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Smart glazing used on road vehicles - Part 3: Electro-field modulated particle orientation glazing

汽车用智能变色玻璃 第3部分：悬浮粒子调光玻璃

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Table of Contents

1 Scope

This document specifies the requirements, test methods, inspection rules, packaging, marking, transportation and storage of electro-field modulated particle orientation glazing used on road vehicles.

This document applies to the design, production and delivery of smart glazing products used on road vehicles that use suspended particles as the dimming medium.

2 Normative References

GB/T 5137.2-2020

GB/T 5137.4

GB/T 11942

GB/T 30142

JJF 1615

3 Terms and Definitions

The terms and definitions defined in JC/T 2631-2021, and the following are applicable to this document.

3.1 Smart glazing used on road vehicles

A glazing product used on road vehicles that, under the influence or excitation of an external energy field, can alter its optical properties, such as transmission, reflection or absorption in Under given control conditions, the time required for electro-field modulated particle orientation glazing (3.4) to change from bright to dark or from dark to bright.

NOTE. the absolute value of the visible light transmittance difference corresponding to the change from bright to dark or from dark to bright is 80% of the openings of bleached and colored (3.8).

3.11 Puncture

The phenomenon of localized burning of the suspended particle dimming layer caused by discharge between electrodes under the influence of an electric field.

4.1 Appearance Quality of Dimming Area

The appearance quality of the dimming area of the electro-field modulated particle orientation glazing in both transparent and dark states shall meet the requirements of Table 1.The corresponding state or appearance characteristics required for different locations after assembly shall be agreed upon by the supply-side and the demand-side.

4.4 Ultraviolet Transmittance of Dimming Area

The ultraviolet transmittance of the dimming area shall not exceed 1.0% in the dark and transparent states.

4.5 Contrast Ratio of Dimming Area

The contrast ratio of the dimming area shall not be less than 20.If there are special requirements, they shall be agreed upon by the supply-side and the demand-side.

4.6 Deviation of Openings of Bleached and Colored of Dimming Area

The absolute value of the difference between the openings of bleached and colored of the dimming area and the explicitly stated nominal value shall not exceed 2%. If no explicitly stated nominal value is provided, it shall be agreed upon by the supply-side and the demand-side.

4.7 Color Uniformity of Dimming Area

It is expressed as color difference deltaE *???? in the CIELAB uniform color space. The single-piece reflective color difference, batch reflective color difference, single-piece transmission color difference, and batch transmission color difference in the dark and transparent states of the dimming area shall all not exceed 3.0.

4.8 Perceptual Switching Time

The perceptual switching time in the dark state shall be less than 15 s, and the perceptual switching time in the transparent state shall be less than 15 s. Special requirements shall be agreed upon by the supply-side and the demand-side.

4.9 Full Switching Time

The full switching time in the dark state shall be less than 60 s, and the full switching time in the transparent state shall be less than 30 s. Special requirements shall be agreed upon by the supply-side and the demand-side.

4.10 Apparent Power

When the dimming area is no greater than 1 m2, the apparent power when power-on shall be no greater than 10.0 VA; when the dimming area is greater than 1 m2, the apparent

power when powered on shall be agreed upon by the supply-side and the demand-side.

The apparent power under special environmental conditions shall be agreed upon by the supply- side and the demand-side.

4.11 Insulation Resistance

The insulation resistance value shall be no less than 50 M?.

5.1.1 Requirements for test pieces

If the inspection item does not affect the performance of the specimen, then the specimen can be used to continue testing for other items. When using specially made test pieces, the test pieces shall be of the same structure, material, and manufactured under the same process conditions as the product. The dimensions of the dimming area corresponding to test pieces of different dimensions are shown in Table 4.

5.1.2 Adjustment and control requirements for dimming area

The dimming control system and its control program shall be provided by the manufacturer and consistent with the actual operating conditions of the product, enabling the specimen to transition to the desired transmission state and remain stable. The adjustment and control requirements for the dimming area and the test results shall be simultaneously recorded.

5.1.3 Test conditions

Unless otherwise specified, the test shall be conducted under the following environmental conditions.

a) Temperature. (23 ? 2) ?C;

b) Relative humidity. 40% ~ 80%.

5.2.1 Specimen

Use the product as the specimen.

5.2.2 Test procedures

5.2.2.1 Connect the specimen to the dimming control system. In accordance with its control program, adjust the specimen to the dark and transparent states and maintain stability.

5.2.2.2 Under an illumination of (1,000 ? 200) lx or in good natural or diffused light background conditions, vertically place the specimen, and at a distance of 600 mm from the specimen, visually observe it, and record any visible appearance defects. The size of point-like defects and the width of line defects are measured using a reading microscope with a division value of 0.01 mm. The length of line defects and the distance between