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Retraining barrier for passenger seat

客车座椅约束隔板

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Retraining barrier for passenger seat

1 Scope

1.1 This standard specifies terms and definitions, requirements, test methods, inspection rules, packaging, transportation, storage for retraining barriers, which are installed in front of passenger car seats.

1.2 This standard is applicable to the restraining barriers for Class B, Class II, Class III passenger cars, in M2 and M3 categories.

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) is applicable to this standard.

GB 11552-2009 The interior fittings of passenger car

GB 13057 Strength of the seats and their anchorages of passenger vehicles

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 14486 Dimensional tolerances for moulded plastic parts

GB 38262 Flammability of interior materials for buses

HG/T 2006 Thermosetting powder coatings

QC/T 484 Automotive paint coating

QC/T 625 Metallic coatings and conversion coatings for automobiles

ISO 6487 Road vehicles - Measurement techniques in impact tests - Instrumentation

at least reach the innermost point of the driver's seat. It shall prevent passenger objects, which are immediately behind the driving area, from rolling into the driving area, from under the retraining barrier, during emergency braking (if a rigid ball with a diameter of 50 mm cannot roll in, this requirement is considered to be met).

4.1.4 For the retraining barrier, which is installed in the passenger step area, its width shall extend from the inner wall of the vehicle body to the inside of the vehicle, to at least 100 mm beyond the longitudinal centerline of the seat on the passenger aisle side, OR to the edge of the innermost step (whichever is smaller).

4.2 Component requirements

4.2.1 The upper beam, at the head impact zone of the retraining barrier, shall be covered with soft materials, which have a Shore (A) hardness not greater than 65.

4.2.2 The dimensional tolerance of the plastic parts of the retraining barrier shall comply with the relevant provisions of GB/T 14486.

4.2.3 The protective surface used for retraining barriers shall be crisp, plump, clean; it shall not have defects, such as discoloration, stains, damage, scratches.

4.2.4 The exposed metal structural parts of the retraining barrier shall be subjected to surface anti-rust treatment; the paint coating shall comply with the relevant provisions of QC/T 484. The electroplating layer and chemical treatment layer shall comply with the relevant provisions of QC/T 625. Thermosetting powder coatings shall comply with the relevant provisions of HG/T 2006.

4.3 Assembly requirements

4.3.1 After assembling the retraining barrier's frame and plastic parts, and the retraining barrier's cover and plastic parts, they shall be firmly connected and used reliably.

4.3.2 There shall be no sharp protrusions, that endanger the safety of passengers, on the outer surface of the retraining barrier 400 mm above the reference plane (contact the above part by a head shape, which has a diameter of 165 mm; the radius of curvature shall not be less than 5 mm).

4.4 Combustion characteristics

The combustion characteristics of the retraining barrier shall meet the requirements of GB 38262-2019 "Flammability of interior materials for buses".

4.5 Strength requirements

4.5.1 Dynamic test strength requirements of retraining barriers

4.5.1.1 The occupant can be properly restrained, by its forward retraining barrier and/or seat belt.

The forward displacement of any part of the torso and head of the dummy shall not exceed the lateral vertical plane, which is located 1.6 m in front of point R of the auxiliary seat.

4.5.1.2 The occupants are not seriously injured. The allowable injury index, which is determined according to Appendix B, shall meet the following requirements:

a) Head allowable indicator (HIC) is less than 500;

b) The chest allowable index (ThAC) is less than 30 g (except for those whose duration is less than 3 ms) ($g = 9.81\ m/s^2$);

c) The leg allowable index (FAC) is less than 10 kN; when the duration is more than 20 ms, it shall be less than 8 kN.

4.5.1.3 The retraining barrier and its anchorages shall be sufficiently firm AND shall meet the following requirements:

a) Retraining barrier's attachment fittings shall not be completely disengaged, during the test;

b) Any fixing point of the retraining barrier shall not be completely separated from the attachment fittings;

c) Retraining barriers shall not have dangerous edges or corners, that may cause injury to occupants.

4.5.2 Strength requirements of retraining barrier's anchorages

4.5.2.1 The strength of the anchorages of the retraining barrier shall be able to withstand the test load, which is specified in 4.5.1 (when the retraining barrier is installed on the test platform representing the body structure).

4.5.2.2 During the test, permanent deformation, including partial fracture, of the anchorage or its surrounding area of the retraining barrier is allowed.

4.5.2.3 When the combination of one type of retraining barrier and one type of anchorage can meet the requirements of 4.5.1, after the combination of this type of retraining barrier and other types of anchorages, it may follow the requirements of 5.3, to test only the different types of anchorages.

5 Test methods

5.1 Dynamic strength test

5.1.1 Preparation of test retraining barriers and auxiliary seats

5.1.3 Test 2

5.1.3.1 Repeat the test specified in 5.1.2, on the hybrid type III 50th percentile dummy wearing a seat belt; measure its damage value.

5.1.3.2 The measurement of the trolley and the dummy shall be carried out, in accordance with the provisions of Appendix A. The allowable damage index shall be determined, in accordance with Appendix B.

5.1.3.3 If one of the following conditions is met, test 2 may be exempted:

a) Three-point seat belts and fixing points are installed on the rear seats, which are adjacent to the retraining barriers, AND fully comply with the provisions of GB 14167;

b) Carry out the energy absorption characteristic test, in accordance with 5.3, in the impact area of the head of the retraining barrier. The duration, during which the deceleration acting on the impact head shape exceeds 80 g, shall not exceed 3 ms, meanwhile the maximum deceleration shall not exceed 120 g.

5.2 Energy absorption characteristic test

5.2.1 Determination of head impact zone

The head impact zone on the retraining barrier is the space -- between two longitudinal vertical planes which are symmetrical to the H point of the adjacent seat, at a distance of 400 mm. As described in Appendix C of GB 11552-2009, it is the zone where thee head shape device is in contact with the retraining baffle, within the range from vertical rotation to the horizontal position; the head shape device shall be placed, according to the provisions of Appendix A of GB 11552-2009. The distance from its center to the center line of the rotating shaft can be continuously adjusted, between 736 mm and 840 mm.

5.2.2 Impact speed and direction

In the head impact zone, any contact point on the retraining barrier is impacted at a speed of 24.1 km/h ~ 25.3 km/h, which shall meet the requirements for energy absorption characteristics in 5.1.3.3 b). The direction of impact coincides with the surface normal at the point of contact, which is determined in 5.2.1 (see Figure 2).

5.3.2 Test procedure

5.3.2.1 Application of force F

a) At 750 mm above the reference plane, the force F acts on the vertical line of the geometric center of the polygon, which is composed of different fixed points as vertices, through the rigid structure as specified in 5.3.1.1;

b) F force is horizontal AND points to the front of the vehicle;

c) The duration of the force application shall not be less than 0.2 s.

5.3.2.2 The F force is determined by formula (1):

$$F=(5\,000\pm50)\times i \qquad \cdots\cdots (1)$$

Where:

F - Force, N;

i - The number of seating positions of seat, on which the fixture is tested.

6 Inspection rules

6.1 Exit-factory inspection

6.1.1 The retraining barrier shall be inspected and qualified by the quality inspection department of the manufacturer, meanwhile the product certificate shall be issued before leaving the factory.

6.1.2 The exit-factory inspection items are those specified in 4.2, 4.3.1, 4.3.2; the sampling number is 3% of each batch of products, with a minimum of 3 pieces.

6.2 Type inspection

6.2.1 In one of the following situations, the product shall be type inspected:

a) Appraisal for type identification of the new product after launching into production OR the old product after trans-plant production;

b) After the formal production, where there are major changes in the structure, material, process, which may affect the performance of the product;

c) Every 2 years during normal production (or agreed by both parties);

d) When the production is resumed after suspension for 1 year;

e) When the quality supervision agency requests type inspection.

Appendix A

(Normative)

Measurement of trolleys and dummies

A.1 For the detection of the trolley and the dummy, the measurement system shall comply with the provisions of ISO 6487.

A.2 Dynamic test

A.2.1 Measurements made on the trolley

The deceleration/acceleration characteristics of the trolley shall be determined, based on the readings of the longitudinal acceleration sensors, on the rigid structural parts of the trolley. The measurement system shall use the data channel of CFC 60.

A.2.2 Measurements made on dummies

Measurements of different parameters shall be recorded by separate data channels of the following CFC (frequency class of channel).

A.2.2.1 Measurement of dummy head

Head centroid (γ_r)'s composite acceleration is measured using the CFC 600.

A.2.2.2 Measurement of dummy chest

The composite acceleration of the center of mass of the chest is measured using the CFC 180.

A.2.2.3 Measurement of dummy legs

Axial pressure shall be measured using CFC 600.

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