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**The requirements of safety in the event of rear-end collision
for passenger car**

乘用车后碰撞安全要求

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The requirements of safety in the event of rear-end collision for passenger car

1 Scope

This document specifies the general requirements, technical requirements, test requirements for rear collision of passenger cars; provides the same type judgment rules.

This document applies to category M₁ vehicles.

2 Normative references

The contents of the following documents constitute the essential terms of this document through normative references in the text. Among them, for dated references, only the version corresponding to the date applies to this document; for undated references, the latest version (including all amendments) applies to this document.

GB 11551-2014 The protection of the occupants in the event of a frontal collision for motor vehicle

GB 18296 Safety property requirements and test methods for automobile fuel tank and its installation

GB/T 31498-2021 Post crash safety requirement for electric vehicle

3 Terms and definitions

The following terms and definitions apply to this document.

3.1

Passenger compartment

The space for accommodating passengers as surrounded by the roof, floor, side panels, doors, glass windows, front panels, rear panels or rear seat back support panels, as well as electrical protection barriers and shells to prevent passengers from contacting live parts.

[Source: GB/T 19596-2017, 3.1.2.2.5]

3.2

4.1.3 The pipelines and other components of the fuel supply system shall be installed in the safest possible position of the vehicle. Torsion and bending movements, vibration of vehicle structures or driving components shall not cause friction, extrusion or any other abnormal stress on the components of the fuel supply system.

4.1.4 The design and construction of the connectors between the hose and the rigid components of the fuel supply system shall ensure that no leakage occurs under various vehicle use conditions, regardless of whether they are subjected to torsion and bending movements or vibration of vehicle structures or driving components.

4.1.5 If the fuel filler port is located on the side of the vehicle, it shall not protrude from the adjacent outer surface of the vehicle body, when the fuel tank cap is in the closed state.

4.2 Circuit system

4.2.1 The design, construction, installation of the circuit system shall ensure that the exposed parts of its components are waterproof and corrosion-resistant.

4.2.2 Except for the wires arranged in the hollow components, other wires shall be fixed to the vehicle components, vehicle body walls or partitions through which they pass; it shall be protected at the point where they pass through the vehicle body walls or partitions, to prevent damage to the insulation layer.

5 Technical requirements

5.1 The test shall be carried out in accordance with the provisions of Chapter 6 and shall comply with the provisions of 5.2 ~ 5.11.

5.2 During the collision test, the fuel supply system shall not leak liquid.

5.3 After the collision test, if there is continuous leakage of liquid in the fuel supply system, the average leakage rate in the first 5 minutes after the collision shall not exceed 30 g/min; if the liquid leaked from the fuel supply system is mixed with the liquid leaked from other systems, meanwhile the different liquids cannot be separated and identified, THEN, the continuous leakage volume shall be evaluated based on all the collected liquids.

5.4 During and after the collision test, the battery powered by the low-voltage auxiliary system shall remain in the installed position and the cable shall remain connected and powered; the chemical substances inside shall not leak into the passenger compartment.

5.5 For pure electric vehicles and hybrid electric vehicles with Class B voltage circuits, after the collision test, the high-voltage system for power of the vehicle including REESS and the high-voltage components connected to it shall comply with the requirements of 4.2 Anti-electric shock protection, 4.3 Electrolyte leakage, 4.4 REESS

in GB/T 31498-2021.

5.6 During the collision test, the doors (excluding the back door or tailgate) shall not be opened.

5.7 After the collision test, the doors shall be unlocked. If the vehicle is equipped with an automatically activated door locking system, the doors shall be locked before the collision and unlocked after the test.

5.8 After the collision test, for each row of seats, at least one door (if any) shall be able to be opened from the outside without the use of tools, to allow passengers to enter and exit normally; if there are no doors, all passengers shall be able to evacuate without using tools to move the seats or change the position of the seat backrest.

5.9 After the collision test, all internal components of the passenger compartment shall not have sharp protrusions or jagged edges; the seats shall not separate from the body structure; the adjustment and locking devices shall not fail; the internal components of the passenger compartment are allowed to fall off due to permanent deformation without increasing the risk of injury to the passengers.

5.10 During the collision test and within 30 minutes after the collision test, the vehicle shall not catch fire (the phenomenon of continuous flames).

5.11 After the collision test, the vehicle shall automatically turn on the hazard warning lights.

6 Test requirements

6.1 Test site

The test site shall be large enough, to accommodate the collision device drive system, the movement of the impacted vehicle after the collision, the installation of the test equipment. The site where the vehicle collides and moves shall be horizontal and flat; the road friction coefficient shall not be less than 0.5.

6.2 Collision device

6.2.1 The collision device shall be a rigid steel structure.

6.2.2 The surface of the collision device shall be flat, with a width of not less than 2500 mm and a height of not less than 800 mm, an edge radius of 40 mm ~ 50 mm, which is equipped a plywood with a thickness of 20 mm ± 1 mm on the surface.

6.2.3 The following requirements shall be met during collision:

- a) The surface of the collision device is vertical and perpendicular to the longitudinal center plane of the impacted vehicle;

fuel specified by the manufacturer. All other systems (brake system, lubrication system, cooling system, etc.) can be emptied; but the mass of the liquid reduced by emptying shall be compensated.

6.6.3 For externally rechargeable REESS devices, the REESS shall be charged to the maximum charge state in accordance with the manufacturer's requirements. The collision test shall be carried out within 24 hours after the charging is completed.

6.6.4 The vehicle can be in neutral and the parking brake shall be in the braking state.

6.6.5 The doors shall be closed but not locked. For vehicles equipped with an automatically activated door locking system, all doors shall be closed and locked before the test.

6.6.6 Adjust the driver's seat; place the Hybrid III 50th percentile male dummy; use the seat belt to restrain. The seat adjustment, dummy placement and adjustment shall comply with the provisions of Appendix A of GB 11551-2014.

6.6.7 If required by the manufacturer, a vehicle that meets the following conditions may be used for testing:

- a) The same test vehicle that has undergone other tests (including those affecting its structure);
- b) The mass of the test vehicle is increased but not more than 8% of its curb weight, meanwhile the additional parts shall be firmly fixed to the structural parts and shall not affect the structural performance of the passenger compartment during the test.

7 Determination of the same type

If the following provisions are met, it is considered to be the same type:

- a) The vehicle curb weight changes by no more than 8%;
- b) The structure, shape, size, material of the vehicle after the transverse plane passing through the R point of the last row of seats are the same;
- c) The layout (transverse or longitudinal) and position of the rear engine or drive motor are the same;
- d) The structure, shape, size, material of the fuel tank are the same;
- e) The distance from the rear end of the fuel tank to the rear end of the vehicle body is the same or increased;
- f) The installation position, installation method, model, manufacturer of the

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