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NATIONAL STANDARD OF THE
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ICS 43.040.60
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GB 9656-2021

Replacing GB 9656-2003

**Safety technical specification for glazing materials
used in power-driven vehicles**

机动车玻璃安全技术规范

Issued on: April 30, 2021

Implemented on: January 01, 2023

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

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Safety technical specification for glazing materials used in power-driven vehicles

1 Scope

This Standard specifies the terms and definitions, classification, technical requirements, test methods, and determination rules related to the safety features of glazing materials used in power-driven vehicles.

This Standard applies to glazing materials used in power-driven vehicles including categories M, N, O, as well as category L vehicles with cabs, and special vehicles for agriculture and forestry.

This Standard does not apply to glazing materials used in lighting, signaling devices and instrument panels of power-driven vehicles.

Note: See GB/T 15089 for the classification of category L, M, N and O vehicles.

2 Normative references

The following documents are indispensable for the application of this document. For the dated references, only the editions with the dates indicated are applicable to this document. For the undated references, the latest edition (including all the amendments) are applicable to this document.

GB/T 5137.1 Test methods of safety glazing materials used on road vehicles
- Part 1: Mechanical properties tests

GB/T 5137.2 Test methods of safety glazing materials used on road vehicles
- Part 2: Optical properties tests

GB/T 5137.3 Test methods of safety glazing materials used on road vehicles
- Part 3: Radiation, high temperature, humidity, fire and simulated weathering resistance tests

GB/T 5137.5 Test methods of safety glazing materials used on road vehicles
- Part 5: Resistant-to-chemical and resistant-to-temperature changes test

GB/T 31849-2015 Film mounted motor vehicle glass

QC/T 1119-2019 Automobile safety glass terminology

3.11

Glass panes other than windscreen

Glass at any location except the windscreen.

Note: They include but are not limited to sunroofs, side windows, rear windows, partitions or partition windows in the compartment, window glass in all parts of the upper compartment of a double-deck passenger car, and upper window glass that does not provide the driver's field of view at the foremost part of a single-deck passenger car, etc.

3.12

Head-up display windscreen

H.U.D windscreen

The windscreen which can image the information content in front of the driver through the optical system.

[QC/T 1119-2019, definition 2.1.9]

3.13

Driver's vision area

The area on the glass which enables the driver to fully observe the indirect visual field device required by GB 15084 when necessary, and obtain the required field of view.

3.14

Head injury criteria

HIC

The characteristic value which characterizes the degree of skull injury, which is generally evaluated by the method of simulating the vertical impact of a blunt object on the safety glazing material.

[QC/T 1119-2019, definition 2.5.8]

3.15

R point

The design point specified by the vehicle manufacturer for each seating position.

vehicle.

4 Classification

4.1 According to the production processing technology and/or material, glazing materials used in power-driven vehicles are classified into laminated safety glass, tempered safety glass, insulating safety glazing unit, glass-plastic safety glazing material, rigid plastic glazing pane, and safety glazing faced with plastic material.

4.2 According to the application location, glazing materials used in power-driven vehicles are classified into windscreen and glass panes other than windscreen.

5 Technical requirements

5.1 General

5.1.1 Laminated safety glass, glass-plastic safety glazing material, and tempered safety glass are suitable for any part of power-driven vehicles. When tempered safety glass is used for the windscreen, it is only suitable for vehicles with a design speed of less than 40 km/h. Insulating safety glazing unit and rigid plastic glazing pane are suitable for any part other than the windscreen.

5.1.2 Laminated safety glass, tempered safety glass or insulating safety glazing unit used for substrates of safety glazing faced with plastic material shall comply with the relevant provisions of this Standard.

5.1.3 The safety technical requirements for glazing materials used in power-driven vehicles include visual field safety requirements, strength safety requirements, damage safety requirements, and environmental durability safety requirements.

5.2 Visual field safety requirements

5.2.1 Visible light transmittance

5.2.1.1 The visible light transmittance of the windscreen shall meet the requirements of Table 1. The visible light transmittance of the glass panes other than windscreen used for the driver's vision area shall not be less than 70%.

5.2.1.2 The visible light transmittance of the glass panes other than windscreen (except for the driver's vision area) of highway buses, tourist buses, buses and school buses with a passenger standing area, and passenger cars with a central engine and an aspect ratio of less than or equal to 0.9 shall not be less

5.5.7 Volatile organic compounds

The volatile organic compound content of the film of safety glazing faced with plastic material shall not be greater than 0.05 mg/cm².

6 Test methods

6.1 General

If the inspection item does not affect the performance of the specimen, the specimen can be used to continue the test of other items. When using a special test piece for testing, the test piece shall be produced with the same thickness, the same material, and the same process conditions as the product.

6.2 Tests of visual field safety performance

6.2.1 Visible light transmittance

According to the method specified in GB/T 5137.2, carry out the test. When the product is used as the sample, measure the flat part of the test area. For the head-up display windscreen product, measure the flat and thicker part of the test area.

6.2.2 Optical distortion

According to the method specified in GB/T 5137.2, carry out the test. When the position of the window opening cannot be clearly indicated on the surface of the windscreen, the edge of the windscreen shall prevail.

6.2.3 Secondary image deviation

According to the method specified in GB/T 5137.2, carry out the test. When the position of the window opening cannot be clearly indicated on the surface of the windscreen, the edge of the windscreen shall prevail.

6.3 Tests of strength safety performance

6.3.1 Human head model impact performance

According to the method specified in GB/T 5137.1, carry out the test. For laminated safety glass, glass-plastic safety glazing material, and insulating safety glazing unit, carry out a human head model impact test without deceleration measurement. For rigid plastic glazing pane, carry out a human head model impact test with deceleration measurement.

6.5.2 Heat resistance

According to the method specified in GB/T 5137.3, carry out the test.

6.5.3 Radiation resistance

According to the method specified in GB/T 5137.3, test the laminated safety glass and glass-plastic safety glazing material. And calculate the ratio of visible light transmittance after the test to the visible light transmittance before the test, expressed as a percentage, accurate to one decimal place. According to the method specified in 6.10 of GB/T 31849-2015, test the safety glazing faced with plastic material.

6.5.4 Humidity resistance

According to the method specified in GB/T 5137.3, carry out the test. Calculate the ratio OF the visible light transmittance of the rigid plastic glazing pane after the test TO the visible light transmittance before the test, expressed as a percentage, accurate to one decimal place.

6.5.5 Resistant-to-temperature changes

According to the method specified in GB/T 5137.5, carry out the test.

6.5.6 Simulated weathering resistance

According to the method specified in GB/T 5137.3, carry out the test. And calculate the ratio of visible light transmittance after the test to visible light transmittance before the test, expressed as a percentage, accurate to one decimal place.

6.5.7 Volatile organic compounds

According to the method specified in Appendix C of GB/T 31849-2015, carry out the test.

7 Determination rules

7.1 Individual determination

The individual determination of each safety performance inspection item shall be carried out in accordance with the provisions of Appendix B.

7.2 Comprehensive determination

When all the safety performance meets the requirements, the safety

- d) A vertical plane passing through V_1 and V_2 , in the +Y axis direction, and at 20° to the -X axis (the line of intersection between this plane and the outer surface of the glass is denoted as T_4).

A.4.1.2 The expanded area A refers to the test area A and its extension on the outer surface of the windscreen to the median plane of the vehicle, and the symmetric part of the extension and test area A to the median plane of the vehicle.

A.4.1.3 For the windscreen of a single-person center-driving vehicle, the four planes, which enclose the test area A, refer to a) and b) in A.4.1.1, as well as the two vertical planes passing through V_1 and V_2 , on the left and right sides of the -X axis and at 15° with the -X axis direction. See Figure A.2.

A.4.2 Determination of test area B and reduced area B

A.4.2.1 Test area B is the area of the outer surface of the windscreen surrounded by the following four planes:

- a) A plane passing through V_1 , parallel to the Y axis, above the horizontal plane, and at 7° to the -X axis (the line of intersection of this plane and the outer surface of the glass is denoted as T_5 . The point of intersection of T_5 and the vertical plane passing through V_1 is denoted as T_{r1} point);
- b) A plane passing through V_2 , parallel to the Y axis, below the horizontal plane, and at 5° to the -X axis (the line of intersection of this plane and the outer surface of the glass is denoted as T_6 . The point of intersection of T_6 and the vertical plane passing through V_2 is denoted as T_{r2} point);
- c) A vertical plane passing through V_1 and V_2 , in the -Y axis direction, and at 17° with the -X axis (the line of intersection between this plane and the outer surface of the glass is denoted as T_7);
- d) A vertical plane symmetrical to c) with respect to the median plane of vehicle (the line of intersection between this plane and the outer surface of the glass is denoted as T_8).

A.4.2.2 The reference points of area B are the following points. See Figure A.3. And each point shall not enter the black border or shading zone area:

- a) The points of intersection OF the line of intersection of the horizontal plane through V_1 on the outer surface of the glass AND T_7 and T_8 , i.e. T_{r3} point and T'_{r3} point.
- b) T_{r1} point and its symmetry point T'_{r1} to the median plane of vehicle;

A.4.3.1 Test area I is the area of the windscreen surrounded by the following four planes. See Figure A.6:

- a) A plane passing through the straight line OQ (a horizontal straight line passing through O point and perpendicular to the median plane of vehicle), above the horizontal plane, and at 10° to the horizontal plane (the line of intersection between this plane and the outer surface of the glass is denoted as T_1);
- b) A vertical plane passing through O point, on the left side of the median plane of vehicle and at 15° to the plane (the line of intersection between this plane and the outer surface of the glass is denoted as T_2);
- c) The symmetry plane of T_c symmetrical to the median plane of vehicle, on the right side of the longitudinal median plane of vehicle (if there is no median plane of vehicle, it is symmetrical to the longitudinal vertical plane of vehicle passing through O point. The line of intersection between this plane and the outer surface of the glass is denoted as T_3);
- d) A plane passing through the straight line OQ, below the horizontal plane, and at 8° to the horizontal plane (the line of intersection between this plane and the outer surface of the glass is denoted as T_4).

A.4.3.2 The 25 mm area inward from the edge of the windscreen or the inner edge of the black border shall not enter the test area I.

A.4.4 Determination of test area I'

The test area I' is the entire area of the windscreen after removing the 100 mm inward from the edge or the inner edge of the black border. See Figure A.7.

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