

ICS 29.140
CCS K 72



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

GB/T 33721-2026

Replacing GB/T 33721-2017

Reliability test methods for LED luminaires

LED灯具可靠性试验方法

Issued on: April 30, 2026

Implemented on: November 1, 2026

**Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC**

Table of Contents

1	Scope
4	General test requirements
5	Temperature Cycling Test
6	Power switch test
8	Temperature shock test
12	Extreme temperature storage
13	Vibration Test
13.1	Test Requirements
14	Test methods for luminous flux maintenance life of LED lamps
14.1	Selection of Experimental Methods
14.3	Direct Method
18	Environmental adaptability of components
18.1	Fall Protection Accessory Test

1 Scope

GB/T 33721-2026 is the Chinese national standard covering how the reliability of an LED luminaire is tested - the lumen maintenance over thousands of hours, the driver which usually fails before the LEDs do, the thermal cycling and humidity, and the statistics that turn the results into a stated life. It replaces GB/T 33721-2017 and has been in force since 1 November 2026, alongside the street and tunnel luminaire standards of this batch. It was issued on 30 April 2026 and takes effect on 1 November 2026, replacing GB/T 33721-2017. The document is under the responsibility of the China National Light Industry Council. This page is published from the official record of the 2026 edition; the clause text of a standard this recent is not yet in circulation, and the figures, limits and tables it contains are those of the document itself, delivered in full with the English translation.

14.1.2 Conditions for measuring luminaire parameters The luminaire operates under the operating conditions and performance temperature ($t_q \pm 2$)°C claimed by the manufacturer. If the manufacturer makes multiple claims regarding t_q , try... The test should be conducted at the highest claimed t_q .

14.1.3 Calculate and measure the unit current I_f of the LED module within the luminaire. Measure the input current of the LED module inside the luminaire, calculate I_f of the module unit according to different circuits, and determine the relationship between I_f and ANSI/IES. The correspondence between the module current I_f given in the LM-80 report.

The measured results may be.

14.1.4 Measuring the temperature at point t's of the LED module inside the luminaire. The results of the measurement may be.

- a) The luminaire's temperature at point t's does not exceed the minimum temperature at point t's in the ANSI/IESLM-80 report, i.e., $t's \leq t_{smin}$, or the luminaire's temperature at point t's... The temperature is equal to either of the other two temperatures reported in the ANSI/IESLM-80 report;
- b) The luminaire's temperature at point t's exceeds the minimum temperature at point t's in the ANSI/IESLM-80 report, but does not exceed the temperature reported in the ANSI/IESLM-80 report. The other highest temperatures at point ts in the report, i.e., t_{smin}
- c) The temperature at point t's of the luminaire exceeds the maximum temperature at point ts in the ANSI/IESLM-80 report, i.e., $t's > t_{smax}$.

14.1.5 Typical estimates of light decay DeltaLO for commonly used secondary optical materials in luminaires Table 8 shows typical estimated values of light decay for commonly used secondary optical materials in lighting fixtures.

14.1.6 Typical estimates of optical attenuation DeltaLO using optical materials other than those in Table 8

14.1.6.1 According to the test methods in GB/T 16422.2, outdoor luminaires shall use method 1 of the cycle number, and indoor luminaires shall use method 5 of the cycle number. The method involves aging the lamp samples for 1200 hours. During the test, the samples are not powered on, and each 240-hour period is considered a test node. The samples are then removed from the aging test chamber. Remove the lamps and perform photoelectric parameter tests to collect data such as luminous flux and color coordinates.

14.1.6.2 A total of 3 samples were tested, all from the same batch produced by the same manufacturer. The 3 samples (a~c) were complete luminaires, tested according to method 14.1.6.1. Conduct the test according to the method outlined in Table 9 and record the data.

14.1.6.3 The deviation values of luminous flux maintenance rate and color shift values shall not exceed the provisions in Table 10.

14.1.7 Selection of light attenuation DeltaLO when using multiple optical materials superimposed on a luminaire

14.1.7.1 General Rules If the luminaire uses multiple optical materials, when selecting the estimated values from Table 8, it is necessary to consider the luminaire's operating environment and the t's point temperature of the LED chips. To make distinctions.

14.1.7.2 Luminaires designed for indoor environments When $t's \leq 55^{\circ}\text{C}$, the optical decay DeltaLO of the outermost optical material given in Table 8 is used for subsequent testing and verification; When 55°C The higher value outside LO; When $t's > 85^{\circ}\text{C}$, the light decay

of the innermost and outermost optical materials of the lamp must be considered simultaneously, and the estimated value of ΔLO is $LO_{inner}LO_{outer}$.

4 General test requirements

4.1 Test Environment Conditions Unless otherwise specified, the operation should be carried out in a non-convection environment with a relative humidity not exceeding 65% and a temperature of $(25 \pm 1)^\circ\text{C}$, for stable working conditions. Performance parameters of the LED luminaires were measured while they were in operation. Measurements of non-performance parameters were conducted at an ambient temperature of 10°C to 30°C .

4.2 Power Supply Voltage Requirements Unless otherwise specified, all tests shall be performed at rated voltage and rated frequency, or at the most severe conditions if the manufacturer provides a voltage range. The test should be conducted at the operating voltage (generally the maximum operating voltage is selected). During the stabilization period, the stability of the power supply voltage and frequency should be within $\pm 0.5\%$. Within the test, the tolerance during the luminous flux maintenance test is $\pm 2\%$. During parameter measurements, the tolerance for power supply voltage and frequency should be $\pm 0.2\%$. The total harmonic content of the power supply voltage should not exceed 3%.

4.3 Stability Criteria During the stabilization period, the luminaires should operate normally. Measure the light output and electrical power every 15 minutes. When the light output and electrical power reach a stable level within 30 minutes... A rate is considered stable when the difference between the three readings (maximum - minimum) is less than 0.5% of the average of the three readings. If in If stability cannot be achieved within 150 minutes, measurements can still be taken, but the observed fluctuations should be described.

4.4 Measurement of Initial Values The initial values of luminous flux, power input, temperature, and chromaticity shall be measured in accordance with the provisions of GB/T 29293.

4.5 Selection of Test Items Of the testing clauses listed in this document, Chapters 5 through 17 cover general testing requirements for LED luminaires, while Chapter 18 covers testing requirements for LED luminaire components. Regarding environmental adaptability requirements, relevant parties may refer to the appendix based on product functional characteristics, actual operating conditions, target performance requirements, and industry practices. Select appropriate reliability test items from list A. Implementation recommendations for the suggested terms should be confirmed through technical evaluation or contractual agreement.

5 Temperature Cycling Test

5.1 General Rules The temperature cycling test shall be conducted in accordance with Test Nb of GB/T 2423.22. "Temperature change at a specified rate of change" and the following

provisions.

5.2 Test Requirements The test shall be conducted in a test chamber that meets the requirements of GB/T 2424.5. The test temperature shall conform to Table 1, with a temperature tolerance of $\pm 2\text{K}$.

5.3 Test Procedure The experimental procedure for a single cycle is as follows:

- a) The LED lights stabilize at the maximum test temperature, then the power is disconnected. The ambient temperature inside the test chamber is maintained at $(10 \pm 1)^\circ\text{C}$.
- 2) The rate of decrease is reduced to the minimum test temperature at K/min ;
- b) The LED lights were kept disconnected from the power supply for 50 minutes at the minimum test temperature, and then subjected to 10 cycles of 10 seconds on and 50 seconds off.
- c) Connect the LED lights to the power supply;
- d) The ambient temperature inside the test chamber increases to the maximum test temperature at a rate of $(10 \pm 2) \text{ K/min}$;
- e) The LED lights are kept powered on for 50 minutes at the maximum test temperature, and then the cycle of 10 seconds on and 50 seconds off is repeated 10 times.

5.4 Qualification Criteria After the test, the labels on the samples should not be cracked, curled or detached, the samples should not be obviously damaged, and the rate of change in optical properties should not exceed 10%.

Note. The rate of change in optical performance refers to the measured optical performance rate, obtained by selecting appropriate optical parameter measurement indicators (such as luminous flux, illuminance, luminance, luminous intensity, etc.) based on the characteristics of the product. The ratio of optical parameters after the experiment to those before the experiment.

6 Power switch test

The ambient temperature for power switch testing should meet the requirements of Table 2.

7. Accelerated service life test LED luminaires should operate continuously for 1000 hours under test conditions. The test temperature should meet the requirements of Table 3, with a temperature tolerance of $\pm 2\text{K}$.

8 Temperature shock test

For LED luminaires used in environments with rapid switching between cold and hot conditions, the test Na of GB/T 2423.22, specifying the switching time, should be followed. Temperature shock tests shall be conducted in accordance with the following provisions