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Hybrid electric vehicles safety specification

混合动力电动汽车安全要求

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Foreword

This Standard is drafted by reference to ECE R100 *Uniform provisions concerning the approval of battery electric vehicles with regard to specific requirements for the construction and functional safety*, ETA HTP001 *Technical specifications for hybrid electric vehicles* and GB/T 18384 *Safety specifications for electric vehicles*, and in combination with the features of domestic hybrid electric vehicles.

This Standard was proposed by the National Technical Committee for Standardization of Automobiles.

This Standard shall be under the jurisdiction of the National Technical Committee for Standardization of Automobiles.

Drafting organizations of this Standard: China Automotive Technology and Research Center, Tsinghua University and Dongfeng Electric Vehicle Co., Ltd.

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Hybrid electric vehicles safety specification

1 Scope

This Standard specifies the special safety specifications for Type M[1] hybrid electric vehicles (for the definition of the hybrid electric vehicles, SEE GB/T 19596).

This Standard is applicable to the Type M hybrid electric vehicles whose on-board circuits' maximum operating voltage is less than 660V (AC) or 1,000V (DC) (according to the provisions of GB 156-1993). Other types of hybrid electric vehicles can use this Standard for reference.

2 Normative references

The provisions in the following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrections) or revisions do not apply to this Standard. However, parties who reach an agreement based on this Standard are encouraged to study if the latest editions of these documents are applicable. For undated references, the latest editions apply to this Standard.

GB 156-1993 *Standard voltages (neq IEC 38:1993)*

GB 4208 *Degrees of protection provided by enclosure (IP code) (GB 4208-1993, eqv IEC 529:1989)*

GB 14023 *Vehicles, motorboats and spark-ignited engine-driven devices - Radio disturbance characteristics - Limits and methods of measurement (GB 14023-2000, idt IEC/CISPR 12:1997)*

GB 18655 *Limits and methods of measurement of radio disturbance characteristics for the protection of receivers used on board vehicles (GB 18655-2002, idt IEC/CISPR 25:1995)*

GB/T 17578 *Provisions of strength for the superstructure of bus (GB 17578-1998, eqv ECE R66)*

GB/T 17619 *Limits and methods of testing for immunity of electrical/electronic sub-assemblies in vehicles to electromagnetic radiation*

[1] For the definition of Type M, SEE GB/T 15089.

GB/T 18384.1 *Electric vehicles - Safety specification - Part 1: On-board energy storage*

GB/T 18384.3-2001 *Electric vehicles - Safety specification - Part 3: Protection of persons against electric hazards*

GB/T 18387 *Performance levels and methods of measurement of magnetic and electric field strength from electric vehicles, broadband, 9 kHz to 30 MHz (GB 18387-2001, idt SAE J551/5:1995)* [Translator note: The original standard No. “GB 18387-2001” does not exist, and should be modified as “GB/T 18387-2001”.]

GB/T 19596 *Terminology of electric vehicles*

GB/T 4094.2-2005 *Electric vehicles - Symbols for controls, indicators and tell-tales*

3 Terms and definitions

The terms and definitions established in GB/T 19596 and the following ones are applicable to this Standard.

High voltage

~~High voltage refers to the voltage whose maximum operating voltage is greater than or equal to 60V (AC) and 25V (DC).~~

High voltage refers to the voltage whose maximum operating voltage is greater than or equal to 25V (AC) and 60V (DC). [Translator Note: See Amendment 1]

4 Requirements

Hybrid electric vehicles shall meet the safety specifications for automobiles of relevant national standards, and shall also meet the special requirements specified in this Standard.

4.1 Requirements for the vehicle structure

4.1.1 Traction battery

4.1.1.1 The requirements for the insulation resistance and creepage distance of traction batteries shall conform to the requirements of GB/T 18384.1.

4.1.1.2 ENSURE that there shall be no hazardous gas accumulation generated by the on-board traction batteries in any positions of the vehicles.

b) If the on-board energy storages are installed inside the passenger compartments, any movements of the on-board energy storages shall ensure the security of the passengers.

c) After the collision and neutralization tests, no electrolyte can enter into the passenger compartments.

d) After the collision and neutralization tests, the energy storages cannot explode or catch fire.

4.1.4.3 Third-party protection

During the collision test, the energy storages, such as traction battery packs and their parts (traction batteries, battery modules and electrolyte) or super capacitors, etc., cannot be tossed out from the vehicles due to the collision.

4.1.4.4 Short-circuit prevention

During the collision test, PREVENT the power circuits from shorting out.

4.1.4.5 Insulation resistance measurement

After the collision test, MEASURE the insulation resistance according to the requirements of Section 6.2.2 in GB/T 18384.3-2001 (no preparatory phase is required). The measurement shall meet the requirements for insulation resistance.

4.1.4.6 Other requirements

For the hybrid electric vehicles using fuels apart from gasoline or diesel, MEET the requirements of relevant security standards for corresponding fuels.

4.1.5 Safety specifications for on-board energy storages during turnover

During turnover, the on-board energy storages shall meet the requirements of Section 4.1.4. Furthermore, the energy storages of the hybrid electric buses shall meet the requirements of GB/T 17578.

4.1.6 Waterproof requirements

USE an insulation resistance value monitoring system to provide waterproof supervision. Or COVER the voltage equipment (no requirements for the non-high voltage parts have been made in this Standard) or USE other methods to prevent its exposure to water. If vehicles are equipped with insulation resistance value monitoring system, CONFORM to the requirements of Section 7.3.1 in GB/T 18384.3-2001.

4.2.2.5 When the vehicles are in parking status and the key switches are in the “off” position, the vehicles cannot automatically start the engines to charge the traction batteries.

4.2.2.6 For the vehicles requiring external charging, the hydrogen measurement during vehicle charging and the corresponding requirements shall conform to the provisions of GB/T 18384.1.

4.2.3 Manual switch

Each vehicle shall be equipped with a manual switch to switch off the on-board power supply (such as traction batteries). When the vehicles cannot ensure the high-voltage system insulation due to maintenance or faults, this switch shall be able to cut off the high-voltage power circuit system.

4.2.4 Electromagnetic compatibility

The vehicles shall meet the requirements of GB/T 18387, GB 14023, GB 18655 and GB/T 17619.

4.3 Fault protection

This clause specifies the protection against the danger caused by the faults of the specific systems and parts of the hybrid electric vehicles. The processing mode of other systems and parts shall be the same with that of the internal combustion vehicles.

4.3.1 Electrical connection

Any unexpected disconnection of the electric connecting pieces shall not put the vehicles at risk.

4.3.2 Overcurrent cut-off device

When the current is excessive, USE a circuit protector, cut-off device or fuse to break the power circuit. This device can be the circuit breaker specified in Section 4.1.1.5.

5 User manual

In the user manual, PAY special attention to the unique aspects of the hybrid electric vehicles. For instance, safety regulations for vehicles (i.e.: the orange line on the vehicle refers to the high-voltage transmission line, the instructions for various safety symbols on the vehicle, etc.), emergency countermeasures, correct operations (i.e.: LAY emphasis on lifting the driving wheels during the vehicle transport and using trailers for transport in the manual. If it is necessary

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