing: | | N/A |
| | Max. temperature on adhesive material (°C) ..... : | | — |
| | 100 cycles between t min and t max | | N/A |
| | Temperature sensing control still in position | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **24.7 (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 |
| **24.7 (4.30)** | **Luminaires with non-user replaceable light source** | | N/A |
| | If protective cover provide protection against electric shock and marked with “caution, electric shock risk” symbol: | | N/A |
| | At least one fixing means requiring use of tool | | N/A |
| **24.7 (4.31)** | **Insulation between circuits** | | N/A |
| | Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3 | | N/A |
| | 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/A |
| 24.7 (4.31.1) | SELV or PELV circuits | | N/A |
| | Used SELV/PELV source | | N/A |
| | Voltage ≤ ELV | | N/A |
| | Insulating of SELV/PELV circuits from LV supply | | N/A |
| | Insulating of SELV/PELV circuits from other non SELV/PELV circuits | | N/A |
| | Insulating of SELV/PELV circuits from FELV | | N/A |
| | Insulating of SELV/PELV circuits from other SELV/PELV circuits | | N/A |
| | SELV/PELV circuits insulated from accessible parts according Table X.1 | | N/A |
| | Plugs not able to make any electrical contact with socket-outlets of other voltage systems | | N/A |
| | Socket outlets does not admit plugs of other voltage systems | | N/A |
| | Plugs and socket-outlets does not have protective conductor contact | | N/A |
| 24.7 (4.31.2) | FELV circuits | | N/A |
| | Used FELV source | | N/A |
| | Voltage ≤ ELV | | N/A |
| | Insulating of FELV circuits from LV supply | | N/A |
| | FELV circuits insulated from accessible parts according Table X.1 | | N/A |
| | Plugs not able to make any electrical contact with socket-outlets of other voltage systems | | N/A |
| | Socket outlets does not admit plugs of other voltage systems | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Socket-outlets does not have protective conductor contact | | N/A |
| 24.7 (4.31.3) | Other circuits | | P |
| | Other circuits insulated from accessible parts according Table X.1 | | P |
| | Class II construction with equipotential bonding for protection against indirect contacts with live parts: | | N/A |
| | - conductive parts are connected together | | N/A |
| | - test according 7.2.3 | | N/A |
| | - conductive part not cause an electric shock in case of an insulation fault | | N/A |
| | - equipotential bonding in master/slave applications | | N/A |
| | - master luminaire provided with terminal for accessible conductive parts of slave luminaires | | N/A |
| | - slave luminaire constructed as class I | | N/A |
| **24.7 (4.32)** | **Overvoltage protective devices** | | N/A |
| | Comply with IEC 61643-11 | | N/A |
| | External to controlgear and connected to earth: | | N/A |
| | - only in fixed luminaires | | N/A |
| | - only connected to protective earth | | N/A |
| **24.7 (4.33)** | **Luminaire powered via information technology communication cabling** | | N/A |
| | Requirements for Class III luminaire | | N/A |
| | Rated voltage within the range of ES1 and does not exceed maximum voltage of used connector | | N/A |
| | Luminaire does not create any hazard from overvoltage | (see Annex 2) | N/A |
| **24.7 (4.34)** | **Electromagnetic fields (EMF)** | | P |
| | No harmful electromagnetic fields | | P |
| **24.7 (4.35)** | **Protection against moving fan blades** | | N/A |
| | Test with a standard test finger | | N/A |
| | Test with test probe acc. to Figure 13 (IEC 61032) for portable luminaire | | N/A |
| | Blades rounded with radius ≥ 0.5 mm and: | | N/A |
| | -hardness less than D60 Shore | | N/A |
| | -peripheral speed less than 15 m/s | | N/A |
| | -input power of fan ≤ 2 W at rated voltage | | N/A |
| **24.7 (4.36)** | **Track-mounted luminaires** | | N/A |
| | Test in accordance with Annex A of IEC60570:2003/AMD2:2019 | | N/A |
| **24.7.1 (-)** | **Degree of protection** | | P |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | IP4X at least | Yes ☒ No ☐ | — |
| | IP5X if presence of dust | Yes ☐ No ☐ | — |
| | IP6X if presence of conductive dust | Yes ☐ No ☐ | — |
| | At least IP 5X or IP6X for certain locations according IEC 60364-4-42 | | N/A |
| **24.7.2 (-)** | **Applicable surfaces comply with requirements of horizontal surfaces** | | P |
| | Vertical surfaces not complying with spacing requirements in 24.13 comply with the limits for horizontal surfaces | | P |

| | | | |
|---|---|---|---|
| **24.8 (11)** | **CREEPAGE DISTANCES AND CLEARANCES** | | P |
| 24.8 (11.2.1) | Impulse withstand category (Normal category II) | Category II ☒ Category III ☐ | — |
| | Category III according Annex U | | N/A |
| | Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1 | | N/A |
| 24.8 (11.2.2) | Creepage distances for frequency up to 30 kHz | See Test Table 24.8 (11.2) I | P |
| | Creepage distances for frequency over 30 kHz: | | N/A |
| | - Controlgear marked with $\hat{U}_{OUT}$ and $f_{UOUT}$ according IEC 61347-1, clause 7.1, item w | See Test Table 24.8 (11.2) II | N/A |
| | - Requirements according IEC 60664-4 for controlgear not covered by IEC 61347 | See Test Table 24.8 (11.2) II | N/A |
| 24.8 (11.2.3) | Clearances for frequency up to 30 kHz | See Test Table 24.8 (11.2) I | P |
| | Clearances distances for frequency over 30 kHz: | | N/A |
| | - Controlgear marked with $U_P$ | See Test Table 24.8 (11.2) II | N/A |
| | - Requirements according IEC 60664-4 for controlgear not covered by IEC 61347 | See Test Table 24.8 (11.2) II | N/A |

| | | | |
|---|---|---|---|
| **24.9 (7)** | **PROVISION FOR EARTHING** | | N/A |
| 24.9 (7.2.1 + 7.2.3) | Accessible metal parts | | N/A |
| | Metal parts in contact with supporting surface | | N/A |
| | Resistance < 0,5 Ω..... : | | N/A |
| | Self-tapping screws used | | N/A |
| | Thread-forming screws | | N/A |
| | Thread-forming screw used in a grove | | N/A |
| | Protective earth makes contact first | | N/A |
| | Terminal blocks with integrated screwless protective earthing contacts tested according Annex V | | N/A |
| | Protective earthing of the luminaire not via built-in control gear | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 24.9 (7.2.2 + 7.2.3) | Protective earth continuity in joints, etc. | | N/A |
| 24.9 (7.2.4) | Locking of clamping means | | N/A |
| | Compliance with 4.7.3 | | N/A |
| 24.9 (7.2.5) | Protective earth terminal integral part of connector socket | | N/A |
| 24.9 (7.2.6) | Protective earth terminal adjacent to mains terminals | | N/A |
| 24.9 (7.2.7) | Electrolytic corrosion of the protective earth terminal | | N/A |
| 24.9 (7.2.8) | Material of protective earth terminal | | N/A |
| | Contact surface bare metal | | N/A |
| 24.9 (7.2.10) | Class II luminaire for looping-in | | N/A |
| | Double or reinforced insulation to functional earth | | N/A |
| 24.9 (7.2.11) | Protective earthing core coloured green-yellow | | N/A |
| | Length of earth conductor | | N/A |
| 24.9 (7.2.12) | PELV circuit connected to protective earth for functional purpose | | N/A |
| **24.10 (14)** | **SCREW TERMINALS** | | N/A |
| | Separately approved; component list ..... : | (see Annex 1) | N/A |
| | Part of the luminaire ..... : | (see Annex 3) | N/A |
| **24.10 (15)** | **SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS** | | N/A |
| | Separately approved; component list ..... : | (see Annex 1) | N/A |
| | Part of the luminaire ..... : | (see Annex 4) | N/A |
| **24.11 (5)** | **EXTERNAL AND INTERNAL WIRING** | | **P** |
| **24.11 (5.2)** | **Supply connection and external wiring** | | **P** |
| 24.11 (5.2.1) | Means of connection ..... : | Plug Power cord | P |
| | Outdoor luminaire has not PVC insulated external wiring if not Class III or SELV/PELV circuits ≤ 25 V AC/60 V DC/25 V peak interrupted DC voltage with frequency 10Hz -200 Hz or protected from outdoor environment | | N/A |
| 24.11 (5.2.2) | Type of cable ..... : | | P |
| | Nominal cross-sectional area (mm²) ..... : | | P |
| | Cables equal to IEC 60227 or IEC 60245 | | N/A |
| 24.11 (5.2.3) | Type of attachment, X, Y or Z | | P |
| 24.11 (5.2.5) | Type Z not connected to screws | | P |
| 24.11 (5.2.6) | Cable entries: | | P |
| | - suitable for introduction | | P |
| | - adequate degree of protection | | P |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 24.11 (5.2.7) | Cable entries through rigid material have rounded edges | | P |
| 24.11 (5.2.8) | Insulating bushings: | | N/A |
| | - suitably fixed | | N/A |
| | - material in bushings | | N/A |
| | - material not likely to deteriorate | | N/A |
| | - tubes or guards made of insulating material | | N/A |
| 24.11 (5.2.9) | Locking of screwed bushings | | N/A |
| 24.11 (5.2.10) | Cord anchorage: | | P |
| | - covering protected from abrasion | | P |
| | - clear how to be effective | | P |
| | - no mechanical or thermal stress | | P |
| | - no tying of cables into knots etc. | | N/A |
| | - insulating material or lining | | P |
| 24.11 (5.2.10.1) | Cord anchorage for type X attachment: | | N/A |
| | a) at least one part fixed | | N/A |
| | b) types of cable | | N/A |
| | c) no damaging of the cable | | N/A |
| | d) whole cable can be mounted | | N/A |
| | e) no touching of clamping screws | | N/A |
| | f) metal screw not directly on cable | | N/A |
| | g) replacement without special tool | | N/A |
| | Glands not used as anchorage | | N/A |
| | Labyrinth type anchorages | | N/A |
| 24.11 (5.2.10.2) | Adequate cord anchorage for type Y and type Z attachment | | P |
| 24.11 (5.2.10.3) | Tests: | | P |
| | - impossible to push cable; unsafe | | N/A |
| | - pull test: 25 times; pull (N)..... : | 60N | P |
| | - torque test: torque (Nm)..... : | 0.15Nm | P |
| | - displacement ≤ 2 mm | 0.2mm | P |
| | - no movement of conductors | | P |
| | - no damage of cable or cord | | P |
| | - function independent of electrical connection | | P |
| 24.11 (5.2.10.4) | Luminaire with/designed for use with supply cord with maximum current of 2A: | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - Ordinary Class III luminaire supplied with SELV ≤ 25V RMS/60V DC | | N/A |
| | - Ordinary Class III luminaire supplied with PELV ≤12V RMS/30V DC | | N/A |
| | - Other than ordinary Class III luminaire supplied with voltage ≤12V RMS/30V DC | | N/A |
| | Pull test of 30N | | N/A |
| 24.11 (5.2.11) | External wiring passing into luminaire | | N/A |
| 24.11 (5.2.12) | Looping-in terminals | | N/A |
| 24.11 (5.2.13) | Wire ends not tinned | | N/A |
| | Wire ends tinned: no cold flow | | N/A |
| 24.11 (5.2.14) | Mains plug same protection | | N/A |
| | Class III luminaire plug | | N/A |
| | No unsafe compatibility | | N/A |
| 24.11 (5.2.15) | Connectors for Class III luminaires (IEC 60603 or IEC 62680) | | N/A |
| 24.11 (5.2.16) | Appliance inlets (IEC 60320) | | N/A |
| | Installation couplers (IEC 61535) | | N/A |
| | Appliance inlet or connector systems (IEC 61984) | | N/A |
| 24.11 (5.2.17) | No standardized interconnecting cables properly assembled | | N/A |
| 24.11 (5.2.18) | Used plug in accordance with | | N/A |
| | - IEC 60083 | | N/A |
| | - other standard | | N/A |
| **24.11 (5.3)** | **Internal wiring** | | **P** |
| 24.11 (5.3.1) | Internal wiring of suitable size and type | | P |
| | Through wiring | | N/A |
| | - not delivered/ mounting instruction | | N/A |
| | - factory assembled | | N/A |
| | - socket outlet loaded (A) ..... : | | N/A |
| | - temperatures ..... : | (see Annex 2) | N/A |
| | Green-yellow for protective earth only | | N/A |
| 24.11 (5.3.1.1) | Internal wiring connected directly to fixed wiring | | N/A |
| | Cross-sectional area (mm²)..... : | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Insulation thickness (mm) ..... : | | N/A |
| | Extra insulation added where necessary | | N/A |
| 24.11 (5.3.1.2) | Internal wiring connected to fixed wiring via internal current-limiting device | | N/A |
| | Cross-sectional area (mm²)..... : | | N/A |
| 24.11 (5.3.1.3) | Double or reinforced insulation for class II | | P |
| 24.11 (5.3.1.4) | Conductors without insulation | | P |
| 24.11 (5.3.1.5) | SELV/PELV current-carrying parts | | N/A |
| 24.11 (5.3.1.6) | Insulation thickness other than PVC or rubber | | N/A |
| 24.11 (5.3.2) | Sharp edges etc. | | P |
| | No moving parts of switches etc. | | P |
| | Joints, raising/lowering devices | | N/A |
| | Telescopic tubes etc. | | N/A |
| | No twisting over 360° | | P |
| 24.11 (5.3.3) | Insulating bushings: | | N/A |
| | - suitable fixed | | N/A |
| | - material in bushings | | N/A |
| | - material not likely to deteriorate | | N/A |
| | - cables with protective sheath | | N/A |
| 24.11 (5.3.4) | Joints and junctions effectively insulated | | N/A |
| 24.11 (5.3.5) | Strain on internal wiring | | N/A |
| 24.11 (5.3.6) | Wire carriers | | N/A |
| 24.11 (5.3.7) | Wire ends not tinned | | N/A |
| | Wire ends tinned: no cold flow | | N/A |
| **24.11 (5.4)** | **Test to determine suitability of conductors having a reduced cross-sectional area** | | N/A |
| | Under test the temperature of the luminaire wiring insulation not exceed the limits stated in Table 12.2 | (see Annex 2) | N/A |
| | No damage to luminaire wiring after test | | N/A |

| | | | |
|---|---|---|---|
| **24.12 (8)** | **PROTECTION AGAINST ELECTRIC SHOCK** | | **P** |
| 24.12 (8.2.1) | Live parts not accessible | | P |
| | Basic insulated parts not used on the outer surface without appropriate protection | | P |
| | Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires | | P |
| | Lamp and starter holders in portable and adjustable luminaires comply with double or reinforced insulation requirements | | N/A |
| | Basic insulation only accessible under lamp or starter replacement | | N/A |
| | Protection in any position | | P |
| | Double-ended tungsten filament lamp | | N/A |
| | Insulation lacquer not reliable | | P |
| | Double-ended high-pressure discharge lamp | | N/A |
| | Relevant warning according to 3.2.18 fitted to the luminaire | | N/A |
| 24.12 (8.2.2) | Portable luminaire adjusted in most unfavourable position | | N/A |
| 24.12 (8.2.3.a) | Class II luminaire: | | P |
| | - basic insulated metal parts not accessible during starter or lamp replacement | | N/A |
| | - basic insulation not accessible other than during starter or lamp replacement | | N/A |
| | - glass protective shields not used as supplementary insulation | | N/A |
| 24.12 (8.2.3.b) | BC lamp holder of metal in class I luminaires shall be connected to protective earth | | N/A |
| 24.12 (8.2.3.c) | SELV circuits with exposed current carrying parts: | | N/A |
| | Ordinary luminaire: | | N/A |
| | - voltage under load/ no-load AC (V)..... : | | N/A |
| | - voltage under load/ no-load DC (V) ..... : | | N/A |
| | - interrupted DC voltage (V) ..... : | | N/A |
| | - touch current if applicable (mA) ..... : | | N/A |
| | One conductive part insulated if required | | N/A |
| | Other than ordinary luminaire: | | N/A |
| | - voltage under load/ no-load AC (V)..... : | | N/A |
| | - voltage under load/ no-load DC (V) ..... : | | N/A |
| | - interrupted DC voltage (V) ..... : | | N/A |
| | Class III luminaire only for connection to SELV | | N/A |
| | Class III luminaire not provided with means for protective earthing | | N/A |
| 24.12 (8.2.3.d) | PELV circuits with exposed current carrying parts: | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Ordinary luminaire: | | N/A |
| | - voltage under load/ no-load AC (V)..... : | | N/A |
| | - voltage under load/ no-load DC (V) ..... : | | N/A |
| | Other than ordinary luminaire: | | N/A |
| | - voltage under load/ no-load AC (V)..... : | | N/A |
| | - voltage under load/ no-load DC (V) ..... : | | N/A |
| | One pole insulated if required | | N/A |
| 24.12 (8.2.4) | Portable luminaire has protection independent of supporting surface | | N/A |
| 24.12 (8.2.5) | Compliance with the standard test finger or relevant probe | | P |
| 24.12 (8.2.6) | Covers reliably secured | | N/A |
| 24.12 (8.2.7) | Luminaire other than below with capacitor > 0,5 μF not exceed 50 V 1 min after disconnection | | N/A |
| | Portable luminaire with capacitor > 0,1 μF (0.25) not exceed 34 V 1 s after disconnection | | N/A |
| | Other luminaires with capacitor > 0,1 μF (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection | | N/A |

| | | | |
|---|---|---|---|
| **24.13 (12)** | **ENDURANCE TEST AND THERMAL TEST** | | P |
| 24.13 (-) | Test of (12.4), (12.5), (12.6) and (12.7) after (9.2) before (9.3) as specified in 24.14 | | — |
| **24.13 (12.2)** | **Selection of lamps and ballasts** | | **—** |
| | Lamp used according Annex B | (Lamp used see Annex 2) | — |
| | Control gear if separate and not supplied | (Control gear used see Annex 2) | — |
| **24.13 (12.3)** | **Endurance test** | | **P** |
| | a) mounting-position ..... : | Normal mounting position | — |
| | b) test temperature (°C)..... : | Ta+10°C | — |
| | c) total duration (h) ..... : | 240h | — |
| | d) supply voltage (V) ..... : | 264V | — |
| | d) if not equipped with control gear, constant voltage/current (V) or (A) ..... : | LED module as delivered | — |
| 24.13 (12.3.1d) | d) Class III luminaires powered via information technology communication cable: | | N/A |
| | - voltage under normal operation (V) ..... : | | — |
| | - voltage under abnormal operation (V) ..... : | | — |
| | e) luminaire ceases to operate | | — |
| | f) luminaire with constant light output function | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 24.13 (12.3.2) | After endurance test: | | P |
| | - no part unserviceable | | P |
| | - luminaire not unsafe | | P |
| | - no damage to track system | | N/A |
| | - marking legible | | P |
| | - no cracks, deformation etc. | | P |
| **24.13 (12.4)** | **Thermal test (normal operation)** | (see Annex 2) | P |
| **24.13 (12.5)** | **Thermal test (abnormal operation)** | (see Annex 2) | N/A |
| **24.13 (12.6)** | **Thermal test (failed lamp control gear condition):** | | N/A |
| 24.13 (12.6.1) | Through wiring or looping-in wiring loaded by a current of (A) ..... : | | — |
| | - case of abnormal conditions ..... : | | — |
| | - electronic lamp control gear | | N/A |
| | - measured winding temperature (°C): at 1,1 Un .. : | | — |
| | - measured mounting surface temperature (°C) at 1,1 Un ..... : | | N/A |
| | - calculated mounting surface temperature (°C) ... : | | N/A |
| | - track-mounted luminaires | | N/A |
| 24.13 (12.6.2) | Temperature sensing control | | N/A |
| | - case of abnormal conditions ..... : | | — |
| | - thermal link | | N/A |
| | - manual reset cut-out | | N/A |
| | - auto reset cut-out | | N/A |
| | - measured mounting surface temperature (°C) ... : | | N/A |
| | - track-mounted luminaires | | N/A |
| **24.13 (12.7)** | **Thermal test (failed lamp control gear in plastic luminaires):** | | N/A |
| 24.13 (12.7.1) | Luminaire without temperature sensing control | | N/A |
| 24.13 (12.7.1.1) | Luminaire with fluorescent lamp ≤ 70W | | N/A |
| | Test method 12.7.1.1 or Annex W ..... : | | — |
| | Test according to 12.7.1.1: | | N/A |
| | - case of abnormal conditions ..... : | | — |
| | - Ballast failure at supply voltage (V) ..... : | | — |
| | - Components retained in place after the test | | N/A |
| | - Test with standard test finger after the test | | N/A |
| | Test according to Annex W: | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - 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 Test Table 24.16 (13.2.1) | N/A |
| 24.13 (12.7.1.2) | Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA | | N/A |
| | - 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 Test Table 24.16 (13.2.1) | N/A |
| 24.13 (12.7.1.3) | Luminaire with short circuit proof transformers ≤ 10 VA | | N/A |
| | - case of abnormal conditions ..... : | | — |
| | - Components retained in place after the test | | N/A |
| | - Test with standard test finger after the test | | N/A |
| 24.13 (12.7.2) | Luminaire with temperature sensing control | | N/A |
| | - thermal link ..... : | Yes ☐ No ☐ | — |
| | - manual reset cut-out ..... : | Yes ☐ No ☐ | — |
| | - auto reset cut-out ..... : | Yes ☐ No ☐ | — |
| | - case of abnormal conditions ..... : | | — |
| | - highest measured temperature of fixing point/ exposed part (°C): ..... : | | — |
| | Ball-pressure test: ..... : | See Test Table 24.16 (13.2.1) | N/A |
| **24.13 (-)** | **Temperature limit for vertical surfaces with gap < 30 mm** | (see Annex 2) | N/A |
| **24.13.1 (-)** | **Special temperature limits – normal operation** | (see Annex 2) | N/A |
| **24.13.2 (-)** | **Special temperature limits – abnormal operation** | (see Annex 2) | N/A |
| **24.13.3 (-)** | **Special temperature limits – fault conditions** | (see Annex 2) | N/A |

| | | |
|---|---|---|
| **24.14 (9)** | **RESISTANCE TO DUST AND MOISTURE** | P |
| 24.14 (-) | Order of tests as specified in clause 24.13 | N/A |
| 24.14 (9.2) | Tests for ingress of dust, solid objects and moisture: | P |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - classification according to IP..... : | IP65 for luminaire,<br>IP44 for Plug | — |
| | - mounting position during test ..... : | Normal mounting position | — |
| | - fixing screws tightened; torque (Nm) ..... : | — | — |
| | - tests according to clauses..... : | IP65 for luminaire (Clause 9.2.2 & 9.2.6)<br>IP44 for Plug (Clause 9.2.0 & 9.2.5) | — |
| | - electric strength test afterwards | | P |
| | a) no deposit in dust-proof luminaire | | N/A |
| | b) no talcum in dust-tight luminaire | IP65 for luminaire | P |
| | c) no trace of water on current-carrying parts or on insulation where it could become a hazard | IP65 for luminaire | P |
| | c.1) For luminaires without drain holes – no water entry | | N/A |
| | c.2) For luminaires with drain holes – no hazardous water entry | | N/A |
| | d) no water in watertight, pressure watertight, high pressure and temperature water jet-proof or high pressure and cold water jet-proof luminaire | | P |
| | e) no contact with live parts (IP 2X) | | N/A |
| | e) no entry into enclosure (IP 3X and IP 4X) | IP44 for Plug | P |
| | e) no contact with live parts through drain holes and ventilation slots (IP3X and IP4X) | | N/A |
| | f) no trace of water on part of lamp requiring protection from splashing water | | N/A |
| | g) no damage of protective shield or glass envelope | | P |
| 24.14 (9.3) | Humidity test 48 h | 25%; 93%R.H.; 48h | P |

| | | | |
|---|---|---|---|
| **24.15 (10)** | **INSULATION RESISTANCE AND ELECTRIC STRENGTH** | | P |
| 24.15 (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): | | N/A |
| | SELV/PELV: | | N/A |
| | - between current-carrying parts of different polarity .....: | | N/A |
| | - between current-carrying parts and mounting surface .....: | | N/A |
| | - between current-carrying parts and metal parts of the luminaire.....: | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....: | | N/A |
| | - Insulation bushings as described in Section 5 .....: | | N/A |
| | Other than SELV/PELV: | | P |
| | - between live parts of different polarity .....: | ＞100 MΩ (limit:2MΩ) | P |
| | - between live parts and mounting surface .....: | ＞100 MΩ (limit:2MΩ) | P |
| | - between live parts and metal parts .....: | | N/A |
| | - between live parts of different polarity through action of a switch.....: | | N/A |
| | - between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....: | | N/A |
| | - Insulation bushings as described in Section 5 .....: | | N/A |
| 24.15 (10.2.2) | Electric strength test | | P |
| | Dummy lamp | | N/A |
| | Luminaires with ignitors after 24 h test | | N/A |
| | Luminaires with manual ignitors | | N/A |
| | Test voltage (V): | | P |
| | SELV/PELV: | | N/A |
| | - between current-carrying parts of different polarity: | | N/A |
| | - between current-carrying parts and mounting surface .....: | | N/A |
| | - between current-carrying parts and metal parts of the luminaire.....: | | N/A |
| | - between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....: | | N/A |
| | - Insulation bushings as described in Section 5 .....: | | N/A |
| | Other than SELV/PELV: | | P |
| | - between live parts of different polarity .....: | 1500V | P |
| | - between live parts and mounting surface .....: | 3000V | P |
| | - between live parts and metal parts .....: | | N/A |
| | - between live parts of different polarity through action of a switch.....: | | N/A |
| | - between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts.....: | | N/A |
| | - Insulation bushings as described in Section 5 .....: | | N/A |
| 24.15 (10.3) | Touch current (mA) .....: | | N/A |
| | Protective conductor current (mA) .....: | | N/A |

| Attachment 5: IEC/EN 60598-2-24 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **24.16 (13)** | **RESISTANCE TO HEAT, FIRE AND TRACKING** | | N/A |
| 24.16 (13.2.1) | Ball-pressure test..... : | See Test Table 24.16 (13.2.1) | N/A |
| 24.16 (13.3.1) | Needle-flame test (10 s) ..... : | See Test Table 24.16 (13.3.1) | N/A |
| 24.16 (13.3.2) | Glow-wire test (650°C) ..... : | See Test Table 24.16 (13.3.2) | N/A |
| 24.16 (13.4) | Proof tracking test (IEC 60112) ..... : | See Test Table 24.16 (13.4) | N/A |

Fig. 1: Overview

Fig. 2: Overview


Fig. 3: Overview

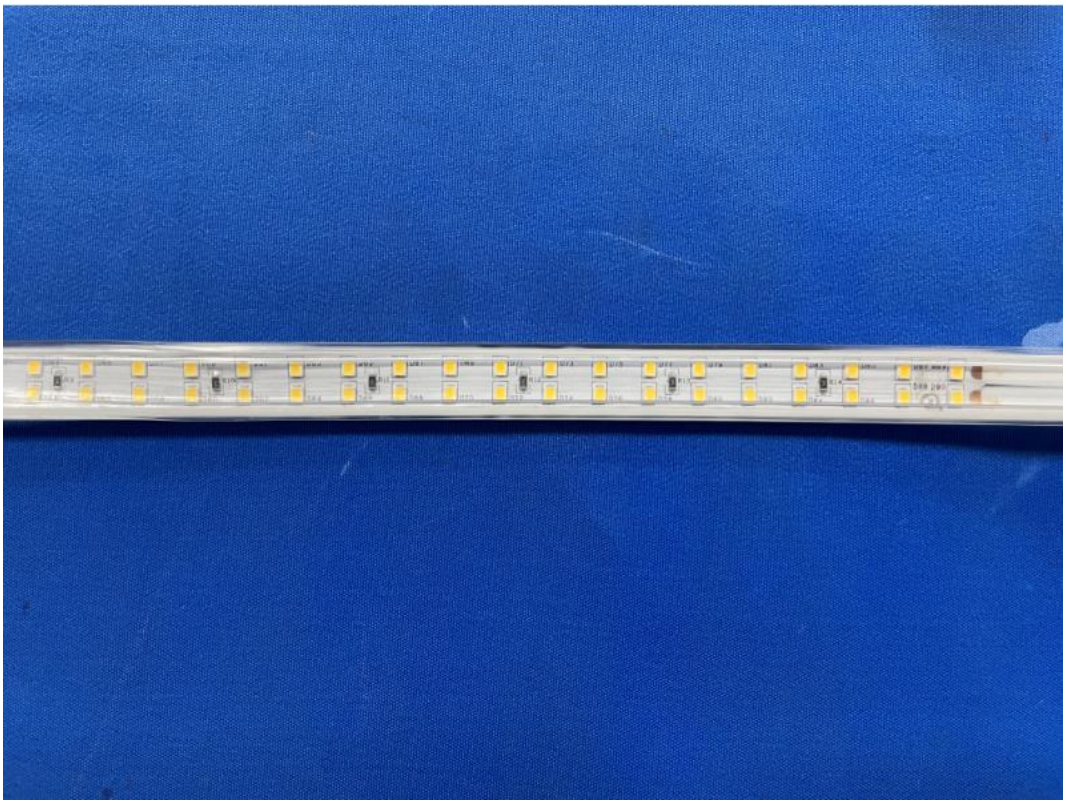


Fig. 4: LED module

**======== End Report ========**