Test Report issued under the responsibility of:

TÜVRheinland®

# TEST REPORT
## IEC 62560
## Self-Ballasted LED-Lamp
## for general lighting services by voltage > 50V Safety specifications

| | |
|---|---|
| **Report Number** ..... : | **16041016 001** |
| Date of issue ..... : | **2012-05-31** |
| Total number of pages ..... : | **26** |

| | |
|---|---|
| **Applicant's name** ..... : | **Foshan Nationstar Optoelectronics Co., Ltd.** |
| Address ..... : | No.18 South Huabao Road, Chan Cheng District, FoShan, GuangDong, 528000 P.R.China |

**Test specification:**

| | |
|---|---|
| Standard ..... : | IEC 62560:2011 (1st Edition) |
| Test procedure ..... : | CB Scheme |
| Non-standard test method ..... : | N/A |

| | |
|---|---|
| **Test Report Form No.** ..... : | IEC62560A |
| Test Report Form(s) Originator ..... : | DEKRA Certification B.V. |
| Master TRF ..... : | Dated 2011-04 |



If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

**This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.**

| | |
|---|---|
| **Test item description** ..... : | T8 LED Tube |
| Trade Mark ..... : | See label |
| Manufacturer ..... : | Same as applicant |
| Model/Type reference ..... : | NS-T8-2, NS-T8-3, NS-T8-4, NS-T8-5, NS-T8-2-B, NS-T8-4-B |
| Ratings ..... : | AC100-240V, 50-60Hz |

| Testing procedure and testing location: | | |
|---|---|---|
| ☒ | **CB Testing Laboratory:** | **TÜV Rheinland (Guangdong) Ltd.** |
| Testing location/ address..... : | | No.199 Kezhu Road, GZ Science City, Guangzhou 510663, P.R.China. |
| ☐ | **Associated CB Laboratory:** | **N/A** |
| Testing location/ address..... : | | |
| Tested by (name + signature).....: | | **Zoe Cao** |
| Approved by (name + signature) .....: | | **Eileen Feng** |
| ☐ | **Testing procedure: TMP** | **N/A** |
| Testing location/ address..... : | | |
| Tested by (name + signature).....: | | |
| Approved by (name + signature) .....: | | |
| ☐ | **Testing procedure: WMT** | **N/A** |
| Testing location/ address..... : | | |
| Tested by (name + signature).....: | | |
| Witnessed by (name + signature).....: | | |
| Approved by (name + signature) .....: | | |
| ☐ | **Testing procedure: SMT** | **N/A** |
| Testing location/ address..... : | | |
| Tested by (name + signature).....: | | |
| Approved by (name + signature) .....: | | |
| Supervised by (name + signature)....: | | |
| ☐ | **Testing procedure: RMT** | **N/A** |
| Testing location/ address..... : | | |
| Tested by (name + signature).....: | | |
| Approved by (name + signature) .....: | | |
| Supervised by (name + signature)....: | | |

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

1. Cap temperature and other parts temperature refer to Annex 1.
2. Overpower test according to 62031 refer to Annex 2.
3. G13 cap test according to 61195 refer to Annex 3.
4. Dimension requirement for interchange according to 60081 refer to Annex 4.

**Summary of testing:**

| **Tests performed (name of test and test clause):** | **Testing location:** |
|---|---|
| 1. Full tests are performed on model NS-T8-3 & NS-T8-4, NS-T8-5, NS-T8-2-B, NS-T8-4-B.<br>2. Dimension and gauge tests for lamp cap G13 are tested according to Data sheet 7006-51-8 of EN 60061-1, gauge 7006-45 of EN 60061-3 and clause 2.3, 2.7&2.9 requirements of EN 61195 (details see annex 4);<br>3. EN 62031 were considered for Led modules. Clause 13.2 overpower were tested on model NS-T8-3 & NS-T8-4, NS-T8-5, NS-T8-2-B, NS-T8-4-B. (details see annex 5)<br>4. Double-capped fluorescent lamps diagrammatic data sheet for location of Lamp dimensions according to EN 60081(details see annex 6).<br>5. EN 62471 was evaluated, emission limit: exempt group. | TÜV Rheinland (Guangdong) Ltd.<br>No.199 Kezhu Road, GZ Science City,<br>Guangzhou 510663, P.R.China. |

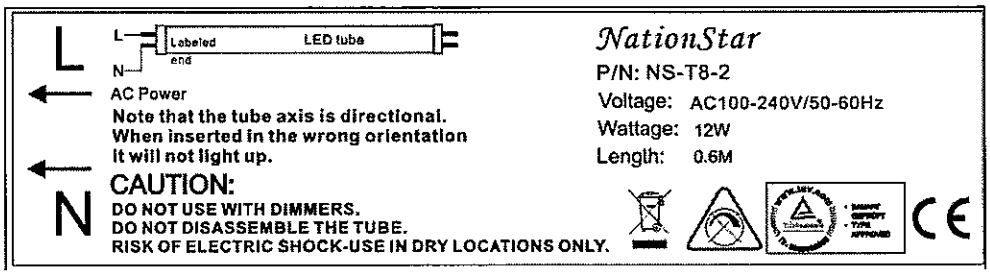
**Summary of compliance with National Differences**

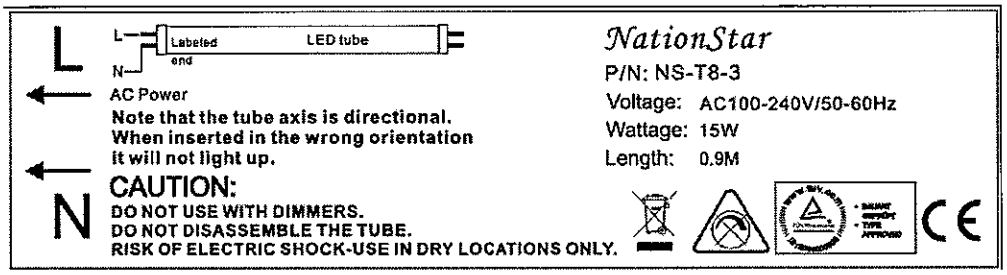
**List of countries addressed: N/A**

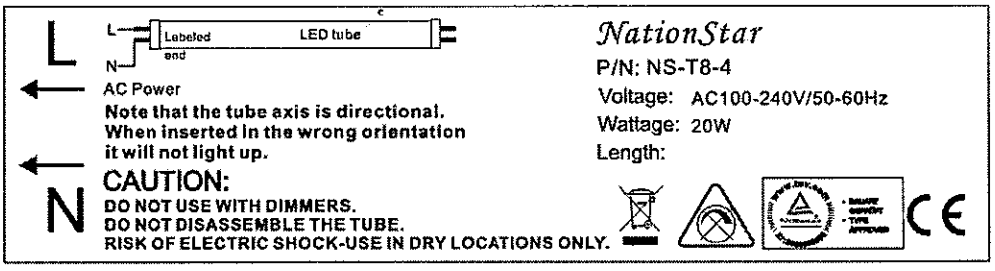
☐ **The product fulfils the requirements of IEC 62560**

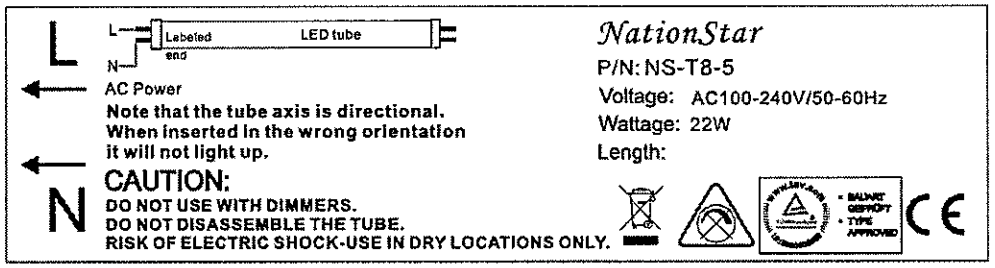
**Copy of marking plate**

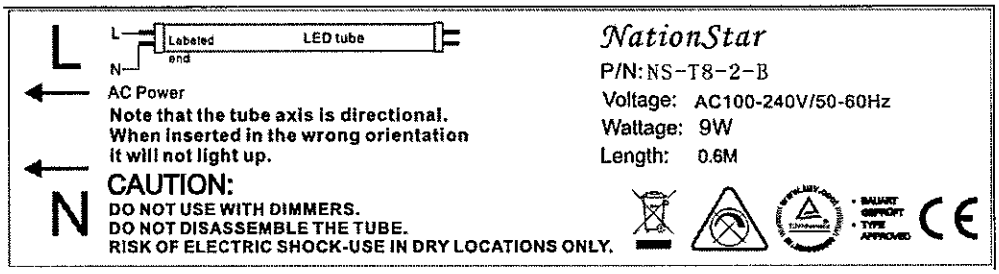
**The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.**

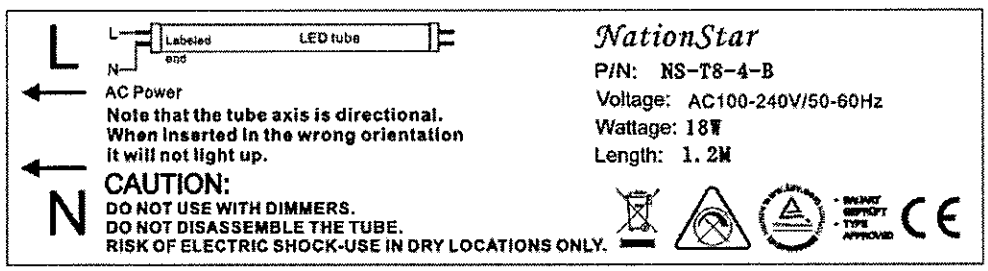



Label located on one end of the tube, size 135mmx35mm.

| | |
|---|---|
| **Test item particulars.....:** | |
| Classification of installation and use.....: | Class II |
| Supply Connection.....: | G13 cap |
| .....: | |
| **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.....: | 2012-05-07 |
| Date (s) of performance of tests.....: | 2012-05-07 to 2012-05-31 |

**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.

Clause numbers between brackets refer to clauses in IEC 61347-1

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

**Manufacturer's Declaration per sub-clause 6.2.5 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**
☒ **Not applicable**

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

**Name and address of factory (ies).....: N/A**

**General product information:**

1. T8 LED tube for general use, only for indoor use.
2. The Maximum weight of LED tube is 460 g, not be more than 500g. The pins of one G13 lamp cap are used for connection of power supply. The other cap's pins are short circuit. There is no electric shock hazard during single side insertion.
3. The models NS-T8-2 and NS-T8-3 have the same circuit diagram LF-G300, PCB layout, silkscreen and critical components, except the wattage, LEDs quantity, length, and parameters of R30, R35, R28&R29.
4. The model NS-T8-4 and NS-T8-5 have different circuit diagram LF-G301B, but same critical components with model NS-T8-3&NS-T8-2.
5. Model NS-T8-5 and NS-T8-4 have the same circuit diagram, PCB layout, silkscreen and critical components, except the wattage, LEDs quantity, input power and parameter of R30&R35.

6. Model NS-T8-2-B and NS-T8-4-B have the same circuit diagram, PCB layout, silkscreen and critical components with the original model NS-T8-2 and NS-T8-4-B separately, except the wattage, LEDs quantity and lamp cap. The lamp cap of the new models can rotate an angle less than 180 °C.
7. All model used the same LEDs.
8. Details as below table:

| Model | Rated Lamp wattage (W) | LED quantity (pcs) | Tube Dimension | Weight (g) | Rated output of LED driver |
|---|---|---|---|---|---|
| NS-T8-2 | 12W | 180 | Φ26mmxLength 600mmm | 210+/-20 | Max. 40Vdc |
| NS-T8-3 | 15W | 240 | Φ26mmxLength 900mmm | 320+/-20 | Max. 40Vdc |
| NS-T8-4 | 20W | 300 | Φ26mmxLength 1200mmm | 420+/-20 | Max. 40Vdc |
| NS-T8-5 | 22W | 324 | Φ26mmxLength 1500mmm | 460+/-30 | Max. 40Vdc |
| NS-T8-2-B | 9W | 144 | Φ26mmxLength 600mmm | 210+/-20 | Max. 40Vdc |
| NS-T8-4-B | 18W | 276 | Φ26mmxLength 1200mmm | 400+/-30 | Max. 40Vdc |

| IEC 62560 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| **4** | **GENERAL REQUIREMENTS** | | **P** |
| 4.1 | The lamp shall be so designed and constructed that in normal use cause no danger to the user. | | P |
| 4.2 | Self-ballasted LED-Lamp are non-repairable. | | P |
| **5** | **MARKING** | | **P** |
| 5.1 | Mandatory marking | | P |
| | - mark of origin | | P |
| | - rated supply voltage (V) ..... : | AC100-240V | P |
| | - rated wattage (W) ..... : | See label | P |
| | - rated frequency (Hz) ..... : | 50-60Hz | P |
| 5.2 | Addition marking | | P |
| | - burning position | | N/A |
| | - rated current (A) ..... : | | N/A |
| | - weight significantly higher | | N |
| | - special conditions or restrictions | Non-dimmable lamp | P |
| | - eye protection | | N/A |
| 5.3 | Marking durable and legible | | P |
| | rubbing 15 s water, 15 s petroleum; marking legible | | P |
| **6** | **INTERCHANGEABILITY** | | **P** |
| 6.1 | Cap interchangeability in accordance with IEC 60061-1 | | P |
| | Gauge in accordance with IEC 60061-3 | G13 | P |
| 6.2 | Bending moment | | P |
| | Bending moment imparted by the lamp at the lampholder | | N/A |
| **7** | **PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS** | | |
| | Internal, basic insulated or live metal parts not accessible | | P |
| | Tested with a test finger with a force of 10 N | | P |
| | Compliance checked with appropriate gauges | | P |
| **8** | **INSULATION RESISTANCE AND ELECTRIC STRENGTH** | | |

| IEC 62560 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| 8.2 | After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ): | | P |
| | ≥ 4 MΩ for double or reinforced insulation..... : | 100MΩ between live parts and enclosure. | P |
| 8.3 | Immediately after clause 8.2 electric strength test for 1 min | | P |
| | Double or reinforced insulation, 4U + 2000 V | 3000V | P |
| | No flashover or breakdown | | P |
| **9** | **MECHANICAL STRENGTH** | | |
| | Torsion resistance of unused lamps | | P |
| 9.1 | Torque test | | N/A |
| | B 15 d Cap.....1,15 Nm | | N/A |
| | B 22 d Cap.....3,0 Nm | | N/A |
| | E 11 Cap.....0,8 Nm | | N/A |
| | E 12 Cap.....0,8 Nm | | N/A |
| | E 14 Cap.....1,15 Nm | | N/A |
| | E 17 Cap.....1,5 Nm | | N/A |
| | E 26 or E27 Cap.....3,0 Nm | | N/A |
| | GX 53 Cap.....3,0 Nm | | N/A |
| 9.2 | Torsion resistance of lamps after a defined time of usage | | P |
| | Torsion resistance of used lamp | | P |
| 9.3 | Repetition of clause 8 | | P |
| | Clause 8 shall comply after the mechanical strength test. | | P |
| **10** | **CAP TEMPERATURE RISE** | | |
| | The cap temperature rise $\Delta t_s$ of the lamp shall not exceed 120 K. | See annex 1 | P |
| **11** | **RESISTANCE TO HEAT** | | **P** |
| | Parts of insulating material retaining live parts in position, ball-pressure test: | | P |
| | - part; test temperature (°C) .....: | See appendix table | P |
| | - part; test temperature (°C) .....: | See appendix table | P |
| | - part; test temperature (°C) .....: | See appendix table | P |
| | - part; test temperature (°C) .....: | See appendix table | P |

| IEC 62560 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| | - part; test temperature (°C) .....: | Power PCB: 125°C; 0,3mm | P |
| 12 | **RESISTANCE TO FLAME AND IGNITION** | | **P** |
| | External parts of insulating material preventing electric shock glow-wire test 650 °C | Plastic enclosure/Cap plastic/PCB /lamp plastic cover/insulation sheet/Bobbin of T | |
| | - flame extinguished within 30 s | No visible flame | P |
| | - no flaming drops igniting tissue paper | | P |
| 13 | **FAULT CONDITIONS** | | **P** |
| 13.2 | Extreme electrical conditions (dimmable lamps) | | N/A |
| | Lamp withstands overpower condition >15 min. | | N/A |
| | Lamp fails safe after 15 min overpower condition | | N/A |
| | Lamp with automatic protective device or power limiter, test performed 15 min. at limit. | | N/A |
| 13.3 | Extreme electrical conditions (non-dimmable lamps) | | P |
| | Tested according 13.2 (as far as possible) | see annex 2 | P |
| 13.4 | Short-circuit across capacitors | (see appended table) | P |
| 13.5 | Fault conditions: where diagram indicates fault condition impairs safety, electronic components have been short-circuited or disconnected | (see appended table) | P |
| 13.6 | When operated under fault conditions the lamp | | P |
| | - does not emit flames or molten material | | P |
| | - does not produce flammable gases or smoke | | P |
| | - live parts not accessible | | P |
| | After the tests the insulation resistance with d.c. 1000 V complies with requirements of Cl. 8.1.....: | 100M Ω | P |
| 14 (16) | **CREEPAGE DISTANCES AND CLEARANCES** | | **P** |
| | Creep age distances and clearances according to Table 3 and 4 of IEC 61347-1, as appropriate | (see appended table) | P |
| | Printed boards see clause 14 of IEC 61347-1 | | P |
| | Insulating lining of metallic enclosures | | N/A |
| 13 | **TABLE: tests of fault conditions( model NS-T8-4)** | | **P** |
| Part | Simulated fault | Result | Hazard |

| IEC 62560 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| BR1 (pin 1-4) | Disconnected | Lamp off immediately, recoverable | NO |
| BR1 (pin 1-4) | Short-circuit | Fused opened immediately | NO |
| C5 | Short-circuit | Fused opened immediately | NO |
| R3 | Short-circuit | Lamp on normally, 20,6W, 88mA | NO |
| R23 | Short-circuit | Lamp dim out , working under 7,6W, 37,0mA, | NO |
| C8 | Short-circuit | Lamp dim out , working under 7,5W, 37,0mA, | NO |
| R13 | Short-circuit | Lamp off immediately, recoverable | NO |
| D11 | Short-circuit | Lamp on normally, 20,5W, 85mA | NO |
| Q1(c-e) | Short-circuit | Lamp on normally, 21,0W, 86mA | NO |
| Q1(b-e) | Short-circuit | Lamp on normally, 20,5W, 85mA | NO |
| Q1(c-b) | Short-circuit | Lamp on normally, 21,0W, 86mA | NO |
| C3 | Short-circuit | Lamp off immediately, recoverable | NO |
| D6 | Short-circuit | Lamp on normally, 20,5W, 85mA | NO |
| C4 | Short-circuit | Lamp off immediately, C3, R18, R25 damaged. | NO |
| Q2(e-b) | Short-circuit | Lamp off immediately, recoverable | NO |
| D5 | Short-circuit | Lamp off immediately, recoverable | NO |
| D10 | Short-circuit | Lamp on, working under 25,4W, 104mA | NO |
| D10 | Disconnected | Lamp on normally, 20,8W, 85mA | NO |
| D12 | Short-circuit | Lamp off immediately, recoverable | NO |
| D7 | Short-circuit | Lamp on normally, 20,5W, 85mA | NO |
| D8 | Short-circuit | Lamp off immediately, R28,R29 damaged. | NO |
| C9 | Short-circuit | Lamp off immediately, recoverable | NO |
| U2A(2-3) | Short-circuit | Lamp flashed between 21,9W, 250mA and 18,7W, 238mA, after 30minutes normal working | NO |
| U3(1-3) | Short-circuit | Lamp off immediately, recoverable | NO |
| U3(2-3) | Short-circuit | Lamp off immediately, recoverable | NO |
| C12 | Short-circuit | Lamp on normally, 20,5W, 85mA | NO |
| U2B(5-6) | Short-circuit | Lamp off immediately, recoverable | NO |
| R6 | Short-circuit | Working under 28,5W, 104mA, after 20 minutes Lamp off , R28,R29 damaged. | NO |
| D2 | Short-circuit | Lamp off immediately, fuse opened, R28,R29 damaged. | NO |
| D13 | Short-circuit | Lamp off immediately, R28,R29, U1 damaged. | NO |
| Q3(b-e) | Short-circuit | Working under 45,4W, 183mA, after 1h R28&R29 damaged. | NO |

| IEC 62560 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| | | | |
|---|---|---|---|
| Q3 (c-e) | Short-circuit | Lamp on normally, 20,5W, 85mA | NO |
| Q3 (b-c) | Short-circuit | Lamp on normally, 20,6W, 87mA | NO |
| C17 | Short-circuit | Working under 54,6W, 252mA, after 4minutes, lamp off, R28, R29& U1 damaged | NO |
| C1 | Short-circuit | Lamp off immediately, R28,R29 damaged. | NO |
| LED(1 circuit) | Short-circuit | Lamp off immediately, recoverable | NO |
| LED | Disconnected | Lamp off immediately, recoverable | NO |

| **Abnormal condition :** Model NS-T8-4, 1. SC Q3(b-e) ; 2. SC C17 | | | |
|---|---|---|---|
| **Thermocouple point** | **Measured temperature( °C)** | | **Limit temperature** |
| | ***SC** Q3(b-e)* | *SC C17* | |
| Plastic enclosure , inside | 35,2 | 33,4 | Ref. |
| Cap plastic | 44,5 | 35,7 | Ref. |
| Power PCB | 78,0 | 103,8 | Ref. |
| Led PCB | 119,2 | 64,2 | Ref. |
| Mounting surface | 74,1 | 65,6 | 130 |
| Plastic cover | 47,6 | 55,4 | Ref. |
| Metal enclosure | 83,4 | 73,9 | 85 |

| 13 | **TABLE: tests of fault conditions( model NS-T8-3)** | | P |
|---|---|---|---|
| Part | Simulated fault | Result | Hazard |
| BR1 (pin 1-4) | Disconnected | Lamp off immediately, recoverable | NO |
| BR1 (pin 1-4) | Short-circuit | Fused opened immediately | NO |
| C20 | Short-circuit | Fused opened immediately | NO |
| R7 | Short-circuit | Lamp on normally, 15,7W, 67,0mA | NO |

| IEC 62560 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |
| R23 | Short-circuit | Lamp dim out , working under 6,1W, 32,0mA, | NO |
| C8 | Short-circuit | Lamp dim out , working under 6,0W, 32,0mA, | NO |
| R13 | Short-circuit | Lamp off dim out, working under 5,6W, 30,0mA, | NO |
| D12 | Short-circuit | Lamp on normally, 16,2W, 66mA | NO |
| Q2(c-e) | Short-circuit | Lamp on normally, 16,3W, 66mA | NO |
| Q2(b-e) | Short-circuit | Lamp on normally, 15,8W, 64mA | NO |
| Q2(c-b) | Short-circuit | Lamp on normally, 16,3W, 65mA | NO |
| C3 | Short-circuit | Lamp off immediately, recoverable | NO |
| D6 | Short-circuit | Lamp on normally, 16,1W, 66mA | NO |
| C13 | Short-circuit | Lamp off immediately, R28, R29 damaged. | NO |
| Q3 (b-e) | Short-circuit | Lamp off immediately, recoverable | NO |
| D5 | Short-circuit | Lamp off immediately, recoverable | NO |
| D10 | Short-circuit | Lamp flashed, working under 22,9W, 91,0mA, | NO |
| D10 | Disconnected | Lamp on normally, 16,5W, 66mA | NO |
| D11 | Short-circuit | Lamp off immediately, recoverable | NO |
| D7 | Short-circuit | Lamp on normally, 16,5W, 66mA | NO |
| D8 | Short-circuit | Lamp on normally, 13,7W, 66mA | NO |
| C9 | Short-circuit | Lamp off immediately, recoverable | NO |
| U1A(2-3) | Short-circuit | Lamp on normally, 16,4W, 96mA | NO |
| U3(1-3) | Short-circuit | Lamp on normally, 15,9W, 64mA | NO |
| U3(2-3) | Short-circuit | Lamp off immediately, recoverable | NO |
| C12 | Short-circuit | Lamp on normally, 16,0W, 65mA | NO |
| U1B(5-6) | Short-circuit | Lamp flashed, after 45minutes working under 14,5W, 86mA | NO |
| R6 | Short-circuit | Lamp on, working under 28,6W, 113mA, | NO |
| D2 | Short-circuit | Lamp off immediately, recoverable | NO |
| D13 | Short-circuit | Lamp off immediately, | NO |
| Q1(b-e) | Short-circuit | Working under 31,0W, 123mA, after 1h lamp off, R28&R29 damaged. | NO |
| Q1(c-e) | Short-circuit | Lamp on normally, 16,7W, 67mA | NO |
| Q1(c-b) | Short-circuit | Lamp on normally, 16,6W, 66mA | NO |
| C17 | Short-circuit | Lamp on, working under 27,8W, 111mA | NO |
| C2 | Short-circuit | Lamp off immediately, 7,8W, 44mA, recoverable | NO |
| LED(1 circuit) | Short-circuit | Lamp off immediately, 9,0W, 49mA | NO |
| LED | Disconnected | Lamp off immediately, recoverable | NO |

| IEC 62560 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| Abnormal condition : Model NS-T8-3, 1. SC Q1(b-e) ; | | | |
|---|---|---|---|
| Thermocouple point | Measured temperature( °C) | | Limit temperature |
| | SC Q1(b-e) | - | |
| Plastic enclosure , inside | 47,6 | - | Ref. |
| Cap plastic | 42,5 | - | Ref. |
| Power PCB | 74,5 | - | Ref. |
| Led PCB | 67,6 | - | Ref. |
| Mounting surface | 37,5 | - | 130 |
| Plastic cover | 33,1 | - | Ref. |
| Metal enclosure | 62,1 | - | 85 |

| IEC 62560 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| 11 | TABLE: Ball Pressure Test of Thermoplastics | | P |
|---|---|---|---|
| **Allowed impression diameter (mm) ..... :** | **2mm** | | — |
| **Part** | **Test temperature (°C)** | **Impression diameter (mm)** | |
| Plastic enclosure/cap plastic | 125 | 1,1 | |
| Lamp plastic cover | 125 | 1,1 | |
| Bobbin of transformer T2/T4 | 125 | 1,0 | |
| Bobbin of T1 | 125 | 1,0 | |
| LED PCB | 125 | 1,3 | |
| Power PCB | 125 | 1,2 | |
| Supplementary information: N/A | | | |

| 14(16) | TABLE: Clearance And Creep age Distance Measurements | | | | | P |
|---|---|---|---|---|---|---|
| **clearance cl and creep age distance decry at/of:** | **Up (V)** | **U rams. (V)** | **Required cl (mm)** | **cl (mm)** | **required cr (mm)** | **cr (mm)** |
| Between L&N | - | 240 | 1,5 | 4,0 | 1,5 | 4,0 |
| Between current fuse two pins | - | 240 | 1,5 | 10,0 | 1,5 | 10,0 |
| Between primary circuit and secondary circuit | - | 240 | 5,0 | 7,0 | 3,0 | 7,0 |
| Between transformer core and secondary circuit | - | 240 | 5,0 | 9,0 | 3,0 | 9,0 |
| Between lamp cap pins and accessible metal parts/screws | - | 240 | 5,0 | 6,0 | 3,0 | 6,0 |
| **Supplementary information: N/A** | | | | | | |

| IEC 62560 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| | TABLE: Critical components information | | | | P |
|---|---|---|---|---|---|
| **Object / part No.** | **Manufacturer/ trademark** | **Type / model** | **Technical data** | **Standard** | **Mark(s) of conformity[1)]** |
| Fuse (F2) | Shenzhen Lanson Electronics Co. Ltd. | 3K T2A250V | AC250V,2 A | EN 60127 | VDE 40010682 |
| Varistor (ZV1) | Shantou High-New Technology Dev. Zone Songtian Enterprise Co., Ltd. | 7D471K | 300VAC, T85 | IEC 61051 | VDE 40023049 |
| X2 capacitor (CX1) | Shenzhen Su Rong Capacitors Co., Ltd. | MPX/MKP | AC280V, 0,1μF, 40/100/21 | EN 60384-14 | VDE 40008924 |
| Opto-coupler(U4) | Bright Led Electronics Corp. | BPC-817C | Reinforced, T110 | EN 60747-5-2 | VDE 40007240 |
| Alternative | Everlight Electronics Co., Ltd. | EL817 V | Reinforced, T110 | EN 60747-5-2 | VDE 132249 |
| Y1 capacitor (CY1) | Shantou High-New Technology Dev. Zone Songtian Enterprise Co., Ltd. | CD-series | AC400V, 2200pF, T125 | EN 60384-14 | VDE 40025754 |
| Transformer (T2)<br>For NS-T8-4, NS-T8-4-B, NS-T8-5 | Shenzhen fengcai Electronic Co., Ltd | LF-G301 B1 | 21.5mmx16mmx 9.75mm; 560uH, 10 kHz, 0.3V | - | Tested with appliance |
| - Primary winding | SHEN ZHEN CITY CHENGWEI INDUSTRY CO LTD | 2UEW | 130°C,<br>N1:Φ0.27*1C,20TS N3:Φ0.18*1C, 13TS<br>N4:Φ0.27*1C, 7TS<br>N5:copper 3mm*0,05,1.1TS | - | UL E227475 |
| -Secondary winding | Shang hai xiang xiang Electronic Co. Ltd. | TKE-B | N2: 130℃, Φ0,3*1C, 28TS | - | VDE 40026588 |
| - Bobbin | CHANG CHUN PLASTICS CO LTD | T375HF | PMC, min. thickness 1,0mm | - | UL E59481 |

| IEC 62560 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| | | | | | |
|---|---|---|---|---|---|
| - insulation tape | SHENZHEN XINHUAHUI PLASTIC & INSULATION MATERIAL CO LTD | HMT803 | 130°C | - | UL E328315 |
| Transformer (T4) for NS-T8-4, NS-T8-4-B, NS-T8-5 | Shenzhen fengcai Electronic Co., Ltd | LF-G301 B2 | 21.5mmx16mmx 9.75mm; 560uH, 10 kHz, 0.3V | - | Tested with appliance |
| - Primary winding | SHEN ZHEN CITY CHENGWEI INDUSTRY CO LTD | 2UEW | 130°C, N1:Φ0.27*1C,20 TS N3:Φ0.27*1C,7T S N4: copper 3*0,05mm 1.1 TS | - | UL E227475 |
| -Secondary winding | Shang hai xiang xiang Electronic Co. Ltd. | TKE-B | N2:130℃,Φ0,3* 1C, 28TS | - | VDE 40026588 |
| - Bobbin | CHANG CHUN PLASTICS CO LTD | T375HF | PMC, min. thickness 1,0mm | - | UL E59481 |
| - insulation tape | SHENZHEN XINHUAHUI PLASTIC & INSULATION MATERIAL CO LTD | HMT803 | 130°C | - | UL E328315 |
| Transformer (T4) for NS-T8-2, NS-T8-2-B, NS-T8-3 | Shenzhen fengcai Electronic Co., Ltd | LF-G300 | 21.5mmx16mmx 9.75mm; 560uH, 10 kHz, 0.3V | - | Tested with appliance |
| - Primary winding | SHEN ZHEN CITY CHENGWEI INDUSTRY CO LTD | 2UEW | 130°C, N1:Φ0.2*1C,30T S N3:Φ0.2*1C,12T S N4:Φ0.2*1C,26T S N5: copper 4*0,05mm 1.1 TS | - | UL E227475 |

| IEC 62560 | | | | | |
|---|---|---|---|---|---|
| Clause | Requirement + Test | | Result - Remark | | Verdict |
| -Secondary winding | Shang hai xiang xiang Electronic Co. Ltd. | TKE-B | N2:130℃,Φ0,3* 1C, 32TS | - | VDE 40026588 |
| - Bobbin | CHANG CHUN PLASTICS CO LTD | T375HF | PMC, min. thickness 1,0mm | - | UL E59481 |
| - insulation tape | SHENZHEN XINHUAHUI PLASTIC & INSULATION MATERIAL CO LTD | HMT803 | 130°C | - | UL E328315 |
| T1 Inductor | Shenzhen fengcai Electronic Co., Ltd | EE10 | 30mH, 1kHz 0.3V, | - | Tested with appliance |
| - winding | SHEN ZHEN CITY CHENGWEI INDUSTRY CO LTD | 2UEW | Polyurethane MW75-C, 130°C | - | UL E227475 |
| T2 Inductor For model NS-T8-2, NS-T8-2-B, NS-T8-3 | Shenzhen fengcai Electronic Co., Ltd | 6*3*3 | 225uH, | - | Tested with appliance |
| - winding | SHEN ZHEN CITY CHENGWEI INDUSTRY CO LTD | 2UEW | Polyurethane MW75-C, 130°C | - | UL E227475 |
| T3 Inductor For model NS-T8-4, NS-T8-4-B, NS-T8-5 | Shenzhen fengcai Electronic Co., Ltd | 6*3*3 | 225uH, | EN 60968 | Tested with appliance |
| - winding | SHEN ZHEN CITY CHENGWEI INDUSTRY CO LTD | 2UEW | Polyurethane, MW75-C, 130°C | - | UL E227475 |
| E Capacitor (C1,C2) | Zhaoqing BERYL Electronic Co.,Ltd | RC | 470uF, 105°C | - | Tested with appliance |
| E Capacitor (C3) | Zhaoqing BERYL Electronic Co.,Ltd | RC | 47uF, 105°C | - | Tested with appliance |
| Input wire of LED driver | DONGGUAN WENCHANG ELECTRONIC CO LTD | UL1672 | Min. AWG24, 105°C, 300V | - | UL E214500 |
| Output Wire of LED driver | GUANG DONG XIN LONG ENTERPRISE CO | UL1007 | AWG22, 300Vac,80°C | - | UL E207567 |
| PCB | GLOBAL PRECISION CIRCUITS CO LTD | T-1 | 94V-0, 130°C | - | UL E324220 |

| IEC 62560 | | | |
|---|---|---|---|
| Clause | Requirement + Test | Result - Remark | Verdict |

| | | | | | |
|---|---|---|---|---|---|
| Alternative | HESHAN XING FA CIRCUIT BOARD FACTORY | XF-D | 94V-0, 130°C | - | UL E325976 |
| Cap plastic | TEIJIN CHEMICALS PLASTIC COMPOUNDS SHANGHAI LTD | L-1250Z (#)(f1) | PC, 94V-2, min. thickness 2,0mm | - | UL E244324 |
| Transparent plastic cover | TEIJIN CHEMICALS PLASTIC COMPOUNDS SHANGHAI LTD | L-1250Z (#)(f1) | PC, 94V-2 | - | UL E244324 |
| Insulation tape | E I DUPONT DE NEMOURS & CO INC | PI, type 315WPS | 94V-0 | - | UL E39505 |
| Alternative | SABIC INNOVATIVE PLASTICS BV | FR60 | 94 V-0 | - | UL E103380 |
| Tubing, Extruded Insulating | CHANGYUAN ELECTRONICS (SHENZHEN) CO LTD | CB-HFT | 600V 125°C | - | UL E180908 |
| LEDs | Nationstar | 3528 | 0.06W, 20mA | EN 60968 | Tested with appliance |
| Tube | FOSHAN NANHUA INSULATION MATERIAL CO LTD | 2752-II | Silicone coated fiberglass sleeving | - | UL E241210 |
| Alternative | NIZING ELECTRIC CO LTD | HST-600 | Silicone coated fiberglass sleeving | - | UL E241200 |

Supplementary information:

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

| | | | |
|---|---|---|---|
| **Annex 1** | **IEC 62560:2011** | | **P** |
| 12 | Temperature measurements, thermal tests of Section 12 | | **P** |
| | Type reference ..... : | NS-T8-4, NS-T8-3 | — |
| | Lamp used ..... : | LED tube | — |
| | Lamp control gear used ..... : | Build in LED driver | — |
| | Table: measured temperatures corrected for ta = 25 °C | | P |
| | - test 1: rated voltage ..... : | 240V | — |

| test point | NS-T8-4 | | NS-T8-3 | | NS-T8-5 | |
|---|---|---|---|---|---|---|
| | Measured value(°C) | Limit value (°C) | Measured value(°C) | Limit value(°C) | Measured value(°C) | Limit value(°C) |
| Cap G13 | 4,2 | 95K | 5,1 | 95K | 3,2 | 95K |
| Cap G13 plastic | 39,4 | For material test | 33,4 | 100 | 28,7 | For material test |
| LED tube plastic enclosure (internal) | 31,2 | For material test | 33,3 | 100 | 33,0 | For material test |
| Metal enclosure, outside | 43,2 | 85 | 46,9 | 85 | 44,4 | 85 |
| LED PCB | 55,7 | 130 | 57,8 | 130 | 47,3 | 130 |
| Led driver PCB | 72,8 | 130 | 54,7 | 130 | 71,1 | 130 |
| Led driver PCB | 63,5 | 130 | 66,8 | 130 | 71,1 | 130 |
| CX1, X2 capacitor | 52,9 | T100 | 56,8 | T100 | 46,9 | T100 |
| T1 winding | 54,7 | 130 | 61,6 | 130 | 46,5 | 130 |
| ZV1 | 56,5 | T85 | 66,4 | T85 | 49,5 | T85 |
| C3 | 64,8 | T105 | 67,6 | T105 | 58,9 | T105 |
| T4, transformer winding | 65,8 | 130 | 74,2 | 130 | 56,2 | 130 |
| T2, transformer winding | 66,1 | 130 | - | - | 55,9 | 130 |
| CY1 | 64,6 | T125 | 64,6 | T125 | 52,4 | T125 |
| C1, E cap | 63,9 | T105 | 63,5 | T105 | 49,8 | T105 |
| T3/T2 winding | 56,1 | 130 | 87,1 | 130 | - | - |
| Internal wire to cap | 34,9 | T105 | 36,0 | T105 | 33,6 | T105 |
| Internal wire to LEDs | 51,3 | T80 | 51,2 | T80 | 40,2 | T80 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Internal wire to Led driver | 47,8 | T105 | 54,5 | T105 | - | - |
| Lampholder | 30,3 | Reference | 30,7 | Reference | - | - |
| Light object (10cm) | 30,9 | 90 | 31,6 | 90 | - | - |
| Plastic, lamp cover | 33,5 | 85 | 36,1 | 85 | 40,6 | 85 |
| Mounting surface | 35,5 | 90 | 37,6 | 90 | 36,5 | 90 |

| **Annex 1** | **IEC 62560:2011** | | **P** |
|---|---|---|---|
| 12 | Temperature measurements, thermal tests of Section 12 | | **P** |
| | Type reference ..... : | NS-T8-2-B, NS-T8-2-B | — |
| | Lamp used ..... : | LED tube | — |
| | Lamp control gear used ..... : | Build in LED driver | — |
| | Table: measured temperatures corrected for ta = 25 °C | | P |
| | - test 1: rated voltage ..... : | 240V | — |

| test point | NS-T8-4-B | | NS-T8-2-B | | - | |
|---|---|---|---|---|---|---|
| | Measured value(°C) | Limit value (°C) | Measured value(°C) | Limit value(°C) | Measured value(°C) | Limit value(°C) |
| Cap G13 | 3,2 | 95K | 5,2 | 95K | - | - |
| Cap G13 plastic | 27,4 | For material test | 29,5 | 100 | - | - |
| LED tube plastic enclosure (internal) | 26,3 | For material test | 34,9 | 100 | - | - |
| Metal enclosure, outside | 36,6 | 90 | 46,0 | 85 | - | - |
| LED PCB | 40,1 | 130 | 48,7 | 130 | - | - |
| Led driver PCB | 70,8 | 130 | 72,5 | 130 | - | - |
| C3, EK | 66,1 | T105 | 58,7 | T105 | - | - |
| T4, transformer winding | 58,5 | 130 | 61,2 | 130 | - | - |
| T2, transformer winding | 57,9 | 130 | - | - | - | - |
| C1, E cap | 51,8 | T105 | 55,2 | T105 | - | - |
| T3/T2 winding | 43,9 | 130 | 48,5 | 130 | - | - |
| Mounting surface | 35,6 | 90 | 38,6 | 90 | - | - |
| Plastic lamp cover | 38,4 | For material | 43,7 | For material | - | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | test | | test | | |

| **Annex 2: EN 62031: 2008** | | | **P** |
|---|---|---|---|
| Clause 13.2 overpower condition | Position: Appliance positioned on the test corner.<br>Duration: 15 minutes<br>Operation: increased to 150% the rated current or power, module withstands overpower condition >15 min. | | |
| | test voltage: 360V | Ta: 25°C | |
| Model NS-T8-4 | Thermocouple point | Measured temperature ( °C ) | Limitation |
| | Lamp plastic enclosure (internal ) | 26,1 | Reference |
| | Lamp plastic cover | 26,6 | Reference |
| | Cap plastic | 28,5 | Reference |
| | Metal enclosure | 28,1 | Reference |
| | PCB of LED driver | 44,6 | Reference |
| | LED PCB | 32,7 | Reference |
| | Mouting surface | 26,5 | 130 |
| Observation: BR1,R28,R29 broken immediately, No fire, molten material, smoke or flammable gas is produced. | | | |

| **Annex 2: EN 62031: 2008** | | | **P** |
|---|---|---|---|
| Clause 13.2 overpower condition | Position: Appliance positioned on the test corner.<br>Duration: until stable<br>Operation: increased to 150% the rated current or power, module withstands overpower condition >15 min. | | |
| | test voltage: 360V | Ta: 25°C | |
| Model NS-T8-3 | Thermocouple point | Measured temperature ( °C ) | Limitation |
| | Lamp plastic enclosure (internal ) | 35,6 | Reference |
| | Lamp plastic cover | 37,5 | Reference |

| | | | |
|---|---|---|---|
| | Cap plastic | 33,6 | Reference |
| | Metal enclosure | 47,8 | Reference |
| | PCB of LED driver | 57,9 | Reference |
| | LED PCB | 59,0 | Reference |
| | Mouting surface | 35,2 | 130 |
| Observation: Tested until steady condition, no fire, molten material, smoke or flammable gas is produced. | | | |

| **Annex 2: EN 62031: 2008** | | | **P** |
|---|---|---|---|
| Clause 13.2 overpower condition | Position: Appliance positioned on the test corner.<br>Duration: 15 minutes<br>Operation: increased to 150% the rated current or power, module withstands overpower condition >15 min. | | |
| | test voltage: 360V | Ta: 25°C | |
| Model NS-T8-5 | Thermocouple point | Measured temperature ( °C ) | Limitation |
| | plastic enclosure (internal ) | 33,5 | Reference |
| | Lamp plastic cover | 40,1 | Reference |
| | Cap plastic | 29,0 | Reference |
| | Metal enclosure | 48,6 | Reference |
| | PCB of LED driver | 75,8 | Reference |
| | LED PCB | 49,1 | Reference |
| | Mouting surface | 36,6 | 130 |
| Observation: No fire, molten material, smoke or flammable gas is produced. | | | |

| **Annex 2: EN 62031: 2008** | **P** |
|---|---|

| | | | |
|---|---|---|---|
| Clause 13.2 overpower condition | Position: Appliance positioned on the test corner.<br>Duration: 15 minutes<br>Operation: increased to 150% the rated current or power, module withstands overpower condition >15 min. | | |
| | test voltage: 360V | Ta: 25°C | |
| Model NS-T8-4-B | Thermocouple point | Measured temperature ( °C ) | Limitation |
| | Lamp plastic enclosure (internal ) | 26,1 | Reference |
| | Lamp plastic cover | 38,5 | Reference |
| | Cap plastic | 26,5 | Reference |
| | Metal enclosure | 36,2 | Reference |
| | PCB of LED driver | 98,6 | Reference |
| | LED PCB | 39,7 | Reference |
| | Mouting surface | 35,5 | 130 |
| Observation: No fire, molten material, smoke or flammable gas is produced. | | | |

| **Annex 2: EN 62031: 2008** | | | **P** |
|---|---|---|---|
| Clause 13.2 overpower condition | Position: Appliance positioned on the test corner.<br>Duration: until stable<br>Operation: increased to 150% the rated current or power, module withstands overpower condition >15 min. | | |
| | test voltage: 360V | Ta: 25°C | |
| Model NS-T8-2-B | Thermocouple point | Measured temperature ( °C ) | Limitation |
| | Lamp plastic enclosure (internal ) | 35,5 | Reference |
| | Lamp plastic cover | 44,3 | Reference |
| | Cap plastic | 27,7 | Reference |
| | Metal enclosure | 49,8 | Reference |

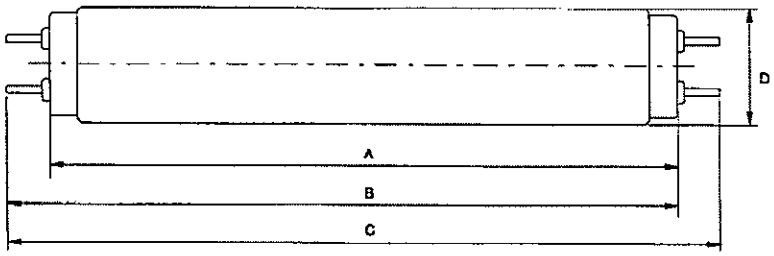
| | | | |
|---|---|---|---|
| | PCB of LED driver | 105,0 | Reference |
| | LED PCB | 51,1 | Reference |
| | Mouting surface | 38,7 | 130 |
| Observation: Tested until steady condition, no fire, molten material, smoke or flammable gas is produced. | | | |

| **Annex 3** | **EN 61195:2000** | | | | | |
|---|---|---|---|---|---|---|
| 2.3.2 | TABLE: Dimensional requirements for caps or bases | | | | | P |
| Cap type .....: G13<br>Used sheet of IEC 60061-1 ....: 7006-51-8<br>Tested quantity .....: 3 pcs. | | | | | | |
| Dimension Code | Measured (1#) | Measured (2#) | Measured (3#) | Required Min. (mm) | Required Max. (mm) | |
| A | 25,75 | 25,73 | 25,76 | - | 25,78 | |
| D | 12,7 | 12,7 | 12,7 | 12.7 | | |
| E(5) | 2,36 | 2,36 | 2,34 | 2.29 | 2.67 | |
| F | 7,45 | 7,46 | 7,48 | 6,60 | 7.62 | |
| N(4) | 9,67 | 9,66 | 9,68 | 8,71 | - | |

| **2.3** | **Mechanical requirements for caps** | | **P** |
|---|---|---|---|
| | Caps shall be so constructed and assembled to the bulbs that they remain attached during and after operation. | | P |
| | Unused lamps is checked by applying a torque test to the pins, as follows:<br>The lamp cap shall remain firmly attached to the bulb and there shall be no rotational movement between component parts of the cap exceeding an angular displacement of 6 when subjected to the torque levels listed in table 1. | | P |
| | - G5 ..... 0,5Nm : | | N/A |
| | - G13 ..... 1,0 Nm: | G13 | P |
| | - R17d..... 1,0 Nm: | | N/A |
| | Rotational movement not exceeding 6 ° | Movement 1 ° | P |

| | | | |
|---|---|---|---|
| | Following a heating treatment for a period of 2000h+/-50h at a temperature of 120C+/-5 °C, The lamp cap shall remain firmly attached to the bulb and there shall be no rotational movement between component parts of the cap exceeding an angular displacement of 6 when subjected to the torque levels listed in table 2. | | P |
| | - G5 ..... 0,3Nm : | | N/A |
| | - G13 ..... 0,6 Nm: | G13 | P |
| | Rotational movement not exceeding 6 ° | Movement 1 ° | P |
| | No loosening of cap pins | | P |
| **2.7** | **Resistance to heat and fire** | | **P** |
| 2.7.1 | Insulating material of caps shall be resistant to heat | | P |
| 2.7.2 | Compliance is checked by the following test. | | P |
| | Samples are tested in a heating cabinet at a temperature of 125 °C+/-5 °C for a period of 168h. | | P |
| | For G13 caps to be sued on lamps with a nominal wattage greater than 40W, the samples shall be tested at a temperature of 140 °C+/-5 °C | | N/A |
| | At the end of the test, the samples shall not have undergone any change impairing their further safety, especially in the following respects: | | P |
| | - reduction in the protection against electric shock as required in 2.4 and 2.5; | | P |
| | - loosening of cap pins, cracks, swelling and shrinking as determined by visual inspection. | | P |
| | At the end of the test, the dimensions shall comply with the requirements of 2.3.2. | | P |
| 2.7.3 | External parts of insulating material shall be resistant to abnormal heat and to fire | | P |
| 2.7.4 | Compliance is checked by the test of glow-wire 650 °C | | P |
| **2.9** | **Lamp cap temperature rise** | | **P** |
| 2.9.1 | For lamps using caps G5, G13 and 2G13, the lamp cap temperature rise above ambient temperature shall not exceed 95K. | See Annex 3 | P |
| 2.9.2 | Compliance is checked according annex B | | P |
| 2.9.3 | Tests on one lamp group are necessary to show compliance for all identically capped lamps. | | P |

| Annex 4 | **Double-capped fluorescent lamps diagrammatic data sheet for location of Lamp dimensions** | P |
|---|---|---|




| Model | Dimension | Limit | | Measurement(mm) |
|---|---|---|---|---|
| | | Min.(mm) | Max.(mm) | |
| NS-T8-2/NS-T8-2-B | A | -- | 589,8 | 585,5 |
| | B | 594,5 | 596,9 | 594,8 |
| | C | -- | 604,0 | 601,2 |
| NS-T8-4/NS-T8-4-B | A | -- | 1199,4 | 1189,5 |
| | B | 1204,1 | 1206,5 | 1205,5 |
| | C | -- | 1213,6 | 1208,2 |
| NS-T8-5 | A | -- | 1500,0 | 1497 |
| | B | 1504,7 | 1507,1 | 1505 |
| | C | -- | 1514,2 | 1514 |

For NS-T8-2 /NS-T8-2-B, the limits are referred to the dimensions of fluorescent tube of T8 18W or 20W.

For NS-T8-4-B /NS-T8-4-B, the limits are referred to the dimensions of fluorescent tube of T8 36W, 40W.

For NS-T8-5, the limits are referred to the dimensions of fluorescent tube of T8 58W or 65W.