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National Standard of the People's Republic of China

GB 11550-2009

Replacing GB 11550-1995

**Strength requirement and test of
automobile seats head restraints**

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Foreword

All technical contents of this Standard are compulsory.

This Standard will replace GB 11550-1995 *Motor vehicles - Seats head restraints - Performance requirement and test methods*.

This Standard modifies and adopts Economic Commission for Europe's Regulations ECE R25 (Version 1, 1999) *Uniform Provisions Concerning the Approval of Head Restraints (regardless whether it is integrated with seats)* (English version).

This Standard has been redrafted according to ECE R25. Comparison schedule between chapter numbering of this Standard and Regulations ECE R25 is listed in Annex A.

Considering the situations of our country, when adopting ECE R25, there have been some changes in this Standard.

The main technical differences BETWEEN this Standard AND ECE R25, and the reasons are as follows:

- Delete Annex 3 "Procedure for Determining the 'H' Point and the Actual Torso Angle for Seating Positions in Motor Vehicles" of ECE R25. In this Standard, the contents involved with this aspect shall be executed by referring to the contents of Annex C of newly issued national standard GB 11551-2003. This prevents the errors in practical operation caused by difference of verbiage in standard drafting.
- Delete Chapter 3 Application of approval, Chapter 4 Markings, Chapter 5 Approval, Chapter 8 Conformity of production, Chapter 9 Penalties for non-conformity of production, Chapter 10 Modification and extension of approval of a type of head restraint, Chapter 11 Instructions, Chapter 12 Production definitely discontinued, Chapter 13 Transitional provisions, Chapter 14 The contents - Names and addresses of certification department and administrative departments belong to "certification programs and certification mark". The reasons are caused by the form difference of standard system and legislative system.

Main differences between this Standard and GB 11550-1995 include:

- Add general requirements of head restraints (4.1 of this version);
- Add requirements of head restraints surface curvature (4.2 of this version);
- Add requirements of head restraints clearance dimension (4.6.2.2 and 4.6.3 of this version);

Strength requirement and test of automobile seats head restraints

1 Scope

This Standard specifies terms and definitions, requirements and test method for automobile seats head restraints.¹

This Standard applies to seats head restraint of vehicles of categories M and N of GB/T 15089-2001.

This Standard does not apply to head restraint of folding, side-facing or rearward-facing seats.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, subsequent amendments (corrigenda excluded) or revisions of these publications do not apply. However, the parties who enter into agreement based on this Standard are encouraged to investigate the possibility of applying the latest edition of the standard. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB 11551-2003 The protection of the occupants in the event of a frontal collision for passenger vehicle

GB 13057-2003 The strength of the seats and their anchorages of passenger vehicles

GB 15083-2006 Strength requirement and test of automobile seats, their anchorages and any head restraints

GB/T 15089-2001 Classification of power-driven vehicles and trailers

ISO 6487:1980 Measurement technology for collision test: Measurement instrument

¹ Head restraints of vehicle of category of M₁ in compliance with GB 15083-2006 can be regarded as to meet this Standard.

3.3

type of seat

Seats which share same dimension, framework or pad. The surface and color can be different.

3.4

type of head restraint

Head restraints which share same dimension, framework or pad. The surface, color and panel skin can be different.

3.5

reference point (H point)

Crossing point BETWEEN torso of three-dimensional H-point device representing human body in relation to the theoretical pivot of thigh AND longitudinal vertical plane of seat.

3.6

reference line

The line on the three-dimensional manikin illustrated in Figure C.1 of Attachment 1 of Annex C of GB 11551-2003.

3.7

head line

A straight line passing through the centre of gravity of the head and through the joint of the neck and the thorax. When the head is at rest, the head line is situated in the extension of the reference line.

3.8

folding seat

An auxiliary seat intended for occasional use and normally folded.

3.9

adjustment system

The device by which the seat or its parts can be adjusted to a position suited to the

for the pressure produced by headform for test using, shall not exist rigid projections which may cause injure.

4.4 The height of head restraints shall meet the following requirements:

4.4.1 Measure the height of head restraints as described in paragraph 5.2 below.

4.4.2 For head restraints not adjustable for height, the height of front seats shall not be less than 800 mm; For other seats, the height shall not be less than 750 mm.

4.4.3 For head restraints adjustable for height:

4.4.3.1 The head restraint's height measured at the highest adjustable position: For the front seats, the values shall not be less than 800 mm; For other seats, the values shall not be less than 750 mm.

4.4.3.2 There shall be no "use-position" in a height of less than 750 mm.

4.4.3.3 Except the front seats, other seats' head restraints can be adjusted to a position of which the height is less than 750 mm. However, occupants must be clearly informed that this place is not the use-position of head restraints.

4.4.3.4 The front seats, if their head restraints can automatically return to the use-position when the seat is occupied, can automatically lower the height to less than 750 mm when the seat is not occupied.

4.4.4 To guarantee the adequate clearance BETWEEN the head restraint AND roof, windows and any part of the vehicle structure, for the front seats, the size specified in 4.4.2 and 4.4.3.1 can be less than 800; for other seats, it can be less than 750mm. However, the clearance shall not exceed 25 mm. For seats fitted with displacement and/or adjustment systems, this shall apply to the seat. Furthermore, there shall not have any "use-position" lower than 700 mm.

4.4.5 For the rear center seats or head restraints of seating positions, it may reduce the height specified in 4.4.2 and 4.4.3.1. However, it shall not be less than 700 mm.

4.5 For head restraint installed with adjustable height, the use-part's height of the head restraints measured in 5.2 provisions shall not be less than 100 mm.

4.6 For head restraint not installed with adjustable height, the gap of the head restraint and the seat-back shall not be more than 60 mm.

4.6.1 For head restraint installed with adjustable height, in its lowest position, the gap of head restraint and seat-back shall not be more than 25 mm.

4.6.2 For integral head restraint, the area to be considered is:

Annex B

(normative)

Test of energy absorption

B.1 Installation, test apparatus, recording instruments and procedure

B.1.1 Installation

Install the head restraint that is covered with energy absorbing material on the seat or the structural part of the vehicle. Firmly fix the seat or the structural component to the test bench so as to remain stationary. Without particular requirements, it shall ensure mounting base to be approximately horizontal.

If seat-back's dip-angle is adjustable, it shall be adjusted to the position as specified in 5.2.2.

Install the head restraints on the seat-back. For the separable head restraint, it shall be installed on the part of the vehicle according to actual installing position.

For adjustable head restraint, adjust it to the most unfavorable position within the adjustable range.

B.1.2 Test apparatus

B.1.2.1 This apparatus consists of a pendulum whose pivot is supported by ball-bearings. The reduced mass at its percussion centre is 6.8 kg. The lower end of the pendulum has a rigid headform of which the diameter is 165 mm. Its centre is coincident to the centre of pendulum percussion.

B.1.2.2 Install 2 accelerometers and a speed-measuring device on the headform to measure the values in the direction of impact.

B.1.3 Recording instruments

The recording instruments adopted shall meet the following grade requirements of measurement precision:

B.1.3.1 Acceleration

Accuracy: $\pm 5\%$ of the actual measured value;

Frequency rating of data channel: Rate 600 corresponding to ISO 6487:1980;

Cross-axis sensitivity shall not be greater than 5% of the minimum scale value.

B.1.3.2 Speed

Accuracy: $\pm 2.5\%$ of actual measured value;

Sensitivity: 0.5km/h.

B.1.3.3 Time recording

The measurement instrument shall be able to record the action procedure throughout the whole continuous duration. The time interval of recorded readings is required to be within one-thousandth second. The impact-start moment, when the headform first-time contacts with the test sample, shall be able to be found in the test record, so as to perform experimental analysis.

B.1.4 Test procedure

B.1.4.1 Install and adjust the head restraint according to the provisions in B.1.1. The impact points shall be within the impact zone specified by 4.1, and be determined by test personnel. If necessary, the impact point can also be, outside the impact zone specified by 4.1, on the surface of which the radius of curvature is less than 5mm.

B.1.4.1.1 When impacting the back-surface of head restraints from back to front, the impact direction shall be on longitudinal plane and be at an angle of 45° to the vertical direction.

B.1.4.1.2 When impacting the front-surface of head restraints from front to back, the impact direction shall be on longitudinal plane and be along the horizontal direction.

B.1.4.1.3 The front and back zones are bounded by the horizontal plane that is tangential to the top of the head restraint and determined by 5.2.

B.1.4.2 The headform shall impact the test sample at the speed of 24.1 km/h. This speed shall be achieved either by the propulsion energy or by using an additional impelling device.

B.2 Results

The duration of time, of which the headform' deceleration determined according to above test procedures is more than 80, shall not exceed 3ms. The deceleration shall take the average of the 2 accelerometer readings.

B.3 Equivalent test program

B.3.1 It may adopt the equivalent test program which can measure the result in B.2. The placement of test devices is not limited. However, it shall ensure that the impact

direction of head restraint is not affected.

B.3.2 It shall let other staffs who adopt other test method to prove that the test method he/she adopted is equivalent with the method specified in B.1 above.

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