# Test Report

**On behalf**

**PLUXB LIGHTING PVT LTD.**
**INTERNATIONAL HOUSE, 10 BEAUFORT COURT, ADMIRALS WAY, LONDON, E14 9XL**

**LED UNDERGROUND LAMP**

**Model :** SHAFT 8620032, SHAFT 8620016, CLAM 86502301, CLAM 86502301
SHRIM'R 86505502, FERI'R 86506204, FERI'R 86506205, FERI'R 86506206
FERI'R 86506207, FERI'S 86506204, FERI'S 86506205, FERI'S 86506206
CRYPT'R 86505801, CRYPT'R 86505801, CRYPT'S 86505801, CRYPT'S 86505801
OPTIC'1H 86515210, OPTIC'1H 86515210, PB-INGITO 86505806, PB-INGITO 86505808
PB-LEO 86515008, PB-LEO 86515010, LUMI 86505502, LUMI 86505502, PLOT 8651700
PLOT 8651712, SINO'R 86511602, SINO'R 86511603, SINO'S 86511602, SINO'S 86511603
TRIF'R 86503801, TRIF'R 86503802, TRIF'S 86503801, TRIF'S 86503802, VIGOR'R 86511606
VIGOR'R 86511609, VIGOR'S 86511606, VIGOR'S 86511606

**Prepared for :** Pluxb Lighting Pvt Ltd.
International House, 10 Beaufort Court, Admirals Way,
London, E14 9XL

**Prepared By:** TMC Testing Services (Shenzhen) Co., Ltd.
1st Floor, Block A1, Zone A, Xinshidai Gongrong Industrial Park,
No. 2, Shihuan Road, Shiyan Street, Baoan District,
Shenzhen, China
Tel: +86-755-86642861
Web: www.tmc-lab.com
Email: Confetime-lab.com

# TEST REPORT
# EN 60598-2-13
# Luminaires
# Part 2: Particular requirements
# Section 13: Ground recessed luminaires

| | |
|---|---|
| **Report Number.....:** | MK22080231-P01B10 |
| **Date of issue.....:** | April 6, 2023 |
| **Total number of pages.....:** | 40 pages |
| **Name of Testing Laboratory preparing the Report.....:** | **TMC Testing Services(Shenzhen) Co., Ltd.** |
| **Applicant's name.....:** | **Pluxb Lighting Pvt Ltd.** |
| **Address.....:** | **International House, 10 Beaufort Court, Admirals Way, London, E14 9XL** |
| **Test specification:** | |
| **Standard.....:** | EN 60598-2-13:2006+A1:2012+A2:2016+A11:2021; EN IEC 60598-1:2021 |
| **Test procedure.....:** | Type Test |
| **Non-standard test method.....:** | N/A |
| **Test Report Form No.....:** | IEC60598_2_13F |
| **Test Report Form(s) Originator.....:** | Intertek Semko AB |
| **Master TRF.....:** | 2021-03 |



**General disclaimer:**

The test results presented in this report relate only to the object tested.

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| | |
|---|---|
| **Test item description.....:** | LED UNDERGROUND LAMP |
| **Trade Mark.....:** | pluxb |
| **Manufacturer.....:** | **Pluxb Lighting Pvt Ltd.** |
| **Address.....:** | **International House, 10 Beaufort Court, Admirals Way, London, E14 9XL** |
| **Model/Type reference.....:** | SHAFT 8620032 / SHAFT 8620016, CLAM 86502301, CLAM 86502301, SHRIM'R 86505502, FERI'R 86506204, FERI'R 86506205, FERI'R 86506206,FERI'R 86506207, FERI'S 86506204, FERI'S 86506205, FERI'S 86506206 CRYPT'R 86505801, CRYPT'R 86505801, CRYPT'S 86505801, CRYPT'S 86505801, OPTIC'1H 86515210, OPTIC'1H 86515210, PB-INGITO 86505806, PB-INGITO 86505808 PB-LEO 86515008, PB-LEO 86515010, LUMI 86505502, LUMI 86505502, PLOT 8651700, PLOT 8651712, SINO'R 86511602, SINO'R 86511603, SINO'S 86511602, SINO'S 86511603, TRIF'R 86503801, TRIF'R 86503802, TRIF'S 86503801, TRIF'S 86503802, VIGOR'R 86511606 VIGOR'R 86511609, VIGOR'S 86511606, VIGOR'S 86511606 |
| **Ratings.....:** | 220-240V~, 50/60Hz, 50W |

| | | |
|---|---|---|
| ☒ **Testing Laboratory:** | | |
| **Testing location/ address.....:** | TMC Testing Services(Shenzhen) Co., Ltd. 1st Floor, Block A1, Zone A, Xinshidai Gongrong Industrial Park, No. 2, Shihuan Road, Shiyan Street, Baoan District, Shenzhen, China | |
| **Tested by (name, function, signature).....:** | Bart Deng | Bert Deng |

| | | |
|---|---|---|
| **Approved by (name, function, signature).:** | Dawen Xu | Dawen Xu |

**List of Attachments (including a total number of pages in each attachment):**

Attachment No. 1: 2 pages of European group differences and national differences according to EN 60598-2-13:2006+A1:2012+A2:2016+A11:2021 used in conjunction with EN IEC 60598-1:2021

Attachment No. 2: Photo documentation.

**Summary of testing:**

| **Tests performed (name of test and test clause):** | **Testing location:** |
|---|---|
| IEC 60598-2-13:2006+A1:2011+A2:2016<br>IEC 60598-1:2020 | TMC Testing Services(Shenzhen) Co., Ltd.<br>1st Floor, Block A1, Zone A, Xinshidai Gongrong Industrial Park, No. 2, Shihuan Road, Shiyan Street, Baoan District, Shenzhen, China |

**Summary of compliance with National Differences:**

**List of countries addressed**

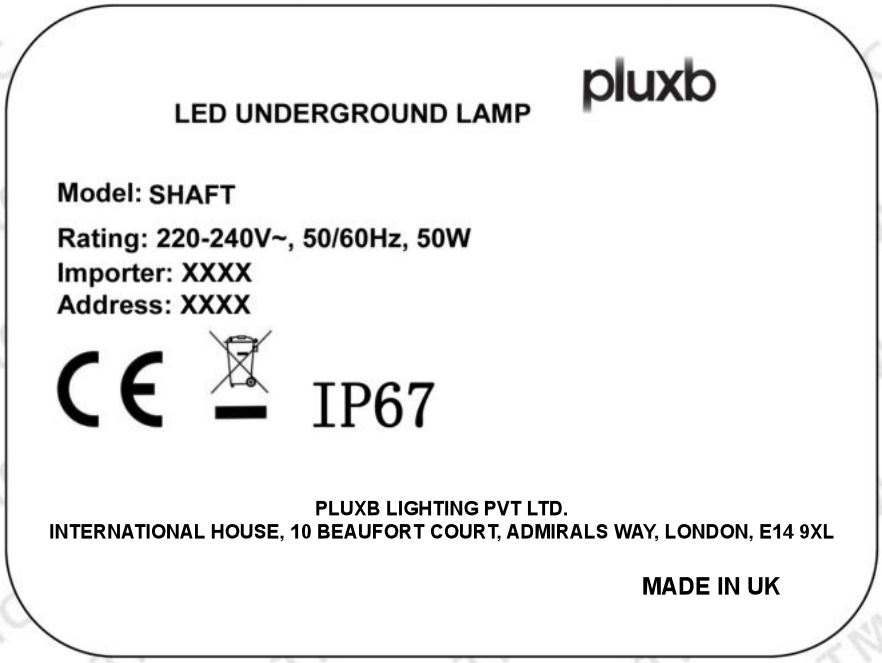
☒ The product fulfils the requirements of Germany and European Group differences

EN 60598-2-13:2006+A1:2012+A2:2016+A11:2021;

EN IEC 60598-1:2021

**Copy of marking plate:**

**The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.**



Remarks:

1. Height of CE mark at least 5mm, height of WEEE symbol should not less than 7mm, height of other marks at least 5mm, height of letters and numerals at least 2mm.

| | |
|---|---|
| **Test item particulars.....** : | LED UNDERGROUND LAMP |
| **Classification of installation and use.....** : | Ground recessed luminaires |
| **Supply Connection.....** : | Supply cord |
| **Protection Class.....** : | Class I |
| **Degree of Protection.....** : | IP67 |
| **Possible test case verdicts:** | |
| **- test case does not apply to the test object.....** : | N/A |
| **- test object does meet the requirement.....** : | P (Pass) |
| **- test object does not meet the requirement.....** : | F (Fail) |
| **Testing.....** : | |
| **Date of receipt of test item.....** : | August 25, 2022 |
| **Date (s) of performance of tests.....** : | August 25, 2022 – September 05, 2022 |

**General remarks:**

This report shall not be reproduced except in full without the written approval of the testing laboratory.
The test results presented in this report relate only to the item tested.
"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.
Clause numbers between brackets refer to clauses in IEC/EN 60598-1.

**Throughout this report a ☒ comma / ☐ point is used as the decimal separator.**

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

**Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:**

| | |
|---|---|
| The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided.....: | ☐ **Yes**<br>☒ **Not applicable** |

**When differences exist; they shall be identified in the General product information section.**

| | |
|---|---|
| **Name and address of factory (ies).....** : | Same as manufacturer |

**General product information:**

- All models have similar appearance, PCB and composition except size and power are difference.
- Unless otherwise specified, the model X2CT12200SH was chosen as representative model to perform all test.

| EN 60598-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **13.2 (0)** | **GENERAL TEST REQUIREMENTS** | | P |
| 13.2 (0.1) | Information for luminaire design considered.....: | Standard<br>Yes ☒ No ☐ | — |
| 13.2 (0.3) | More sections applicable.....: | Yes ☐ No ☒ | — |
| 13.2 (0.5) | Components | (see Annex 1) | — |
| 13.2 (0.7) | Information for luminaire design in light sources standards | | — |
| 13.2 (0.7.2) | Light source safety standard .....: | | — |
| | Luminaire design in the light source safety standard | | P |
| **13.4 (2)** | **CLASSIFICATION** | | P |
| 13.4 (2.2) | Type of protection .....: | Class I | — |
| 13.4 (2.3) | Degree of protection.....: | IP67 | — |
| 13.4 (2.4) | Luminaire suitable for direct mounting on normally flammable surfaces.....: | Yes ☒ No ☐ | — |
| 13.4 (2.5) | Luminaire for normal use .....: | Yes ☒ No ☐ | — |
| | Luminaire for rough service .....: | Yes ☐ No ☒ | — |
| **13.5 (3)** | **MARKING** | | P |
| 13.5 (3.2) | Mandatory markings | | P |
| | Position of the marking | | P |
| | Format of symbols/text | | P |
| 13.5 (3.3) | Additional information | | P |
| | Language of instructions | English | P |
| 13.5 (3.3.1) | Combination luminaires | | N/A |
| 13.5 (3.3.2) | Nominal frequency in Hz | 50/60Hz | P |
| 13.5 (3.3.3) | Operating temperature | | N/A |
| 13.5 (3.3.4) | Symbol or warning notice | | N/A |
| 13.5 (3.3.5) | Wiring diagram | | N/A |
| 13.5 (3.3.6) | Special conditions | | N/A |
| 13.5 (3.3.7) | Metal halide lamp luminaire – warning | | N/A |
| 13.5 (3.3.8) | Limitation for semi-luminaires | | N/A |
| 13.5 (3.3.9) | Power factor and supply current | | P |
| 13.5 (3.3.10) | Suitability for use indoors | | N/A |

| EN 60598-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 13.5 (3.3.11) | Luminaires with remote control | | N/A |
| 13.5 (3.3.12) | Clip-mounted luminaire – warning | | N/A |
| 13.5 (3.3.13) | Specifications of protective shields | | N/A |
| 13.5 (3.3.14) | Symbol for nature of supply | ~ | P |
| 13.5 (3.3.15) | Rated current of socket outlet | | N/A |
| 13.5 (3.3.16) | Rough service luminaire | | N/A |
| 13.5 (3.3.17) | Mounting instruction for type Y, type Z and some type X attachments | type Y | P |
| 13.5 (3.3.18) | Non-ordinary luminaires with PVC cable | | N/A |
| 13.5 (3.3.19) | Protective conductor current in instruction if applicable | | N/A |
| 13.5 (3.3.20) | Provided with information if not intended to be mounted within arm's reach | | N/A |
| 13.5 (3.3.21) | Non-replaceable and non-user replaceable light sources information provided | | N/A |
| | Cautionary symbol | | N/A |
| 13.5 (3.3.22) | Controllable luminaires, classification of insulation provided | | N/A |
| 13.5 (3.3.23) | Luminaire without controlgear provided with necessary information for selection of appropriate component | | N/A |
| 13.5 (3.3.24) | If not supplied with terminal block, information on the packaging | | N/A |
| 13.5 (3.4) | Test with water | | P |
| | Test with hexane | | P |
| | Legible after test | | P |
| | Label attached | | P |
| 13.5.1 (-) | Rated load in the manufacturer's instruction (N).....: | | P |
| 13.5.2 (-) | Rated maximum surface temperature *T* (°C)..... : | | P |
| 13.5.3 (-) | Information concerning external connection box | | P |

| EN 60598-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| | | | |
|---|---|---|---|
| **13.6 (4)** | **CONSTRUCTION** | | P |
| 13.6 (4.2) | Components replaceable without difficulty | | N/A |
| 13.6 (4.3) | Wireways smooth and free from sharp edges | | P |
| **13.6 (4.4)** | **Lamp holders** | | N/A |
| 13.6 (4.4.1) | Integral lamp holder | | N/A |
| 13.6 (4.4.2) | Wiring connection | | N/A |
| 13.6 (4.4.3) | Lamp holder for end- to- end mounting | | N/A |
| 13.6 (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 have not moved from its position and show no permanent deformation | | N/A |
| | - bending test (N) .....: | | — |
| | After test the lamp holder have not moved from its position and show no permanent deformation | | N/A |
| 13.6 (4.4.5) | Peak pulse voltage | | N/A |
| 13.6 (4.4.6) | Centre contact | | N/A |
| 13.6 (4.4.7) | Parts in rough service luminaires resistant to tracking | | N/A |
| 13.6 (4.4.8) | Lamp connectors | | N/A |
| 13.6 (4.4.9) | Caps and bases correctly used | | N/A |
| 13.6 (4.4.10) | Light source for lamp holder or connection according IEC 60061 not connected another way | | N/A |
| **13.6 (4.5)** | **Starter holders** | | N/A |
| | Starter holder in luminaires other than class II | | N/A |
| | Starter holder class II construction | | N/A |
| **13.6 (4.6)** | **Terminal blocks** | | **N/A** |
| | Tails | | N/A |
| | Unsecured blocks | | N/A |
| **13.6 (4.7)** | **Terminals and supply connections** | | **N/A** |
| 13.6 (4.7.1) | Contact to metal parts | | N/A |
| 13.6 (4.7.2) | Test 8 mm live conductor | | N/A |
| | Test 8 mm earth conductor | | N/A |
| 13.6 (4.7.3) | Terminals for supply conductors | | N/A |

| EN 60598-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 13.6 (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 15.8.2 | | N/A |
| | - electrical test according to 15.9 | | N/A |
| | - heat test according to 15.9.2.3 and 15.9.2.4 | | N/A |
| 13.6 (4.7.4) | Terminals other than supply connection | | N/A |
| 13.6 (4.7.5) | Heat-resistant wiring/sleeves | | N/A |
| 13.6 (4.7.6) | Multi-pole plug | | N/A |
| | - test at 30 N | | N/A |
| **13.6 (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 |
| **13.6 (4.9)** | **Insulating lining and sleeves** | | **N/A** |
| 13.6 (4.9.1) | Retainment | | N/A |
| | Method of fixing.....: | | — |
| 13.6 (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 |
| **13.6 (4.10)** | **Double or reinforced insulation** | | P |
| 13.6 (4.10.1) | No contact, mounting surface – accessible metal parts – wiring of basic insulation | | P |
| | Safe installation fixed luminaires | | P |
| | Capacitors and switches | | N/A |
| | Interference suppression capacitors according to IEC 60384-14 | | N/A |
| 13.6 (4.10.2) | Assembly gaps: | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - not coincidental | | N/A |
| | - no straight access with test probe | | N/A |
| 13.6 (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 |
| **13.6 (4.11)** | **Electrical connections and current-carrying parts** | | **P** |
| 13.6 (4.11.1) | Contact pressure | | P |
| 13.6 (4.11.2) | Screws: | | P |
| | - self-tapping screws | | N/A |
| | - thread- cutting screws | | P |
| 13.6 (4.11.3) | Screw locking: | | N/A |
| | - spring washer | | N/A |
| | - rivets | | N/A |
| 13.6 (4.11.4) | Material of current-carrying parts | | P |
| 13.6 (4.11.5) | No contact to wood or mounting surface | | P |
| 13.6 (4.11.6) | Electro-mechanical contact systems | | N/A |
| **13.6 (4.12)** | **Screws and connections (mechanical) and glands** | | **P** |
| 13.6 (4.12.1) | Screws not made of soft metal | | P |
| | Screws of insulating material | | N/A |
| | Torque test: torque (Nm); part.....: | Fixed enclosure: 0,6Nm | P |
| | Torque test: torque (Nm); part.....: | | N/A |
| | Torque test: torque (Nm); part.....: | | N/A |
| 1.6 (4.12.2) | Screws with diameter < 3 mm screwed into metal | | N/A |
| 1.6 (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 |

| EN 60598-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 13.6 (4.12.5) | Screwed glands; force (Nm)..... : | | N/A |
| **13.6 (4.13)** | **Mechanical strength** | | **P** |
| 13.6 (4.13.1) | Impact tests: | | P |
| | - fragile parts; energy (Nm)..... : | | N/A |
| | - other parts; energy (Nm)..... : | 0,7Nm, no damage | P |
| | 1) live parts | | P |
| | 2) linings | | N/A |
| | 3) protection | | P |
| | 4) covers | | P |
| 13.6 (4.13.3) | Straight test finger | | P |
| 13.6 (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 |
| 13.6 (4.13.6) | Tumbling barrel | | N/A |
| **13.6 (4.14)** | **Suspensions, fixings and means of adjusting** | | **P** |
| 13.6 (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 |
| | Metal rod. diameter (mm) ..... : | | N/A |
| | Fixed luminaire or independent control gear without fixing devices | | N/A |
| 13.6 (4.14.2) | Load to flexible cables | | N/A |
| | Mass (kg) ..... : | | — |

| EN 60598-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Stress in conductors (N/mm²) .....: | | N/A |
| | Mass (kg) of semi-luminaire .....: | | — |
| | Bending moment (Nm) of semi-luminaire .....: | | N/A |
| 13.6 (4.14.3) | Adjusting devices: | | N/A |
| | - flexing test; number of cycles.....: | | N/A |
| | - strands broken.....: | | N/A |
| | - electric strength test afterwards | | N/A |
| 13.6 (4.14.4) | Telescopic tubes: cords not fixed to tube; no strain on conductors | | N/A |
| 13.6 (4.14.5) | Guide pulleys | | N/A |
| 13.6 (4.14.6) | Strain on socket-outlets | | N/A |
| **13.6 (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 |
| 1.6 (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 |
| **13.6 (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 |
| 13.6 (4.16.1) | Lamp control gear spacing: | | P |
| | - spacing 35 mm | | N/A |
| | - spacing 10 mm | | P |
| 13.6 (4.16.2) | Thermal protection: | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - in lamp control gear | | N/A |
| | - external | | N/A |
| | - fixed position | | N/A |
| | - temperature marked lamp control gear | | N/A |
| 13.6 (4.16.3) | Design to satisfy the test of 12.6 | (see clause 12.6) | N/A |
| **13.6 (4.17)** | **Drain holes** | | N/A |
| | Clearance at least 5 mm | | N/A |
| **13.6 (4.18)** | **Resistance to corrosion** | | N/A |
| 13.6 (4.18.1) | - rust- resistance | | N/A |
| 13.6 (4.18.2) | - season cracking in copper | | N/A |
| 13.6 (4.18.3) | - corrosion of aluminium | | N/A |
| 13.6 (4.19) | Igniters compatible with ballast | | N/A |
| 13.6 (4.20) | Rough service vibration | | N/A |
| **13.6 (4.21)** | **Protective shield** | | N/A |
| 13.6 (4.21.1) | Shield fitted if tungsten halogen lamps or metal halide lamps | | N/A |
| | Shield of glass if tungsten halogen lamps | | N/A |
| 13.6 (4.21.2) | Particles from a shattering lamp not impair safety | | N/A |
| 13.6 (4.21.3) | No direct path | | N/A |
| 13.6 (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 |
| 13.6 (4.22) | Attachments to lamps not cause overheating or damage | | N/A |
| 13.6 (4.23) | Semi-luminaires comply Class II | | N/A |
| **13.6 (4.24)** | **Photobiological hazards** | | N/A |
| 13.6 (4.24.1) | No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P) | | N/A |
| 13.6 (4.24.2) | Retinal blue light hazard | | N/A |
| | Luminaires with $E_{thr}$ : | | N/A |
| | a) Fixed luminaires | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - 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 |
| **13.6 (4.25)** | **Mechanical hazard** | | **P** |
| | No sharp point or edges | | P |
| **13.6 (4.26)** | **Short-circuit protection** | | N/A |
| 13.6 (4.26.1) | Adequate means of uninsulated accessible SELV parts | | N/A |
| 13.6 (4.26.2) | Short-circuit test with test chain according 4.26.3 | | N/A |
| | Test chain not melt through | | N/A |
| | Test sample not exceed values of Table 12.1 and 12.2 | | N/A |
| **13.6 (4.27)** | **Terminal blocks with integrated screwless 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 |
| **13.6 (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 |
| **13.6 (4.29)** | **Luminaires with non-replaceable light source** | | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Not possible to replace light source | | P |
| | Live part not accessible after parts have been opened by hand or tools | | P |
| **13.6 (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 |
| | Minimum two fixing means | | N/A |
| **13.6 (4.31)** | **Insulation between circuits** | | P |
| | Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3 | | P |
| | 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 |
| 13.6 (4.31.1) | SELV circuits | | P |
| | Used SELV source | | P |
| | Voltage ≤ ELV | | P |
| | Insulating of SELV circuits from LV supply | | P |
| | Insulating of SELV circuits from other non SELV circuits | | N/A |
| | Insulating of SELV circuits from FELV | | N/A |
| | Insulating of SELV circuits from other SELV circuits | | N/A |
| | SELV circuits insulated from accessible parts according Table X.1 | | N/A |
| | Plugs not able to enter 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 |
| 13.6 (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 |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Plugs not able to enter 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 |
| 13.6 (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 of above | | 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 |
| **13.6 (4.32)** | **Overvoltage protective devices** | | N/A |
| | Comply with IEC 61643-11 | | N/A |
| | External to control gear and connected to earth: | | N/A |
| | - only in fixed luminaires | | N/A |
| | - only connected to protective earth | | N/A |
| **13.6.1 (-)** | **Resistance to static load** | | P |
| | Withstand the minimum static load | | P |
| | Comply with 4.13.1 of Part 1 after test | | P |
| **13.6.2 (-)** | **Resistance to torque and shear loads** | | P |
| 13.6.2.1 (-) | Torque test 50 N 1 min. | | P |
| | Comply with 4.13.1 of Part 1 after test | | P |
| 13.6.2.2 (-) | Shear load test with pull force 5 kN | | P |
| | Comply with 4.13.1 of Part 1 after test | | P |
| **13.6.3 (-)** | **Resistance to thermal shock** | | P |
| | Resistance to thermal shock with iced water | | P |
| **13.6.4 (-)** | **Edges** | | P |
| | Accessible edges is rounded | | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Surface of top assembly is smooth and free from burrs, flashes and the like | | P |
| **13.6.5 (-)** | **Mechanical strength** | | P |
| | Mechanical strength with impact energy of 5 Nm | | P |
| **13.7 (11)** | **CREEPAGE DISTANCES AND CLEARANCES** | | P |
| 13.7 (11.2) | Creepage distances and clearances.....: | See Table 1.7 (11.2) | P |
| | Working voltage (V).....: | | — |
| | Rated pulse voltage (kV).....: | | — |
| | Voltage form.....: | Sinusoidal ☒<br>Non-sinusoidal ☐ | — |
| | PTI.....: | < 600 ☒ ≥ 600 ☐ | — |
| | Impulse withstand category (Normal category II) (Category III Annex U) | Category II ☒ Category III ☐ | — |
| **13.8 (7)** | **PROVISION FOR EARTHING** | | P |
| 13.8 (7.2.1 + 7.2.3) | Accessible metal parts | | P |
| | Metal parts in contact with supporting surface | | P |
| | Resistance < 0,5 Ω.....: | 0.072 | P |
| | Self-tapping screws used | | N/A |
| | Thread-forming screws | | P |
| | Thread-forming screw used in a grove | | P |
| | Earth makes contact first | | P |
| | Terminal blocks with integrated screwless earthing contacts tested according Annex V | | N/A |
| | Protective earthing of the luminaire not via built-in control gear | | N/A |
| 13.8 (7.2.2 + 7.2.3) | Earth continuity in joints, etc. | | P |
| 13.8 (7.2.4) | Locking of clamping means | | N/A |
| | Compliance with 4.7.3 | | N/A |
| | Terminal blocks with integrated screwless earthing contacts tested according Annex V | | N/A |
| 13.8 (7.2.5) | Earth terminal integral part of connector socket | | N/A |
| 13.8 (7.2.6) | Earth terminal adjacent to mains terminals | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 13.8 (7.2.7) | Electrolytic corrosion of the earth terminal | | N/A |
| 13.8 (7.2.8) | Material of earth terminal | | N/A |
| | Contact surface bare metal | | N/A |
| 13.8 (7.2.10) | Class II luminaire for looping-in | | N/A |
| | Double or reinforced insulation to functional earth | | N/A |
| 13.8 (7.2.11) | Earthing core coloured green-yellow | | P |
| | Length of earth conductor | | P |
| **13.9 (14)** | **SCREW TERMINALS** | | N/A |
| | Separately approved; component list.....: | (see Annex 1) | N/A |
| | Part of the luminaire.....: | (see Annex 3) | N/A |
| **13.9 (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 |
| **13.10 (5)** | **EXTERNAL AND INTERNAL WIRING** | | P |
| **13.10 (5.2)** | **Supply connection and external wiring** | | P |
| 13.10 (5.2.1) | Means of connection.....: | Power cord | P |
| | Outdoor luminaire has not PVC insulated external wiring if not class III or SELV ≤ 25 V a.c./60 V d.c. or protected from outdoor environment | | N/A |
| 13.10 (5.2.2) | Type of cable.....: | | P |
| | Nominal cross-sectional area (mm²)..... : | 3*0.75mm² | P |
| | Cables equal to IEC 60227 or IEC 60245 | | P |
| 13.10 (5.2.3) | Type of attachment, X, Y or Z | | P |
| 13.10 (5.2.5) | Type Z not connected to screws | | N/A |
| 13.10 (5.2.6) | Cable entries: | | P |
| | - suitable for introduction | | P |
| | - adequate degree of protection | | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 13.10 (5.2.7) | Cable entries through rigid material have rounded edges | | P |
| 13.10 (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 |
| 13.10 (5.2.9) | Locking of screwed bushings | | N/A |
| 13.10 (5.2.10) | Cord anchorage: | | P |
| | - covering protected from abrasion | | P |
| | - clear how to be effective | | P |
| | - no mechanical or thermal stress | | P |
| | - no tying of cables into knots etc. | | P |
| | - insulating material or lining | | P |
| 13.10 (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 |
| 13.10 (5.2.10.2) | Adequate cord anchorage for type Y and type Z attachment | | P |
| 13.10 (5.2.10.3) | Tests: | | P |
| | - impossible to push cable; unsafe | | N/A |
| | - pull test: 25 times; pull (N)..... : | 60 | P |
| | - torque test: torque (Nm)..... : | 0.25 | P |
| | - displacement ≤ 2 mm | 0.3 | P |
| | - no movement of conductors | | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - no damage of cable or cord | | P |
| | - function independent of electrical connection | | N/A |
| 13.10 (5.2.11) | External wiring passing into luminaire | | N/A |
| 13.10 (5.2.12) | Looping- in terminals | | N/A |
| 13.10 (5.2.13) | Wire ends not tinned | | P |
| | Wire ends tinned: no cold flow | | N/A |
| 13.10 (5.2.14) | Mains plug same protection | | N/A |
| | Class III luminaire plug | | N/A |
| | No unsafe compatibility | | N/A |
| 13.10 (5.2.16) | Appliance inlets (IEC 60320) | | N/A |
| | Installation couplers (IEC 61535) | | N/A |
| | Other appliance inlet or connector according relevant IEC standard | | N/A |
| 13.10 (5.2.17) | No standardized interconnecting cables properly assembled | | N/A |
| 13.10 (5.2.18) | Used plug in accordance with | | N/A |
| | - IEC 60083 | | N/A |
| | - other standard | | N/A |
| **13.10 (5.3)** | **Internal wiring** | | **P** |
| 13.10 (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 earth only | | N/A |
| 13.10 (5.3.1.1) | Internal wiring connected directly to fixed wiring | | P |
| | Cross-sectional area (mm²)..... : | | P |
| | Insulation thickness | | P |
| | Extra insulation added where necessary | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 13.10 (5.3.1.2) | Internal wiring connected to fixed wiring via internal current-limiting device | | N/A |
| | Adequate cross-sectional area and insulation thickness | | N/A |
| 13.10 (5.3.1.3) | Double or reinforced insulation for class II | | N/A |
| 13.10 (5.3.1.4) | Conductors without insulation | | N/A |
| 13.10 (5.3.1.5) | SELV current-carrying parts | | N/A |
| 13.10 (5.3.1.6) | Insulation thickness other than PVC or rubber | | N/A |
| 13.10 (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 |
| 13.10 (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 |
| 13.10 (5.3.4) | Joints and junctions effectively insulated | | P |
| 13.10 (5.3.5) | Strain on internal wiring | | N/A |
| 13.10 (5.3.6) | Wire carriers | | N/A |
| 13.10 (5.3.7) | Wire ends not tinned | | N/A |
| | Wire ends tinned: no cold flow | | N/A |
| 13.10 (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 |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 13.10 (-) | Cable for outdoor use provided by the luminaire manufacturer equal to<br>- 60245 IEC 57 or 60245 IEC 66<br>- other rubber sheathed cables 450/750V according to regional Wiring Rules | | P |
| **13.11 (8)** | **PROTECTION AGAINST ELECTRIC SHOCK** | | P |
| 13.11 (8.2.1) | Live parts not accessible | | P |
| | Basic insulated parts not used on the outer surface without appropriate protection | | P |
| | Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires | | N/A |
| | Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires | | P |
| | Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements | | N/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 | | N/A |
| | Double-ended high pressure discharge lamp | | N/A |
| | Relevant warning according to 3.2.18 fitted to the luminaire | | N/A |
| 13.11 (8.2.2) | Portable luminaire adjusted in most unfavourable position | | N/A |
| 13.11 (8.2.3.a) | Class II luminaire: | | N/A |
| | - 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 |
| 13.11 (8.2.3.b) | BC lampholder of metal in class I luminaires shall be earthed | | N/A |
| 13.11 (8.2.3.c) | SELV circuits with exposed current carrying parts: | | N/A |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | Ordinary luminaire: | | N/A |
| | - touch current .....: | | N/A |
| | - no-load voltage.....: | | N/A |
| | Other than ordinary luminaire: | | N/A |
| | - nominal voltage .....: | | N/A |
| 13.11 (8.2.4) | Portable luminaire have protection independent of supporting surface | | N/A |
| 13.11 (8.2.5) | Compliance with the standard test finger or relevant probe | | P |
| 13.11 (8.2.6) | Covers reliably secured | | P |
| 13.11 (8.2.7) | Discharging of capacitors ≥ 0,5 μF | | P |
| | Portable plug connected luminaire with capacitor | | N/A |
| | Other plug connected luminaire with capacitor | | N/A |
| | Discharge device on or within capacitor | | N/A |
| | Discharge device mounted separately | | N/A |
| **13.12 (12)** | **ENDURANCE TEST AND THERMAL TEST** | | P |
| 13.12 (-) | If IP > IP 20 relevant test of (12.4), (12.5) and (12.6) after (9.2) before (9.3) specified in 4.13 | | — |
| 13.12 (12.3) | Endurance test: | | P |
| | - mounting- position.....: | As normal used | — |
| | - test temperature (°C).....: | 35°C | — |
| | - total duration (h).....: | 240h | — |
| | - supply voltage: Un factor; calculated voltage (V)...: | 1.1*240V=264V~ | — |
| | - lamp used.....: | LED | — |
| 13.12 (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 |
| 13.12 (12.4) | Thermal test (normal operation) | (see Annex 2) | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 13.12 (12.5) | Thermal test (abnormal operation) | (see Annex 2) | N/A |
| 13.12 (12.6) | Thermal test (failed lamp control gear condition): | | N/A |
| 13.12 (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 |
| 13.12 (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 |
| 13.12 (12.7) | Thermal test (failed lamp control gear in plastic luminaires): | | N/A |
| 13.12 (12.7.1) | Luminaire without temperature sensing control | | N/A |
| 13.12 (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 |
| | - case of abnormal conditions..... : | | — |
| | - measured winding temperature (°C): at 1,1 Un..... : | | — |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - measured temperature of fixing point/exposed part (°C): at 1,1 Un.....: | | — |
| | - calculated temperature of fixing point/exposed part (°C).....: | | — |
| | Ball-pressure test.....: | See Table 1.15 (13.2.1) | N/A |
| 13.12 (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 Table 1.15 (13.2.1) | N/A |
| 13.12 (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 |
| 13.12 (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 Table 1.15 (13.2.1) | N/A |

| | | | |
|---|---|---|---|
| **13.13 (9)** | **RESISTANCE TO DUST, SOLID OBJECTS AND MOISTURE** | | P |
| 13.13 (-) | If IP > IP 20 the order of tests as specified in clause 1.12 | | P |
| 13.13 (9.2) | Tests for ingress of dust, solid objects and moisture: | | — |
| | - classification according to IP.....: | IP67 | — |
| | - mounting position during test.....: | Normal use | — |
| | - fixing screws tightened; torque (Nm).....: | Fixing enclosure; 2.4 | — |
| | - tests according to clauses.....: | Clauses 9.2.0 and 9.2.5 | — |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - electric strength test afterwards | Clauses 10.2.2 | P |
| | a) no deposit in dust-proof luminaire | | P |
| | b) no talcum in dust- tight luminaire | | P |
| | c) no trace of water on current-carrying parts or on insulation where it could become a hazard | | P |
| | d) i) For luminaires without drain holes – no water entry | | P |
| | d) ii) For luminaires with drain holes – no hazardous water entry | | N/A |
| | e) no water in watertight luminaire | | N/A |
| | f) no contact with live parts (IP 2X) | | N/A |
| | f) no entry into enclosure (IP 3X and IP 4X) | | N/A |
| | f) no contact with live parts (IP3X and IP4X) | | N/A |
| | g) no trace of water on part of lamp requiring protection from splashing water | | N/A |
| | h) no damage of protective shield or glass envelope | | P |
| 13.13 (9.3) | Humidity test 48 h | 25°C, 93%RH | P |
| **13.14 (10)** | **INSULATION RESISTANCE AND ELECTRIC STRENGTH** | | P |
| 13.14 (10.2.1) | Insulation resistance test | | P |
| | Cable or cord covered by metal foil or replaced by a metal rod of mm Ø .....: | | — |
| | Insulation resistance (MΩ)..... : | | — |
| | SELV | | 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 | | P |
| | - between live parts of different polarity..... : | | N/A |
| | - between live parts and mounting surface.....: | 100MΩ, limit: 2 MΩ | P |
| | - between live parts and metal parts.....: | 100MΩ, limit: 2 MΩ | P |

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|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - 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 |
| 1.14 (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)..... : | | N/A |
| | SELV | | 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 | | P |
| | - between live parts of different polarity..... : | | N/A |
| | - between live parts and mounting surface.....: | 1480Vac, no breakdown | P |
| | - between live parts and metal parts.....: | 1480Vac, no breakdown | P |
| | - 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 |
| 13.14 (10.3) | Touch current or protective conductor current (mA).: | 0.035mA＜0.7mA | P |
| **13.15 (13)** | **RESISTANCE TO HEAT, FIRE AND TRACKING** | | P |
| 13.15 (13.2.1) | Ball-pressure test..... : | See Test Table 1.15 (13.2.1) | P |

| EN 60598-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 13.15 (13.3.1) | Needle-flame test (10 s).....: | See Test Table 1.15 (13.3.1) | N/A |
| 13.15 (13.3.2) | Glow- wire test (650°C).....: | See Test Table 1.15 (13.3.2) | P |
| 13.15 (13.4) | Proof tracking test (IEC 60112).....: | See Test Table 1.15 (13.4) | N/A |
| **13.7 (11.2)** | **TABLES: Creepage distances and clearances** | | P |
| **Table 11.1** | **Minimum distances (mm) for a.c. (50/60 Hz) sinusoidal voltages** | | P |

| RMS working voltage (V) not exceeding | 50 | 150 | 250 | 500 | 750 | 1000 |
|---|---|---|---|---|---|---|
| **Creepage distances** | | | | | | |
| Required basic insulation, PTI ≥ 600 | 0,6 | 0,8 | 1,5 | 3 | 4 | 5,5 |
| Measured | | | | | | |
| Required basic insulation, PTI < 600 | 1,2 | 1,6 | 2,5 | 5 | 8 | 10 |
| Measured | | | | | | |
| Required supplementary insulation PTI ≥ 600 | - | 0,8 | 1,5 | 3 | 4 | 5,5 |
| Measured | | | | | | |
| Required supplementary insulation PTI < 600 | - | 1,6 | 2,5 | 5 | 8 | 10 |
| Measured | | | | | | |
| Required reinforced insulation | - | 3,2 | 5 | 6 | 8 | 11 |
| Measured | | | | | | |
| **Clearances** | | | | | | |
| Required basic insulation | 0,2 | 0,8 | 1,5 | 3 | 4 | 5,5 |
| Measured | | | | | | |
| Required supplementary insulation | - | 0,8 | 1,5 | 3 | 4 | 5,5 |
| Measured | | | | | | |
| Required reinforced insulation | - | 1,6 | 3 | 6 | 8 | 11 |
| Measured | | | | | | |

| **Table 11.2** | **Minimum distances (mm) for non-sinusoidal pulse voltages** | **N/A** |
|---|---|---|

| EN 60598-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Rated pulse voltage (peak kV) | 2,0 | 2,5 | 3,0 | 4,0 | 5,0 | 6,0 | 8,0 |
| Required clearances | 1,0 | 1,5 | 2 | 3 | 4 | 5,5 | 8 |
| Measured | | | | | | | |
| Rated pulse voltage (peak kV) | 10 | 12 | 15 | 20 | 25 | 30 | 40 |
| Required clearances | 11 | 14 | 18 | 25 | 33 | 40 | 60 |
| Measured | | | | | | | |
| Rated pulse voltage (peak kV) | 50 | 60 | 80 | 100 | - | - | - |
| Required clearances | 75 | 90 | 130 | 170 | - | - | - |
| Measured | | | | | | | |

| EN 60598-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

**Measured TABLE:**

| 1.7 (11.2) | TABLES: Creepage distances and clearances | | | | | P |
|---|---|---|---|---|---|---|
| Test Location | Working voltage | Measured cl (mm) | Required cl (mm) | Measured cr (mm) | Required cr (mm) | Verdict |
| L/N | 220-240V~ | 3.5 | 1.5 | 3.5 | 2.5 | P |
| Current-carrying parts and accessible parts | 220-240V~ | 5.8 | 1.5 | 5.8 | 2.5 | P |
| Current-carrying parts and mounting surface | 220-240V~ | 5.8 | 1.5 | 5.8 | 2.5 | P |

| 1.15 (13.2.1) | TABLE: Ball Pressure Test of Thermoplastics | | | P |
|---|---|---|---|---|
| **Allowed impression diameter (mm) .....:** | | 2,0mm | | — |
| Object/ Part No./ Material | Manufacturer/ trademark | Test temperature (°C) | Impression diameter (mm) | |
| LED cover | -- | 75°C | 0.8mm | |
| - | -- | - | - | |
| Supplementary information:-- | | | | |

| 1.15 (13.3.1) | TABLE: Needle-flame test (IEC 60695-11-5) | | | | | N/A |
|---|---|---|---|---|---|---|
| Object/ Part No./ Material | Manufacturer/ trademark | Duration of application of test flame (ta); (s) | Ignition of specified layer Yes/No | Duration of burning (tb) (s) | Verdict | |
| -- | -- | -- | -- | -- | -- | |
| Supplementary information:-- | | | | | | |

| 1.15 (13.3.2) | TABLE: Glow-wire test (IEC 60695-2-11) | | | | | P |
|---|---|---|---|---|---|---|
| **Glow wire temperature .....:** | | 650°C | | | | — |
| Object/ Part No./ Material | Manufacturer/ trademark | Duration of application of test flame (ta); (s) | Ignition of specified layer Yes/No | Duration of burning (tb) (s) | Verdict | |
| LED cover | -- | 30 | 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:-- | | | | | | |

| EN 60598-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| 1.15 (13.4) | **TABLE: Proof tracking test (IEC 60112)** | | | | **N/A** |
|---|---|---|---|---|---|
| **Test voltage PTI ..... :** | | 175 V | | | — |
| Object/ Part No./ Material | Manufacturer/ trademark | Withstand 50 drops without failure on three places or on three specimens | | | Verdict |
| -- | -- | -- | -- | -- | -- |
| | | | | | |
| Supplementary information:-- | | | | | |

| **ANNEX 1** | **TABLE: Critical components information** | | | | | -- |
|---|---|---|---|---|---|---|
| **Object / part No.** | **Code** | **Manufacturer/ trademark** | **Type / model** | **Technical data** | **Standard** | **Mark(s) of conformity[1)]** |
| LED PCB | B | Various | Various | 130°C | UL796 | UL |
| Supply cord | B | Zhongshancity Defang Wire & Cable Co.,Ltd. | H05RN-F | 3*0.75mm$^2$ 300/500V | IEC 60245 | VDE 40049745 |
| | | | | | | |
| | | | | | | |

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

| **ANNEX 2** | **TABLE: Temperature measurements, thermal tests of Section 12** | | P |
|---|---|---|---|
| | Type reference.....: | X2CT12200SH | — |
| | Lamp used.....: | LED module | — |
| | Lamp control gear used.....: | LED driver | — |
| | Mounting position of luminaire.....: | Normal use | — |
| | Supply wattage (W).....: | | — |
| | Supply current (A)..... : | | — |
| | Calculated power factor.....: | | — |

| EN 60598-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| | | | |
|---|---|---|---|
| | Table: measured temperatures corrected for ta = 25 °C: | | P |
| | - abnormal operating mode.....: | | — |
| | - test 1: rated voltage.....: | | — |
| | - test 2: 1,06 times rated voltage or 1,05 times rated wattage.....: | | — |
| | - test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage..... : | | — |
| | - test 4: 1,1 times rated voltage or 1,05 times rated wattage.....: | | — |
| | Through wiring or looping-in wiring loaded by a current of A during the test ..... : | | — |

**Temperature measurements, (°C)**

| Part | Clause 12.4 – normal | | | | Clause 12.5 – abnormal | |
|---|---|---|---|---|---|---|
| | test 1 | test 2 | test 3 | limit | test 4 | limit |
| Supply cord | -- | 36.4 | -- | 90 | -- | -- |
| Tc of LED driver | -- | 56.8 | -- | 85 | -- | -- |
| PCB near LED | -- | 65.7 | -- | Ref. | -- | -- |
| Mounting surface | -- | 38.2 | -- | 90 | -- | -- |
| Incrustation | -- | 46.3 | -- | 70 | -- | -- |
| Ambient | -- | 25,0 | -- | -- | -- | -- |
| | | | | | | |
| | | | | | | |

Supplementary information:

| | | | |
|---|---|---|---|
| **ANNEX 3** | **Screw terminals (part of the luminaire)** | | N/A |
| **(14)** | **SCREW TERMINALS** | | N/A |
| (14.2) | Type of terminal.....: | | — |
| | 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)..... : | | — |
| (14.3.3) | Conductor space (mm).....: | | N/A |
| (14.4) | Mechanical tests | | N/A |

| EN 60598-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| (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 |

| **ANNEX 4** | **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) | Terminals and connections for internal wiring | | N/A |
| (15.5.1) | Mechanical tests | | N/A |
| (15.5.1.1.1) | Pull test spring-type terminals (4 N, 4 samples).....: | | N/A |
| (15.5.1.1.2) | Pull test pin or tab terminals (4 N, 4 samples).....: | | N/A |
| | Insertion force not exceeding 50 N | | N/A |

| EN 60598-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| (15.5.1.2) | Permanent connections: pull-off test (20 N) | | N/A |
| (15.5.2) | Electrical tests | | N/A |
| | 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 |
| (15.6) | Terminals and connections for external wiring | | N/A |
| (15.6.1) | Conductors | | N/A |
| | Terminal size and rating | | N/A |
| 15.6.2 | Mechanical tests | | N/A |
| (15.6.2.1) | Pull test spring-type terminals or welded connections (4 samples); pull (N) ..... : | | N/A |
| (15.6.2.2) | Pull test pin or tab terminals (4 samples); pull (N) .....: | | N/A |
| (15.6.3) | Electrical tests | | N/A |
| | Tests according 15.6.3.1 + 15.6.3.2 in IEC 60598-1 | | N/A |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **(15.6.3.1)** | **TABLE: Contact resistance test / Heating tests** | | | | | | | | | N/A |
| **(15.6.3.2)** | Voltage drop (mV) after 1 h | | | | | | | | | — |
| terminal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| voltage drop (mV) | | | | | | | | | | |
| | Voltage drop of two inseparable joints | | | | | | | | | |
| | Voltage drop after 10th alt. 25th cycle | | | | | | | | | |
| | Max. allowed voltage drop (mV).....: | | | | | | | | | — |
| terminal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| voltage drop (mV) | | | | | | | | | | |
| | Voltage drop after 50th alt. 100th cycle | | | | | | | | | |
| | Max. allowed voltage drop (mV).....: | | | | | | | | | — |
| terminal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

| EN 60598-2-13 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| voltage drop (mV) | | | | | | | | | | |
| | Continued ageing: voltage drop after 10th alt. 25th cycle | | | | | | | | | |
| | Max. allowed voltage drop (mV).....: | | | | | | | | | — |
| terminal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| voltage drop (mV) | | | | | | | | | | |
| | Continued ageing: voltage drop after 50th alt. 100th cycle | | | | | | | | | |
| | Max. allowed voltage drop (mV).....: | | | | | | | | | — |
| terminal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| voltage drop (mV) | | | | | | | | | | |
| Supplementary information:-- | | | | | | | | | | |

# Attachment No.1

| IEC 60598_2_13D-ATTACHMENT | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

## ATTACHMENT TO TEST REPORT IEC 60598-2-13
## EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

Luminaires

Part 2: Particular requirements

Section 13: Ground recessed luminaires

| | |
|---|---|
| **Differences according to..... :** | EN 60598-2-13:2006+A1:2012+A2:2016+A1:2021 used in conjunction with EN IEC 60598-1:2021 |
| **Annex Form No..... :** | EU_GD_IEC60598_2_13F |
| **Annex Form Originator..... :** | OVE |
| **Master Annex Form..... :** | 2021-03 |



| | | | |
|---|---|---|---|
| | **CENELEC COMMON MODIFICATIONS (EN)** | | P |

| | | | |
|---|---|---|---|
| **13.5 (3)** | **MARKING** | | **P** |
| 13.5 (3.3.101) | For luminaires not supplied with terminal block: Adequate warning on the package | | P |

| | | | |
|---|---|---|---|
| **13.6 (4)** | **CONSTRUCTION** | | **P** |
| 13.6 (4.11.6) | Electro-mechanical contact systems | | P |

| | | | |
|---|---|---|---|
| **13.10 (5)** | **EXTERNAL AND INTERNAL WIRING** | | **P** |
| 13.10 (5.2.1) | Connecting leads | | N/A |
| | - without a means for connection to the supply | | N/A |
| | - terminal block specified | | N/A |
| | - relevant information provided | | N/A |
| | - compliance with 4.6, 4.7.1, 4.7.2, 4.10.1, 11.2, 12 and 13.2 of Part 1 | | N/A |
| 13.10 (5.2.2) | Cables equal to EN 50525 | | N/A |
| | Replace table 5.1 – Supply cord | | P |

# Attachment No.1

| IEC 60598_2_13D-ATTACHMENT | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **13.12 (12)** | **ENDURANCE TESTS AND THERMAL TESTS** | | **P** |
| 13.12 (12.4.2c) | Thermal test (normal operation)<br>see footnote c to table 12.2 relating to unsleeved fixed wiring | | P |
| **ZB** | **ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)** | | P |
| (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 | | P |
| **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><br>(Arrêté du 30 décembre 2011 portant règlement de sécurité pour la construction des immeubles de grande hauteur et leur protection contre les risques d'incendie et de panique; Section VIII; Article GH 48, Eclairage)<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 |
| (13.3) | GB: Requirements according to United Kingdom Building Regulation | | N/A |

# Attachment No.2

## Photo Documentation

View:

[ ]General
[ X ]Front
[ ]Rear
[ ]Internal
[ ]Top
[ ]Bottom
[ ]PWB

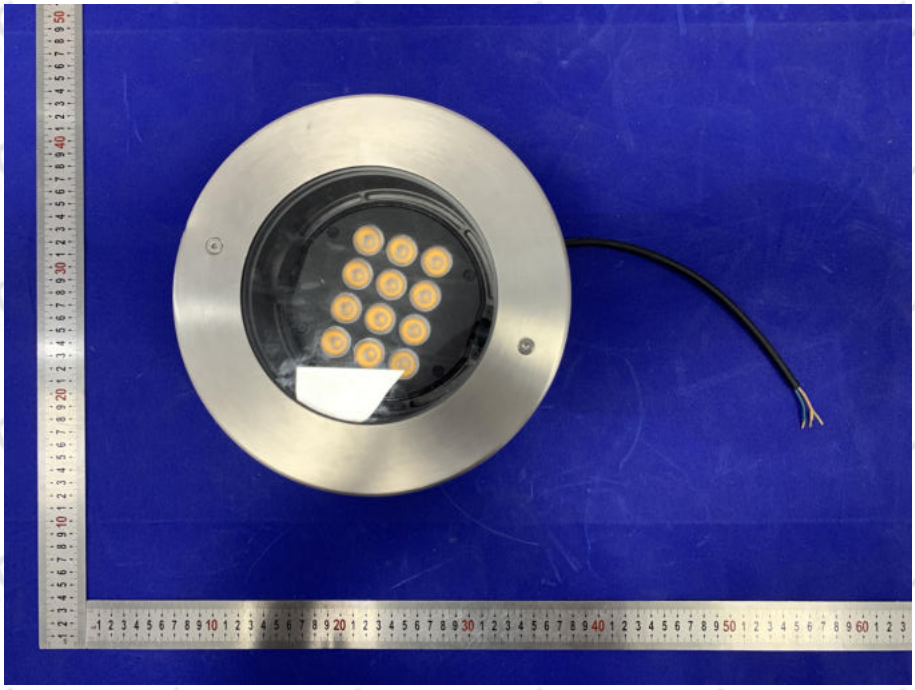

Figure 1

View:

[X]General
[ ]Front
[ ]Rear
[ ]Internal
[ ]Top
[ ]Bottom
[ ]PWB

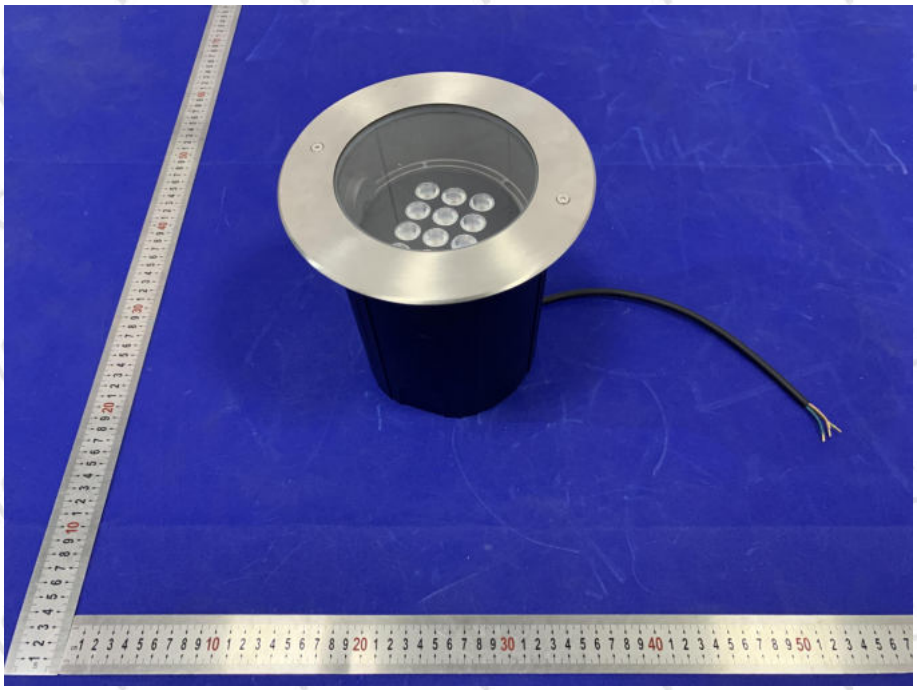

Figure 2