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

GB/T 44174-2024

**Performance requirements and testing methods for night vision
system of passenger cars**

乘用车夜视系统性能要求及试验方法

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Foreword

This document was issued on 24 July 2024 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 24 July 2024.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

1 Scope

GB/T 44174-2024 specifies what a car's night vision system must do and how it is tested.

Night driving accounts for a disproportionate share of serious accidents involving pedestrians and animals, for the straightforward reason that headlights illuminate perhaps sixty metres while stopping distance at highway speed is longer than that. A thermal or near-infrared system sees beyond the beam and can show a person in the road before the driver could otherwise know they were there. Whether it helps depends on properties that marketing does not distinguish: the range at which a pedestrian is actually detected, the performance in rain and fog when the driver needs it most, the false alarm rate that determines whether the driver keeps trusting it, and the latency and display placement that decide whether the warning is acted on or missed. This document specifies the performance requirements for night vision systems in passenger cars and describes the corresponding test methods. It applies to M1 vehicles fitted with such systems. It is written for vehicle manufacturers and their sensor suppliers, for the testing organisations that certify the systems, and for the safety rating programmes that assess them.

This document specifies the performance requirements for night vision systems of passenger cars and describes the corresponding test methods.

This document applies to M1 vehicles equipped with night vision systems.

2 Normative references

The provisions of the following documents constitute the essential clauses of this document through normative references in this text. Among them, for referenced documents with dates, only the versions corresponding to the dates are applicable to this document; for referenced documents without dates, the latest versions (including all amendments) are applicable to this document.

GB 34660 Road vehicles - Requirements and test methods of electromagnetic compatibility

GB/T 39263 Road vehicles - Advanced driver assistance systems - Terms and definitions

3 Terms and definitions

The terms and definitions defined in GB/T 39263 and the following apply to this document.

3.1 night vision system

A system that provides visual assistance or warning information to the driver during

nighttime or other low-light driving conditions.

3.2 subject vehicle

The vehicle under test, which is equipped with a night vision system and test equipment.

3.3 target

Pedestrians within the detection range of the night vision system.

3.4 longitudinal distance

In the subject vehicle coordinate system, the projection distance between the outermost edge of the front end of the subject vehicle and the target's center of mass in the direction of travel of the subject vehicle.

3.5 time to collision; TTC

The ratio of the longitudinal distance to the relative speed on the projection of the longitudinal distance at the same moment.

3.6 self-check

A function that enables the system to check its own faults.

4 General requirements

4.1 Functional requirements

Night vision systems can be divided into Type I, Type II and Type III and shall meet the following requirements:

- a) Type I night vision system displays the driving environment in real time;
- b) Type II night vision system displays the driving environment and marked targets in real time;
- c) Type III night vision system displays the driving environment and marked targets in real-time, and issues a collision warning when there is a risk of longitudinal collision between the subject vehicle and the target.

4.2 Self-check requirements

4.2.1 The night vision system shall at least perform a self-check after power-on.

4.2.2 The night vision system shall at least have the following self-check functions:

- a) Check whether the relevant electrical components are operating normally;

b) Check whether the relevant sensor components are operating normally.

4.2.3 In the event of an electronic or electrical fault, the fault warning information shall between the target and the subject vehicle, the Type III night vision system shall issue a collision warning. The collision warning shall meet the following requirements:

- a) When the collision warning is issued, the time to collision (TTC) between the subject vehicle and the target is not less than 1.7 seconds;
- b) At least one of the visual, acoustic or tactile methods shall be used;
- c) It shall be clearly distinguished from other prompt information in the vehicle.

6 Test methods

6.1 Test environment requirements

6.1.1 The test site shall be a dry, flat asphalt or concrete road surface.

6.1.2 The ambient temperature shall be -20 degrees C~30 degrees C.

6.1.3 The ambient light illuminance shall not exceed 1 lx.

6.1.4 The relative humidity of the environment shall not exceed 75%.

6.2 Test equipment requirements

6.2.1 Test target requirements

6.2.1.1 The target height shall be 1.80 m $\pm$ 0.02 m (excluding the dummy support base), and the target shoulder width shall be 0.50 m $\pm$ 0.02 m.

6.2.1.2 The target shall simulate the temperature characteristics of the human body, and the target heating area shall include but not be limited to the head area, torso area, arm area, hand area and leg area, as shown in Figure 1. The temperature of the heating area shall reach 37 degrees C $\pm$ 2 degrees C and shall be kept constant during the test.

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