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

GB/T 24970-2020

Replacing GB/T 24970-2010

Delineators

轮廓标

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1 Scope

China's national standard for road delineators. It specifies the classification, the requirements, the test methods, the inspection rules and the marking, packaging, transport and storage of the retroreflective devices installed along a road to show its alignment. A delineator does something no other road device does: it shows the driver where the road goes before the headlights reach it. Markings on the surface are visible only as far as the beam illuminates the ground, which at night at speed is well short of the stopping distance; a line of delineators on posts or barriers, mounted at eye height and retroreflecting the headlight straight back, is visible far beyond that and traces the curve ahead. On an unlit rural road, in fog, in rain when the surface markings disappear under water, and in snow when they are covered altogether, the delineator is often the only alignment information the driver has. So the requirement that matters is retroreflective performance, and it is specified as a coefficient of retroreflection at defined observation and entrance angles - the entrance angle mattering because a driver approaching a curve sees the delineators at increasingly oblique angles, exactly when the information is most needed. Colour is specified because

delineators are colour-coded by side of the road. And durability is the other half: a delineator lives at the roadside for years, is washed by spray, sandblasted by traffic, hit by snowploughs and vandalised, so the standard covers the impact resistance, the weathering and the retention of retroreflectivity after ageing, along with the mounting and the breakaway behaviour of the post. Issued on 6 March 2020 and in force since 1 October 2020, it replaces GB/T 24970-2010.

This Standard stipulates the product classification, technical requirements, test methods, inspection rules as well as marking, packaging, transportation and storage of the delineator. This Standard is applicable to delineator set up in China's highways and urban roads; while parking lots and other places where delineator need to be set may be implemented by reference.

2 Normative References

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) are applicable to this document.

GB/T 228.1 Metallic Materials - Tensile Testing - Part 1: Method of Test at Room Temperature

GB/T 2893.4 Graphical Symbols - Safety Colors and Safety Signs - Part 4: Colorimetric and Photometric Properties of Safety Sign Materials

GB/T 3681 Plastics - Methods of Exposure to Direct Weathering, to Weathering Using Glass-Filtered Daylight, and to Intensified Weathering by Daylight Using Fresnel Mirrors

GB/T 3880.1 Wrought Aluminum and Aluminum Alloy Plates, Sheets and Strips for General Engineering - Part 1: Technical Conditions of Delivery

GB/T 3978 Standard Illuminants and Geometric Conditions

GB/T 3979 Methods for the Measurement of Object Color

GB/T 9286 Paints and Varnishes - Cross Cut Test for Films

GB/T 10125 Corrosion Tests in Artificial Atmospheres - Salt Spray Tests

GB/T 18226 Specification for Steel Component Anticorrosion of Highway Engineering

3.4 Persistence luminous The brightness of self-luminous marks at a certain moment in the persistence time.

4 Product Classification

According to the setting conditions, the delineators are divided into post delineator buried

on the ground and attached delineator attached to the structure. According to the shape of the reflector, the delineators are divided into trapezoidal, circular and rectangular delineator. According to the color, the delineators are divided into white and yellow delineator.

5.1.1 Post delineator

5.1.1.1 The post delineator is composed of a cylinder, a black mark and a reflector; and the three parts shall be firmly connected. The cylinder is white. There shall be a 250mm long black mark on the upper part of the cylinder. There shall be a 180mmx40mm rectangular reflector in the middle of the black mark. Energy storage self-luminous material may be added on the basis of the reflector.

5.1.1.2 The cross-section of the cylinder is an isosceles triangle or a circular arc with hollow fillets.

5.1.1.3 When the post cross section is an isosceles triangle, the height of the post is 1250mm; the height of the triangle is 120mm; and the length of the base-edge is 100mm. See Figure 1 for dimensions and errors. When the reflector is a micro-prism reflector, it shall not be penetrated by water or mist.

5.9 Salt spray corrosion resistance After the salt spray corrosion resistance test, there shall be no signs of discoloration, blistering, rust or erosion for each component. The reflector shall not be infiltrated by water or mist; the reflective film shall not leak, or its edges shall be peeled off; the energy storage self-luminous material shall not appear traces such as chalking, spots, bubbles, cracks or uneven appearance.

5.10 High and low temperature resistance After the high and low temperature resistance test, there shall be no signs of damage such as cracks, flaking, chipping, blistering, warping or deformation.

5.11 Weather resistance After continuous natural exposure or artificial accelerated aging test:

- a) There should be no obvious cracks, nicks, bubbles, rust, erosion, peeling, discoloration, chalking, or deformation on the delineator.
- b) The chromaticity coordinates and luminance factors of the various colors of the delineator shall be kept within the range specified in Table 1 or Table 2.
- c) The reflector shall not show any signs of water penetration; the reflective film shall not show the phenomenon of peeling off the edge; the energy storage self-luminous material shall not show signs of chalking, spots, bubbles, cracks or uneven appearance.
- d) The luminous intensity coefficient value of the reflector shall be no lower than 50% of the corresponding specified value in Table 3 or Table 4; the retroreflective coefficient value of the reflective film shall be no lower than 80% of the corresponding specified value in Table 5; the luminous properties of energy storage self-luminous material shall be maintained at

more than 75% before the test; the energy storage self-luminous material shall not show signs of chalking, spots, bubbles, cracks or uneven appearance.

6.1 Test preparation

6.1.1 Preparation of specimen The preparation of the specimen is as follows:

- a) Randomly extract the overall product of the delineator, or intercept a section of the cylindrical delineator with a complete black mark and reflective material, a length of no less than 350mm, as a product specimen;
- b) Randomly extract the reflector as a reflector specimen;
- c) Randomly select the reflective film, generally intercepting 1.22mx0.25m; and make the reflective film specimen according to the method specified in GB/T 18833;
- d) Randomly select the energy storage self-luminous material. Generally, 0.5mx0.5m is taken as the specimen of energy storage self-luminous material.

6.1.2 Test environment The specimen shall be placed in an environment with a temperature of $23^{\circ}\text{C}\pm 2^{\circ}\text{C}$ and a relative humidity of $(50\pm 10)\%$. After being placed for 24h, various test work may be performed. General test work shall be carried out in an environment with a temperature of $23^{\circ}\text{C}\pm 2^{\circ}\text{C}$ and a relative humidity of $(50\pm 10)\%$.

6.2 Structural dimension The composition of the structure shall be visually inspected' the external dimensions, the thickness of the plate, etc. shall be measured with tools such as a ruler and a plate thickness micrometer whose accuracy and range meet the requirements.

6.3 Appearance quality

6.3.1 Under the condition of daytime indoor illuminance greater than 70lx, visually inspect the appearance of the product or carefully check it with a 4X magnifier.

6.3.2 Put the blade of the knife-edge ruler close to the surface of the cylinder; measure the maximum gap between the surface of the cylinder and the blade, which is the surface unevenness tolerance.

6.4 Mechanical properties of material

6.4.1 The base plate and bracket materials shall be implemented in accordance with the provisions of the tensile test of metallic materials specified in GB/T 228.1.

6.4.2 Black marking materials shall be implemented in accordance with the provisions of the cross-cut test specified in GB/T 9286.

6.5 Colorimetric properties

6.5.1 Adopt the D65 standard illuminator and 45/0 lighting observation conditions specified