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# National Standard of the P.R.C.

GB XXXX-XXXX

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## The Requirements of Fuel System Safety in the Event of Rear-End Collision for Passenger Cars

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## Contents

|  |    |
|--|----|
| Foreword.....  | II |
| 1 Scope.....   | 1  |
| 2 Normative Documents Quoted.....  | 1  |
| 3 Terms and Definitions.....   | 1  |
| 4 General Requirements.....  | 1  |
| 5 Technical Requirements.....  | 2  |
| 6 Test Methods.....  | 2  |
| 7 Change of Vehicle Types.....   | 3  |
| Appendix A (Informative) Cross-Reference of Numbering of Chapters and Clauses in this Standard to That in ECE R34..... | 4  |

## Foreword

All technical contents in this Standard are mandatory.

This Standard is revised pursuant to ECE R34 Regulations (02 series, version 2003)  
<Regulations on Certification of Fire Prevention for Motor Cars> (English).

Appendix A is a cross-reference of numbering of chapters and clauses in this standard to that in ECE R34.

Some contents in this Standard are not included in “Certification Procedure and Certification Mark” in ECE R34, because the standard system differs in form from the regulation system.

The technical requirements in ECE R34 have been revised as follows:

a) The collision speeds in 6.2.4.2 and 6.2.5.4 of this Standard are changed from “35 ~ 38 km/h” specified in Part II of ECE R34 to “50±2 km/h”.

b) The following contents are deleted: “Certification of Fuel Tank” in Part I in ECE R34, “Test on Plastic Fuel Tank” in Appendix 5, and “Front Collision Test” in Appendix 3.

c) “These Regulations” is changed to this Standard.

d) Informative Appendix A is added.

Appendix A to this Standard is informative.

Suggestions for the effective date of this Standard:

a) For cars of new types: from 1 July 2006

b) For cars in production: from 24 months after this Standard is issued.

This Standard is proposed by National Development and Reform Commission.

This Standard is managed by National Technical Committee of Automobile Standardisation.

This Standard is chiefly drafted by China Automobile Technical Research Center.

The following organisations have participated in drafting this Standard: Automobile Dept. of Tsinghua University, Shanghai Automobile Test Center, Shanghai Volkswagen Co., Ltd., National Automobile Quality Supervision and Test Center, Technical Center of Citroen Automobile, R&D Center of Guangzhou Honda, Chery Automobile Co., Ltd., Technical Center of Changan Automobile Group, Volkswagen (China) Investment Co., Ltd., Shanghai Pan Asia Technical Automotive Center, and National Quality Supervision and Inspection Center for Heavy-Duty Automobile

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# Fuel System Safety Requirements in the Event of Rear-End Collision for Passenger Car

## 1 Scope

This standard specifies safety requirements and test methods for the fuel system of passenger cars in the event of rear-end collision.

This Standard applies to M<sub>1</sub>-type cars with liquid fuel tank, and may serve as a reference for other cars.

## 2 Normative Documents Quoted

Clauses of the following documents become clauses of this Standard once quoted herein. None of the revisions (excluding contents of the corrigenda) or revised versions of quoted documents that are dated is applicable to this Standard. However, parties which have reached agreement under this Standard are encouraged to study whether the latest versions of the aforesaid documents are applicable. The latest versions of quoted documents not dated are applicable to this Standard.

GB 18296 Safety Performance Requirements and Test Methods for Fuel Tanks of Automobiles

## 3 Terms and Definitions

The following terms and definitions apply to this Standard.

### 3.1 Vehicle type

Vehicles of the same type not different in the following major respects:

- 3.1.1 Structure, shape, dimensions and material of the fuel tank;
- 3.1.2 Position of the fuel tank in the vehicle;
- 3.1.3 Features of the fuel supply system (pump, filter, etc.) and its position in the vehicle;
- 3.1.4 Features of the electric device that may have an effect on the collision test results described hereunder, and its position in the vehicle.

### 3.2 Transverse plane

The plane perpendicular to the longitudinal central plane of the vehicle.

### 3.3 Unladen weight

Mass of the vehicle in motion, excluding the driver, passengers, and cargo, but including fuel tank at 90% capacity, cooling liquid, lubricating oil, accessory tools and spare tyres (if provided as standard configurations by the manufacturer).

### 3.4 Capacity of the fuel tank

The capacity of the fuel tank specified by the manufacturer.

### 3.5 Liquid fuel

Fuel that is in liquid state at normal temperature and pressure.

## 4 General requirements

### 4.1 Fuel device

- 4.1.1 The fuel tank shall comply with GB 18296.
- 4.1.2 The parts of the fuel device shall be protected by the car body or frame to prevent them from touching any obstacle on the ground. Those parts do not need protection if they are higher above the ground than the car body or frame.

4.1.3 The pipes and other parts of the fuel device shall be fixed in the safest places of the vehicle. Torsion and bending, and vibrations of the vehicle structure or transmission gear shall not result in friction and squeezing between the parts of the fuel device, or any other abnormal stress.

4.1.4 Connectors between the hose and the rigid parts of the fuel device shall be designed and structured so as to ensure that they are sealed under any conditions of the vehicle, whether in torsion or bending or in vibrations of the vehicle structure or transmission gear.

4.1.5 If the filler cap is at the side of the vehicle, it shall not protrude out of the neighboring surface of the vehicle when the fuel tank is covered.

#### 4.2 Electrical device

4.2.1 All electrical wires except those in hollow components shall be fixed to the walls or partition boards of the vehicle parts passed and shall be properly protected to avoid damaging the insulating layer.

4.2.2 The electrical device shall be designed, structured and installed so as to ensure that the exposed components are resistant to corrosion.

#### 5 Technical requirements

When conducting a rear-end collision test as specified in Chapter 6 of this Standard:

5.1 No liquid shall leak out of the fuel device during the test;

5.2 If liquid leaks continuously out of the fuel device after the collision test, then the leaking speed in the first five minutes after collision shall not be greater than 30g/min; if the liquids leaking out of the fuel device and other systems are mixed and are hard to separate or distinguish, then the continuous leakage amount shall be evaluated according to all the liquids collected;

5.3 No fuel shall burn;

5.4 The batteries shall be kept in place by the protection device during and after the collision test.

#### 6 Test methods

##### 6.1 Objectives and scope

This test is intended to simulate rear-end collision with another vehicle in motion.

##### 6.2 Installation procedure and measuring instruments

###### 6.2.1 Test site

The test site shall be large enough to hold the collision device driving system, to move the collided vehicle after collision, and to install the test equipment. The ground for the collision and motion of vehicles shall be level, with the friction coefficient not less than 0.5.

###### 6.2.2 Collision device

6.2.2.1 The collision device shall be a rigid steel structure

6.2.2.2 The surface of the collision device shall be a plane at least 2,500 mm in width and 800 mm in height, the round edge shall be 40 ~ 50 mm in radius, with 20mm-thick plywood on the surface.

6.2.2.3 The following requirements shall be met during collision.

6.2.2.3.1 The collision surface shall be vertical and perpendicular to the longitudinal central plane of the collided vehicle;

6.2.2.3.2 The moving direction of the collision device shall be horizontal and parallel to the longitudinal central plane of the collided vehicle;

6.2.2.3.3 The lateral difference between the perpendicular bisector of the collision device surface and the longitudinal central plane of the collided vehicle shall not be greater than 300 mm, and the collision surface shall be wider than the collided vehicle;

6.2.2.3.4 The lower edge of the collision surface shall be  $(175 \pm 25)$  mm above the ground.

### 6.2.3 The driving mode of the collision device

The collision device can either be fixed on a moving vehicle (moving barrier) or be part of the pendulum.

### 6.2.4 Requirements for using the moving barrier

6.2.4.1 If the collision device is fixed with a restraint component on a moving vehicle (moving barrier), the restraint component must be rigid and must not deform due to collision. The moving vehicle shall detach from the tension gear at the moment of collision and move freely.

6.2.4.2 The collision speed shall be  $50 (\pm 2)$  km/h;

6.2.4.3 The total weight of the moving vehicle and the collision device shall be  $(1100 \pm 20)$  kg;

### 6.2.5 Requirements for using the pendulum

6.2.5.1 The center of the collision surface of the collision device shall be at least 5m from the rotating axis of the pendulum.

6.2.5.2 The collision device shall be fixed firmly on the rigid arm and hang the pendulum freely through the rigid arm, without getting deformed because of collision.

6.2.5.3 The pendulum shall be provided with an arresting gear to prevent the pendulum from colliding the test vehicle twice.

6.2.5.4 The instantaneous speed of the pendulum collision center at the moment of collision is  $50 (\pm 2)$  km/h

6.2.5.5 Following is the relation between the converted mass “ $m_r$ ” and total mass “ $m$ ” of the pendulum collision center, the distance “ $a$ ” between the collision center and rotating axis, and the distance “ $l$ ” between the center of gravity and the rotating axis:

$$m_r = m \cdot \frac{l}{a}$$

6.2.5.6 The converted mass  $m_r$  shall be  $(1100 \pm 20)$  kg

### 6.2.6 General regulations on the mass and speed of the collision device

If the collision speed is greater than specified in 6.2.4.2 and 6.2.5.4 and/or the mass of the collision device is greater than specified in 6.2.4.3 and 6.2.5.6, and the vehicle complies with the requirements of this Standard, then the test shall be deemed as valid.

### 6.2.7 Status of the test vehicle

6.2.7.1 The test vehicle shall be provided with fireproof parts and equipment, which will be included into the total mass of the vehicle.

6.2.7.2 The fuel tank shall be at least 90% full of fuel or nonflammable liquid whose density and viscosity are similar to those of normal fuel. Other systems (like arresting liquid tank, radiator, etc.) can be emptied.

6.2.7.3 The gearbox can be out of the neutral position, and the stopping gear may be in the arresting status.

6.2.7.4 The following deviations are allowed if required by the manufacturer:

6.2.7.4.1 This inspection institution in charge of this test may use the same test vehicle that has undergone other tests (including the tests which may affect its structure) for the test specified in this Standard.

6.2.7.4.2 The weight of the vehicle may increase a little but no more than 10% of the total. The added weight shall be fixed firmly on the structural members and shall not affect the structural performance of the passenger cabin.

#### 6.2.8 Measuring instruments

The accuracy of the instruments used to record the speeds specified in 6.2.4.2 and 6.2.5.4 is 1.

#### 6.3 Equivalent test methods

6.3.1 Equivalent test methods are allowed under the conditions specified in this Standard, i.e. substitution test methods or calculation based on the substitution test results.

6.3.2 If methods specified in 6.2 are to be used, their equivalency shall be validated.

#### 7 Change of vehicle type

7.1 Any change of vehicle type shall be notified to the vehicle management department, which

7.1.1 may think the change does not have any negative effect and the vehicle can meet the relevant requirements in any case or

7.1.2 may require the inspection institution in charge of the test to produce a further report.

7.2 If the conditions under 7.1 are met and the integrated mass of the vehicle does not change by more than 20%, vehicle type will not be changed

Appendix A  
(Informative)

Cross-Reference of Numbering of Chapters and Clauses in this Standard and That in ECE R34

Table A.1 Cross-Reference of Numbering of Chapters and Clauses in this Standard and that in  
ECE R34

| Numbering of Chapters and Clauses in this Standard | Numbering of Chapters and Clauses in ECE R34 |
|--|--|
| 1  | 1.2  |
| 3  | Part II 7                                    |
| 4  | Part II 8                                    |
| 5  | Part II 9                                    |
| 6  | Appendix 4                                   |
| 7  | Part II 10                                   |
| Appendix A   | --   |