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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 32481-2026

Replacing GB/T 32481-2016

**Performance specifications for LED luminaires for tunnel
lighting**

隧道照明用LED灯具性能规范

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5 General Requirements

- 5.1 The luminaires shall comply with the requirements of Chapter 4 and 5.6 of GB/T 31897.1-2025.
- 5.2 The luminaires shall be able to function properly under the claimed conditions.
- 5.3 The safety of luminaires shall comply with the provisions of GB 7000.203.
- 5.4 The electromagnetic compatibility of luminaires shall comply with the provisions of GB/T 17743, GB 17625.1 and GB/T 18595.
- 5.5 The safety and performance of the light source and components supplied with the luminaire shall comply with the requirements of their applicable national standards.
- 5.6 To meet the requirements of this document, the specified sample size must satisfy all requirements.

6.1.1 Markings on lamps

- 6.1.1.1 The following electrical parameters shall be marked.
- Rated power supply voltage;
- Rated input power;

---Rated standby power (if applicable).

6.1.1.2 The following photometric parameters should be labeled.

---Rated luminous flux of the luminaire;

---Luminous efficiency of lamps.

6.1.1.3 For luminaires with adjustable LED module positions, the adjustment position should be clearly marked near the adjustment device.

6.1.1.4 For luminaires with adjustable elevation angles, the adjustment angle should be marked on the adjustment device.

6.1.1.5 For luminaires with asymmetrical longitudinal light distribution along the road, the housing shall be marked with markings and text descriptions indicating that the luminaire is installed along the direction of vehicle travel.

Note. For an introduction to symmetrical and asymmetrical lighting for tunnel lighting fixtures, please refer to Appendix C.

6.1.2 Product Information

6.1.2.1 The product sample book or instruction manual shall include at least the contents specified in

6.1.2.2 to 6.1.2.12.

6.1.2.2 The information specified in Table 1, Chapter 4 of GB/T 31897.201-2025, including numbers b and f~l, shall be indicated, including.

---Photometric code;

---Light flux maintenance code;

---Initial and maintained rated chromaticity coordinate values;

---Rated correlated color temperature (CCT, K);

---Rated general color rendering index (Ra);

---Rated ambient temperature (tq) related to luminaire performance;

---Rated luminous efficacy (lm/W);

---Refining time, if not 0h.

6.1.2.3 The applicable control device model and specifications and its corresponding manufacturer shall be indicated.

6.1.2.4 The applicable LED module model and specifications and its corresponding manufacturer should be indicated.

6.1.2.5 For luminaires with replaceable LED modules, the replacement method should be explained. If bolts are used for fixing, the tightening method should be indicated in the instruction manual. The system displays the torque value and provides a warning that "LED module replacement requires professional personnel."

6.2 Energy Saving Evaluation

6.2.1 General Rules It should meet the manufacturer's claimed applicable luminance and uniformity in the middle segment, and satisfy the standard limits for threshold increments. Requirements for lighting power density. The conformity is checked by

6.2.2 and 6.2.3.

6.2.2 Tunnel Lighting Quality The average road surface light intensity should be calculated based on the measured spatial photometric distribution data of the luminaires and the luminaire installation conditions claimed in the manufacturer's instructions. Brightness maintenance value, overall road surface brightness uniformity, road surface longitudinal brightness uniformity, and initial value of threshold increment. Note

1.The purpose of this clause is to provide an estimate of the quality of tunnel lighting provided by the luminaires. Due to the significant differences in the reflectivity of the wall materials actually used in tunnels, the quality of tunnel lighting provided by the luminaires may vary. Because accurate prediction is difficult during the design phase, the method provided in this document ignores the contribution of wall reflections to road surface brightness when calculating tunnel lighting quality. When the contribution of on-site wall reflection to road surface brightness is very low, the calculated value is basically consistent with the on-site measured value. When the contribution of on-site wall reflection to road surface brightness is very low, the calculated value is basically consistent with the on-site measured value. When the contribution to brightness is high, the evaluation according to this document may be more severe, such as the calculated brightness value being lower than the actual measured value, or the TI value being higher than the actual measured value. The lighting quality in the middle section of the tunnel should meet the following requirements.

---Under the same installation conditions, the average brightness of the road surface should not be lower than the applicable brightness claimed by the manufacturer.

---Under the same installation conditions, the overall uniformity of road surface brightness and the longitudinal uniformity of road surface brightness should not be lower than the brightness uniformity claimed by the manufacturer. Uniformity.

---The initial value of the threshold increment should not exceed 15%. Note

2.The lighting in other areas such as the entrance section, transition section, and exit section is related to the brightness of the opening.

6.2.3 Lighting power density The power density value of tunnel pavement lighting should not exceed the value specified in Table 3.

6.11 Weight The weight of a single luminaire (including bracket and controller) should not exceed 15kg, but should not exceed 20kg.

6.12 Operating ambient temperature It should be able to work normally under conditions of -40°C to 45°C. If the ambient temperature of the area where the product is used exceeds the above-mentioned range, it should be able to operate normally at the marked limit temperature.

6.13 Luminous flux maintenance Luminaires using LED modules that demonstrate compliance with GB/T 24823-2024 (see 4.2) do not need to provide samples for this test. Module sound The maintenance value at the rated value t_p can be claimed as the maintenance value of the luminaire at t_q . Luminaires using LED modules that do not explicitly state compliance with GB/T 24823-2024 shall be tested for a period equal to the rated life. 25%, with a maximum of 6000 hours. In addition to the requirements below, the provisions of

11.2 in GB/T 24823-2024 also apply to LED luminaires. The ambient temperature for maintaining the test should be within the performance temperature range (rated $t_q \pm 5^\circ\text{C}$). The measured luminous flux should not be less than the luminous flux corresponding to the rated luminous flux maintenance rate.

6.14 Correlated color temperature, chromaticity coordinates, and color rendering index

6.15 Durability

6.15.1 Temperature Cycling It should comply with the requirements of Chapter 5 of GB/T 33721-2026.

6.15.2 Power Switch It should comply with the requirements of Chapter 6 of GB/T 33721-2026.

6.15.3 Accelerate service life It should comply with the requirements of Chapter 7 of GB/T 33721-2026.

6.16 Vibration It should comply with the requirements of Chapter 13 of GB/T 33721-2026.

6.17 Performance rating of luminaires Lighting fixtures should be classified into Grade A, Grade B, or Grade C according to their performance level. The relevant requirements for Grade A, Grade B, or Grade C shall comply with the provisions of Table 4.

7.1 Inspection of lamp markings

7.1.1 Markings on lamps The marking test shall be conducted according to the method specified in