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

GB 11551-2014

**The protection of the occupants in the event of a frontal
collision for motor vehicle**

汽车正面碰撞的乘员保护

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Table of Contents

1	Scope
2	Normative references
3	Terms and definitions
4	Requirements
4.1	General requirements
4.2	Technical requirements
5	Test methods
5.1	Facilities and vehicle preparation
5.1.4	Vehicle conditions
5.1.4.2	Vehicle mass
5.2	Dummy
5.3	Vehicle driving
5.4	Test speed
5.5	Measurement of front seat dummy
5.6	Measurements made on vehicle
6	Vehicle type change and expansion
7	Transition period requirements of standard

1 Scope

China's mandatory national standard for the protection of occupants in a frontal collision. It is one of the crash tests every new car sold in China must pass, and it is the one that shaped the modern car body: the vehicle is driven into a barrier at a defined speed with instrumented dummies aboard, and the injury values recorded on the head, chest, femur and neck must stay under limits derived from what a human body tolerates. What the test really measures is the structure's ability to do two contradictory things at once - crush progressively at the front to absorb energy over the longest possible distance, and not crush at all around the occupants. Everything else follows from that: the restraint system has to be tuned to the deceleration pulse the structure produces, the steering column must collapse, and the fuel system must stay intact so that a survivable impact does not become a fire.

This Standard specifies terms and definitions, requirements and test methods for occupant protection of front seats for frontal seating in frontal collision of vehicles. This Standard is applicable to vehicles of M1 category and N1 vehicles of which the maximum total mass is

not greater than 2500 kg as well as multipurpose goods vehicle.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 3730.1 Motor vehicles and trailers - Types - Terms and definitions

GB 14166 Safety-belts, restraint systems, child restraint systems and ISOFIX child restraint systems for occupants of power-driven vehicles

GB 14167 Safety-belt anchorages, ISOFIX anchorages systems and ISOFIX top tether anchorages for vehicles

GB/T 15089 Classification of power-driven vehicles and trailers

GB/T 20913-2007 The protection of the occupants in the event of an off-set frontal collision for passenger car

3 Terms and definitions

For the purposes of this document, the following terms and definitions defined in GB/T 20913-2007 apply.

3.1 protective system internal mounting parts and devices for restraining occupants

3.2 type of protective system protective devices which have no differences in the following main aspects.

3.3 angle of impact the angle between the line perpendicular to the front surface of the barrier and the direction of travel of the longitudinal direction of the vehicle

3.4 barrier face the part of face of which the barrier is against the plywood

3.5 vehicle type vehicles which have no differences in the following main aspects.

3.6 passenger compartment space for occupants which is enclosed by roof, floor, side wall, door, glass window and front, rear or rear seat back support plate

4.1 General requirements

4.1.1 The H point of each seat shall be determined in accordance with the procedures specified in Annex A.

4.1.2 If the front seat position protection system includes seat belts, the safety belt should meet the requirements of GB 14166.

4.1.3 For riding positions used to seat dummies and equipped with protective system

including seat belt, its seat belt anchor point shall meet the requirements of GB 14167.

4.1.4 For seats equipped with airbags, there should be airbag prompt information.

4.1.5 For vehicle equipped with one or more frontal protective airbags, the information should be prompted that extreme risk shall be generated after rear-facing child restraint system is used on the seat protected by a front airbag.

4.2 Technical requirements

4.2.1 If the test is carried out for the vehicle according to the provisions of GB/T 20913-2007, and it complies with the provisions of

4.2 in GB/T 20913-2007, this vehicle shall be considered to comply with the requirements of 4.2. For N1 category vehicle and multipurpose good vehicle, the requirements of b),

4.2.2 of this Standard are not required.

4.2.2 For a dummy in the front outboard seat, the performance criteria determined in accordance with Annex B shall meet the following requirements.

4.2.3 Do not open the door during the test.

4.2.4 During the test, the locking system of the front door must not be locked.

4.2.5 After the impact test, in addition to the necessary tools to support the mass of the dummy, without the use of other tools, it should.

4.2.6 During the collision, the fuel supply system should not leak.

4.2.7 After the impact test, if there is continuous liquid leakage in the fuel supply system, the average leakage rate shall not be greater than 30 g/min for the first 5 minutes after the collision; if the liquid from the fuel supply system is mixed with liquid from other systems, and different liquids are not easily separated and identified, then all liquid collected shall be included in the assessment of continuous leakage.

5.1 Facilities and vehicle preparation

5.1.1 Test site The test site should be large enough to accommodate runways, barriers and the necessary technical facilities for testing. At least 5 m of the runway before the barrier shall be level, flat and smooth.

5.1.2 Barrier The barrier is made of reinforced concrete. The front width is not less than 3 m and the height is not less than

1.5 m. Barrier thickness should ensure that its mass is not less than 7×10^4 kg. The front surface of the barrier should be plumb. The normal line should form a 0° angle with the straight direction of the vehicle. And the barrier surface should be covered with a plywood of $20 \text{ mm} \pm 1 \text{ mm}$ thickness and in good condition (as shown in Figure 5).

5.1.3 Barrier positioning The orientation of the barrier shall make the angle of impact 0°. Figure 5 0° barrier with plywood

5.1.4 Vehicle conditions

5.1.4.1 General requirements The test vehicle shall be able to reflect the characteristics of the series, shall include all equipment normally installed, and should be in the normal operation state. Some components may be replaced by equivalent mass alternatives, but the requirement for such replacement should not affect the measurement results of 5.6.

5.1.4.2 Vehicle mass

5.1.4.3 Adjustment of passenger compartment

5.1.4.3.1 Steering wheel position If the steering wheel is adjustable, it shall be adjusted to the position specified by the manufacturer. If not specified by the manufacturer, it should be adjusted to the middle of the adjustable range. At the end of the acceleration process, the steering wheel should be in a free state, and in the position specified by the manufacturer when the vehicle is running straight.

5.1.4.3.2 Glass The moving glass on the vehicle should be in the closed position. In order to facilitate the test measurement, agreed by the manufacturer, the moving glass can be put down, as long as the position of the handle at this time is equivalent to the position where the glass is closed.

5.1.4.3.3 Shift lever The shift lever should be in the neutral position.

5.1.4.3.4 Pedal The pedal should be in the normal position. If the pedal is adjustable, it should be placed in the middle position, unless the manufacturer has special requirements for this position.

5.2 Dummy

5.2.1 In accordance with the provisions of Annex C, in each front seat on the outside, place a dummy that meets the requirements, the dummy should meet 50% of Hybrid III dummy technical requirements and the corresponding adjustment requirements. In order to record the necessary data so as to determine the performance indicators, the dummy shall be equipped with a measuring system complying with the technical requirements of Annex D.

5.2.2 During the test, it shall use the restraint system set by the manufacturer.

5.3 Vehicle driving

5.3.1 Vehicles should not be driven by their own power.

5.5 Measurement of front seat dummy

5.5.1 In order to determine all measurements required by performance indicators, it shall use the measurement system which complies with requirements of Annex D.

5.5.2 The different parameters shall be recorded by means of an independent data channel