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The safety technique specifications of special school buses

专用校车安全技术条件

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The safety technique specifications of special school buses

1 Scope

This Standard specifies the terms and definitions, type classification, requirements and test methods for special school buses.

This Standard is applicable to special school buses for groups over 3 years old at the kindergarten stage and those educated at the nine-year compulsory education stage.

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 2406.2, *Plastics - Determination of burning behavior by oxygen index - Part 2: Ambient-temperature test*

GB/T 2408-2008, *Plastics - Determination of burning characteristics - Horizontal and vertical test*

GB 4351.1, *Portable fire extinguishers 0- Part 1: Performance and construction*

GB/T 5454, *Textiles - Burning behavior - Oxygen index method*

GB 5768.2-2009, *Road traffic signs and markings - Part 2: Road traffic signs*

GB 8410-2006, *Flammability of automotive interior materials*

GB/T 8627-2007, *Test method for density of smoke from the burning or decomposition of building materials*

GB/T 12428-2005, *Laden mass calculating method for buses*

GB 12676, *Technical requirements and testing methods for commercial vehicle and trailer braking systems*

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

GB 13094-2007, *The safety requirements for bus construction*

GB/T 13594, *Antilock braking performance and test procedure for motor vehicles and their trailers*

GB 13954-2009, *Warning Lamps for Police Cars, Fire Engines, Ambulances and Engineering Rescue 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 14172, *Static roll stability test method for motor vehicles*

GB 15083, *Motor vehicles - Seat systems - Strength requirements and test methods*

GB 15084, *Motor vehicles - Devices for indirect vision - Requirements of performance and installation*

GB 17578, *Requirements and test methods of strength for the superstructure of bus*

GB/T 17729, *Hygienic standard for the air quality inside long distance coach*

GB/T 18833, *Retroreflective sheeting for traffic control*

GB 18986, *The safety requirements for light bus construction*

GB/T 19056, *Vehicle travelling data recorder*

GB/T 19596-2004, *Terminology of electric vehicles*

GB 24315, *The marker for school bus*

GB 24406, *The strength of seats and their anchorages of special school bus for schoolchildren*

GB/T 24545, *Requirement of speed limitation system for motor vehicles*

GB/T 28370, *Detect methods for the air quality inside long distance coach*

JT/T 782, *Performance requirements and test methods of tyre blow-out emergency safety device for commercial vehicle*

5 Requirements and test methods

5.1 Appearance marks and main structure sizes

5.1.1 The special school bus shall be sprayed with the appearance mark of the special school bus that meets the requirements of GB 24315.

5.1.2 The front of the special school bus shall be equipped with a collision safety structure. If it is a front transverse engine, the centerline of the engine crankshaft shall be before the front point of the windshield. If it is a front longitudinal engine, the centerline of the first and second cylinders of the engine shall be before the foremost point of the windshield. If the front collision performance of the large and medium-sized special school bus is not lower than the first two structures, the layout of the engine may not be limited.

NOTE: The centerline of the first and second cylinders of the engine refers to the centerline of the distance between the first and second cylinders of the engine.

5.1.3 Articulated buses and double-decker buses shall not be used as special school buses.

5.1.4 The height of the dedicated school bus shall not be greater than 3.7m.

5.1.5 If there is a side luggage compartment, the height of the top of the luggage compartment from the ground shall be less than 1.0m.

5.1.6 Special school buses must not be equipped with luggage racks outside the vehicle.

5.1.7 There shall be no holes inside or outside the bus that can easily catch the fingers of children and elementary school students. There shall be no protrusions, depressions, sharp corners and other defects that may cause personal injury.

5.2 Dynamic

The specific power of special school buses (except electric special school buses) shall not be less than 9.0kW/t.

NOTE 1: Electric special school buses refer to the types of electric vehicles defined in GB/T 19596-2004: pure electric vehicles, hybrid (electric) vehicles, fuel cell electric vehicles.

NOTE 2: The specific power is the ratio of the maximum net power of the engine (or 0.9 times the rated power of the engine or 0.9 times the rated power of the engine) to the maximum allowable total mass of the motor vehicle.

5.3 Mass of passengers and crew and maximum number of passengers

5.8 Front and rear bumpers

5.8.1 Special school buses shall be equipped with front and rear bumpers.

5.8.2 The bumper shall be connected to the frame or body frame. The front bumper shall extend forward to the front of the radiator grille, headlights, hood part and so on and extend outward to the outer edge of the wheel cover to provide maximum protection. The rear bumper shall cover the rear corner of the body.

5.8.3 There shall be no protrusions, depressions, or sharp corners on the bumper that may cause personal injury.

5.9 Roll stability

Test according to the method specified in GB/T 14172. Load the plane on the seat cushion of each seat according to the mass of passengers and crew specified in 5.3.1 (if there is a luggage compartment, the luggage compartment shall not be loaded). The load must be firmly fixed to the seat. The measured roll stability angle shall not be less than 32°. Simultaneously measure under no load. The measured roll stability angle shall not be less than 35°.

5.10 Body structure, strength, exit and interior layout

5.10.1 Body structure

5.10.1.1 Large and medium-sized special school buses shall have a body frame structure. The top beam, column and main beam of the underframe on the same cross section shall form a closed ring (except for the wheel cover and the top wind window). The body column between the longitudinal beams from the side windows to the bottom beams shall adopt an integral structure. No tailor welding is allowed in the middle. If the body structure of the light special school bus does not adopt the above structure, it shall adopt the structure of the cover and the reinforced beam.

5.10.1.2 The passenger area of the special school buses for infants shall adopt a flat floor structure. There must be no steps on the floor, except for the local structural protrusions of the wheel cover and the access cover.

5.10.1.3 The floor coverings in the riding area, passage area and approach area shall be non-slip and wear resistant.

5.10.2 Top structural strength

The top structural strength is tested according to Annex A, in accordance with the following requirements:

a) During the test, the body structure shall be able to withstand the specified

5.10.5.1 Seats

5.10.5.1.1 Driver's seat

5.10.5.1.1.1 The driver's seat shall be equipped with a 3-point seat belt.

5.10.5.1.1.2 The strength of the driver's seat and its vehicle fixings shall meet the requirements of GB 15083.

5.10.5.1.1.3 The safety belt of the driver's seat and its fixing points shall meet the requirements of GB 14166 and GB 14167 respectively.

5.10.5.1.2 Seat of caregiver

5.10.5.1.2.1 At least one caregiver seat shall be installed on the special school bus. When the number of child seats on the special school buses for infants is greater than or equal to 20 and less than 40, 2 or 3 seats for caregivers shall be installed. 3 or 4 seats for caregivers shall be installed when there are more than 40 seats. When the number of student seats on the special school buses for primary school students and special school buses for primary and junior middle school students is greater than or equal to 40, 2 or 3 seats for caregivers shall be installed. When there is only one caregiver's seat, the caregiver's seat shall be located at the front of the vehicle aisle and close to the passenger door. When there is more than one caregiver seat, there shall be at least one caregiver seat close to the emergency door.

5.10.5.1.2.2 The caregiver seat shall be marked.

5.10.5.1.2.3 Seat belts for caregivers shall be equipped.

5.10.5.1.2.4 The strength of the front-mounted caregiver seat and its vehicle fixings shall meet the requirements of GB 13057.

5.10.5.1.2.5 The seat belts and their fixing points of the caregiver's seat shall meet the requirements of GB 14166 and GB 14167 respectively.

5.10.5.1.3 Seats for infants and students

5.10.5.1.3.1 Seats for infants and students shall be arranged forward. Infants and student seats shall not be folding seats. The seats for infants and students shall not be provided before the horizontal and vertical plane where the driver's seat R is located. Infants and student seats are arranged at most "2+3" in the transverse direction of the vehicle.

5.10.5.1.3.2 The strength of infant and student seats and their vehicle fixtures shall meet the requirements of GB 24406.

5.10.5.1.3.3 Each infant and student seat shall be equipped with a two-point

5.10.5.1.4.3 Free space above the seat

Free space above each seat:

a) Each seat shall have a vertical clear space. From the plane where the highest point of the seat cushion that has never been squeezed locates upwards, it shall not be less than 900mm. From the floor where passengers rest on their feet upwards, it shall not be less than 1350mm (see Figure 8). For the wheel cover and the rear seat, it can be reduced to 1250mm.

b) This clear space shall include all the horizontal areas described below:

1) Horizontal area: Between the longitudinal vertical planes at 165mm on both sides of the center vertical plane of the special school buses for infants; Between the longitudinal vertical planes at 175mm on both sides of the center vertical plane of the special school buses for primary school students; Between the longitudinal vertical planes at 190mm on each side of the center vertical plane of the student seat of the special school buses for primary and junior middle school students; Between the longitudinal vertical planes at 200mm on both sides of the center vertical plane of the caregiver seat;

2) Vertical area: Between the horizontal vertical plane where the special school buses for infants passes through the last point of the upper part of the seat back AND the horizontal vertical plane 200mm forward through the front end of the uncompressed seat cushion; Between the horizontal vertical plane where the special school buses for primary school students passes through the last point of the upper part of the seat back AND the horizontal vertical plane 200mm forward through the front end of the uncompressed seat cushion; Between the horizontal vertical plane where the special school buses for primary and junior middle school students passes through the last point of the upper part of the seat back AND the horizontal vertical plane 280mm forward through the front end of the uncompressed seat cushion; Between the horizontal vertical plane passing through the last point of the upper part of the seat back of the caregiver and the horizontal vertical plane passing the front end of the uncompressed seat cushion 280mm forward. Measurements are made on the vertical plane of the seat center.

c) The clear space may not include the following areas:

1) The cross section of the side wall above the window seat is an inverted right triangle area. The apex of the triangle is located 650mm above the floor, and the bottom side is 100mm wide (see Figure 8).

on the mounting bracket.

5.10.5.6 Interior lighting

5.10.5.6.1 The interior lighting shall cover the following areas:

- All passenger area and crew area;

- All steps;

- Approaches to all exits and areas near the passenger door;

- Internal signs and internal controls for all exits;

- Where there are obstacles.

5.10.5.6.2 There shall be at least two internal lighting circuits. When one line fails, it shall not affect the lighting of the other line. The line used for conventional lighting at the entrance and exit can be used as one of them.

5.10.5.6.3 Protective measures shall be taken to prevent the driver from being affected by interior lighting and reflected light.

5.10.5.7 Interior decoration

The interior trim parts shall be firmly fixed on the vehicle. There shall be no sharp corners, sharp edges, or burrs that may cause injury.

5.11 Signal system

5.11.1 Stopping signal plate

Special school buses shall be equipped with stopping signal plate in accordance with Annex B. When students are on and off the bus, the stopping signal plate shall be stretched out to remind the vehicles behind to stop and wait.

5.11.2 Sign lights of special school bus

5.11.2.1 Installation location and quantity

The special school bus shall be equipped with 2 yellow special school bus lights on the top and rear of the bus. The distance between the front marker light and the front edge of the roof shall not be greater than 400mm. The distance between the rear indicator light and the rearmost edge of the roof shall not be greater than 400mm. The left and right indicator lights shall be as close as possible to the outer edges of the left and right sides of the vehicle body and symmetrical to the longitudinal centerline of the vehicle.

sleeve at the joints. Flame-retardant and wear-resistant insulating sleeves shall be installed when the wires pass through the holes. Electrical components shall be connected reliably. The connectors outside the passenger compartment shall have waterproof requirements. The wire shall be properly protected and safely fixed in a location where it shall not be scratched, worn, or corroded. Unless special insulation and protection are provided (for example, the solenoid coil that controls the exhaust valve), it shall not be in contact with the oil pipe, exhaust system or subject to excessive temperature. Battery installation shall meet the requirements of GB 13094.

5.12.2.2 Circuit protection

Except for the starter, ignition coil (forced ignition), glow plug, engine shutdown device, charging circuit and battery ground, the power supply circuit of each electrical equipment shall have a fuse or circuit breaker. However, for the power supply lines of low power consumption equipment, if the total rated current does not exceed 16A, a public fuse or public circuit breaker can be set to protect.

5.12.2.3 Main power switch

The special school bus shall be equipped with a main power switch. However, if a safety device is installed on all power supply lines at the battery end, or the vehicle electrical equipment is directly driven by the electronic control unit and has a load monitoring function, when the electronic control unit power supply line and individual direct power supply lines are all equipped with a safety device, an electromagnetic power switch may not be equipped. A special school bus with a length of not less than 6m shall also be equipped with a manual mechanical power-off switch that can cut off the battery and the circuit connection.

5.12.2.4 Emergency switch

In order to reduce the loss caused by the fire, a safety emergency switch shall be installed near the driver's seat. Allow the driver to operate from his seat. And use protective cover or other methods to avoid mis-operation. Clearly mark the operation method at the emergency switch. For example, “Remove the cover and turn on the switch! Only operate when the vehicle has stopped!”.

After starting the emergency switch, the following functions shall be realized at the same time:

- The engine stops working quickly;

- The cooling fan of the heater can be turned off with a delay;

- The control system for opening and closing the passenger door can work normally;

Fire extinguishers shall be equipped in the passenger compartment. It shall be ensured that at least one ABC type dry powder fire extinguisher weighing at least 2kg is located near the seat of the caregiver and near the driver's seat. Its requirements shall meet the requirements of GB 4351.1. The installation location of the fire extinguisher shall be clearly marked. Easy to access in emergency. The pressure gauge of the fire extinguisher shall be able to observe the pressure without moving the fire extinguisher.

5.13 Driver's field of vision

5.13.1 Outside vision device

Determine the eye point position of the driver's field of vision according to the provisions of GB 15084. The driver’s field of vision shall meet the requirements of Annex C. No device that affects the driver's external vision shall be installed. After the passenger door is closed, the driver shall be able to observe the situation around the passenger door.

5.13.2 Auxiliary reversing device

The special school bus shall be equipped with a rear-view system to ensure that the driver can clearly see the situation within the range of 3.6m long and 2.5m wide on the ground directly below the rear edge of the rear windshield under normal driving conditions.

5.13.3 In-vehicle vision device

The driver shall be able to observe all passenger areas through the endoscope under normal driving conditions. No sharp corners or sharp edges on the edge of the endoscope.

5.13.4 Front wind window defrosting fog device

Special school buses shall be equipped with front windshield defrosting devices.

5.14 Air quality in the vehicle

If natural ventilation is not possible, a forced ventilation device shall be installed. The components in the air in the vehicle shall meet the requirements of GB/T 17729. Test method is according to GB/T 28370. Allow the use of air purification devices with functions of sterilization and elimination of harmful gases to meet air quality requirements.

5.15 Driving information recording and processing system

Special school buses shall be equipped with driving records that have satellite positioning functions and comply with GB/T 19056. The display part of the tachograph shall be easy to observe. The data interface shall be easy to insert

Annex A

(normative)

Test method for upper structure strength

A.1 Test conditions

A.1.1 Ambient temperature

The ambient temperature is between 0°C~40°C.

A.1.2 Vehicle conditions

The windows, doors and emergency exits are completely closed and are in a state of being tied instead of locked.

A.2 Test equipment

The test equipment shall be able to automatically complete loading and load retention at a loading speed not exceeding 13mm/s.

A.3 Test procedures

A.3.1 The test sample is a complete vehicle, or a body frame that is welded to the underframe according to the actual vehicle structure and contains the door and floor (the vehicle with the skeleton structure may not be equipped with inner and outer skins, accessories and so on).

A.3.2 The test load is uniformly and vertically applied to the top structure of the test sample through a rigid flat plate with a length and width not less than the length and width of the test body.

A.3.3 Place the force plate on the roof of the vehicle so that its rigid surface is perpendicular to the vertical longitudinal plane. And there are no less than two contact points with the roof. If viewed from the roof of the vehicle, its longitudinal centerline shall coincide with the longitudinal centerline of the vehicle. The projection of the force plate shall cover all occupant areas.

A.3.4 Test sample installation: When the test sample is a complete vehicle, the deformation of the suspension and tires shall be eliminated by multiple rigid support of the lower plane of the vehicle bottom (vehicle) frame. The installation of the test vehicle shall ensure that the bottom (vehicle) frame is firmly fixed. When the test sample is a skeleton vehicle body, the installation of the sample shall ensure that the bottom (vehicle) frame is firmly fixed.

Annex B

(normative)

Stopping signal plate

B.1 Installation requirements

A stopping signal plate shall be installed on the left side of the vehicle. When the stopping signal plate extends, it shall be in the following position:

a) Vertical to the side of the vehicle. its installation tolerance is ±5°.

b) The upper edge of the stopping signal plate is parallel to and below the horizontal plane tangent to the lower edge of the passenger window behind the driver. And it is not more than 150mm apart. The longitudinal installation position of the stopping signal plate shall be within the area where the driver can observe.

c) When the stopping signal plate is extended, the distance between the outer edge of the vehicle and the installation contact of the stopping signal plate is not more than 610mm.

d) When the stopping signal plate is stowed, its outer edge is not more than 160mm away from the vehicle and the installation contact of the stopping signal plate, and it shall be stowed to the rear of the vehicle.

B.2 Technical requirements for stopping signal plate

B.2.1 The color, shape, character and graphics of the stopping signal plate shall be implemented in accordance with Figure 71 of GB 5768.2-2009. The diameter of the circumscribed circle is 500mm or 450mm. The white border width is 20mm. The surface shall not have sharp bumps or corners that could cause injury.

B.2.2 Both sides of the stopping signal plate shall be the same. The retroreflective material used meets the requirements of the secondary or primary reflective film specified in GB/T 18833.

B.2.3 When a force of 50N is applied to the outer edge of the stopping signal plate along the tangent of the rotation track, the stopping signal plate shall rotate in the direction of the applied force. When rotating to parallel to the vehicle, the stopping signal plate shall stop rotating. After the external force is eliminated, it shall be possible to return the stopping signal plate to the normal position by electric or manual operation.

Annex C

(normative)

Test method for driver's field of vision

C.1 Test conditions

C.1.1 The special school bus shall ensure that the driver can see the entire top surface of the cylinder shown in Figure C.1.

C.1.2 The height and diameter of cylinder A~O are both 0.3m. The diameter of the cylinder P is 0.3m and the height is 0.91m.

C.1.3 The color of the cylinder shall form a strong contrast with the road where the vehicle is parked.

C.2 Test steps

C.2.1 Place the cylinder in the position specified in C.2.1~C.2.7, as shown in Figure C.1. The distance shown in Figure C.1 is the center distance of a top view of a cylinder to another cylinder. C.2.1 places cylinders G, H and I. Make them tangent to a horizontal vertical plane. The horizontal vertical plane is the plane tangent to the frontmost surface of the front bumper of the vehicle. Place cylinders D, E and F. Make their center lie in a horizontal vertical plane. The horizontal vertical plane is 1.8m in front of the horizontal vertical plane passing through the center of cylinder G, H and I. Place the cylinders A, B and C so that their centers are in a horizontal vertical plane. The horizontal vertical plane is 3.6m in front of the horizontal vertical plane passing through the center of cylinder G, H and I.

C.2.2 Place cylinders B, E and H so that their centers are on a longitudinal vertical plane. The longitudinal vertical plane passes through the longitudinal centerline of the vehicle.

C.2.3 Place cylinders A, D, and G so that their centers are on a longitudinal vertical plane. This longitudinal vertical plane is tangent to the outermost edge of the left side of the front bumper of the vehicle.

C.2.4 Place the cylinders C, F and I so that their centers are on a longitudinal vertical plane. This longitudinal vertical plane is tangent to the outermost edge of the right side of the front bumper of the vehicle.

C.2.5 Place the cylinder J so that its center is on a longitudinal vertical plane. The longitudinal vertical plane is 0.3m to the left of the longitudinal vertical plane

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