

ICS 43.040.20

CCS T 38



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

GB/T 10485-2025

Replacing GB/T 10485-2007

**Road vehicles - Lighting and light-signalling devices -
Environmental endurance**

道路车辆 外部照明和光信号装置 环境耐久性

Issued on: January 24, 2025

Implemented on: August 1, 2025

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

Table of Contents

Foreword	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Test requirements	7
5 Thermal cycle test	8
6 Sealing test	11
7 Thermal shock test	12
8 Thermal deformation test	13
9 Salt spray test	15
10 Dustproof test	15
11 Accompanied vibration test	17
12 Impact vibration test	21
13 Waterproof test	23
14 Test for resistance to lubricating oil, fuel, cleaning fluid	25
15 Light source irradiation test	26
16 Fog test	27
17 Highly accelerated life test (HALT)	30
18 Highly accelerated stress screening test (HASS)	36
19 Focusing test	38
Appendix A (Informative) Recommended sequence of environmental endurance test	43
Appendix B (Normative) Lighting mode of lighting and light signaling device	44
References	46

1 Scope

This document specifies the test requirements for environmental endurance tests of road vehicle exterior lighting and light signaling devices (except retro-reflective devices), thermal cycle tests, sealing tests, thermal shock tests, thermal deformation tests, salt spray tests, dust tests, accompanied vibration tests, impact vibration tests, waterproof tests, lubricating oil resistance, fuel resistance and cleaning fluid resistance tests, light source irradiation tests, fog tests, highly accelerated life tests, highly accelerated stress screening tests, focusing tests, etc.

This document is applicable to categories M, N, O, L road vehicle's exterior lighting and light signaling devices.

2 Normative references

GB 4599

GB 4785

GB/T 6495.9

GB/T 32466-2015

3 Terms and definitions

The terms and definitions defined in GB 4785, as well as the following terms and definitions, apply to this document.

3.1 and light signaling devices

This test is used to evaluate the temperature and humidity resistance of external lighting

5.2.2 Number of samples

2 lighting devices or 2 light signaling devices.

5.2.3 Test conditions

The test shall be carried out in a temperature and humidity test chamber.

5.2.4 Test method

5.2.4.1 During the test, the sample is not lit.

5.2.4.2 According to 4.4 and Chapter 6, the sample is initially tested for changes in photometric values and sealing tests.

5.2.4.3 The sample is placed in the test chamber in a simulated normal installation position and tested according to the number of cycles required by 5.2.5.

5.2.4.4 Each test cycle is 720 minutes, including the following processes (see Figure 2).

- Heating process 1. The temperature rises from 23 °C to 80 °C; the relative humidity rises to 80% (for category L vehicle lamps, the temperature is allowed to rise from 23 °C to 60 °C, the relative humidity rises to 80%); the heating time is 60 minutes.

- Damp heat process. Maintain the temperature at 80 °C (for category L vehicle lamps, the temperature is allowed to be maintained at 60 °C), the relative humidity is 80% for a duration of 240 min.

- Cooling process. From 80 °C (for category L vehicle lamps, the temperature is allowed to be reduced from 60 °C and the relative humidity 80% to -40 °C); when the temperature drops to 20 °C, the relative humidity shall be 20% ~ 50%; when the temperature is below 10 °C, there is no requirement for humidity. The cooling time is 120 min.
- Maintain low temperature. -40 °C, for a duration of 240 min.
- Heating process 2. Heating to 23 °C; heating time is 60 min; when the temperature is greater than 10 °C, the relative humidity is controlled at 20% ~ 40%.

For devices with front lighting function, 8 cycles of test shall be carried out according to the requirements of Figure 2; devices with only optical signal function shall be carried out according to the requirements of Figure 2.

5.2.4.5 According to 4.4 and Chapter 6, retest the sample for photometric value change and sealing test.

except for the vents/ventilated membranes, etc., any vents/ventilated membranes, etc.

can be retained; all other vents/ventilated membranes, etc. can be sealed. Apply 3 kPa air pressure through the retained ventilation structure, until the air pressure stabilizes; immerse the sample in water.

Immersion depth. The entire sample is immersed in the horizontal plane; the sample is rotated to place the bonding, welding or each connection 50 mm below the horizontal plane in turn.

Immersion time. 15 s (for each evaluation area).

6.4.2 If the sample is an open structure, that is, it is sealed with the vehicle body through a sealing gasket, it is necessary to use a special sealing test bracket simulating the vehicle body (the bracket needs to have a vent); seal the sample with the bracket; apply 3 kPa air pressure through the vent on the bracket; immerse the sample in water after the air pressure stabilizes.

Immersion depth. The entire sample is immersed in the horizontal plane; the sample is rotated to place the bonding, welding or each connection 50 mm below the horizontal plane in turn.

Immersion time. 15 s (for each evaluation area).

6.5 Result judgment

During the test, visually inspect the sample at the bonding, welding, each connection; no bubbles shall be generated.

7.1 Applicability

This test is applicable to lighting devices and light signaling devices installed below the lower edge of the door side window; it is used to evaluate their thermal shock resistance.

7.2 Number of samples

2 lighting devices or 2 light signaling devices.

7.3 Test conditions

The test shall be carried out at room temperature.

7.4 Test method

7.4.1 Perform the initial test of the sealing test on the sample in accordance with Chapter 6.

7.4.2 At room temperature, the sample is lit at the maximum power working state (as specified by the manufacturer) under the test voltage for 30 minutes. For multi-lamp units, all functions that can work simultaneously shall be lit.

7.4.3 After the function is continuously lit, immediately immerse the entire outer

surface of the light distribution lens including the bonding part of the light distribution lens in the prepared $4\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ water for 5 minutes. If necessary, the connectors, ventilation, ventilation parts that may be flooded can be temporarily sealed.

7.4.4 Perform the retest of the sealing test on the sample in accordance with Chapter 6.

7.5 Result judgment

After the test, visually inspect the light-transmitting parts of the sample; there shall be no cracks and bubbles. During the retest of the sealing test, visually inspect the sample at the bonding, welding, joints; there shall be no bubbles.

8.1 Applicability

This test is applicable to lighting devices and light signaling devices; it is used to evaluate the heat resistance of their plastic parts to the environment and their own light sources.

8.2 Number of samples

2 lighting devices or 2 light signaling devices.

8.3 Test conditions

8.3.1 The sample shall be initially and retested for the sealing test before and after the test.

8.3.2 The test is carried out in a temperature test chamber; the airflow in the chamber shall be $0.5\text{ m/s} \sim 2\text{ m/s}$. Temperature conversion rate. $1.0\text{ }^{\circ}\text{C/min} \sim 4.0\text{ }^{\circ}\text{C/min}$.