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**Road vehicles - Spark-plugs for gas engines -
Test methods and requirements**

道路车辆 燃气火花塞 试验方法 and 要求

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Road vehicles - Spark-plugs for gas engines - Test methods and requirements

1 Scope

This Standard specifies the test methods and requirements for the mechanical and electrical properties of spark-plugs for ignition gas engines of road vehicles.

This Standard applies to spark-plugs for ignition gas engines (including oil-gas dual-fuel engines).

Note: Gases include compressed natural gas (CNG), liquefied petroleum gas (LPG), liquefied natural gas (LNG), and other combustible gases.

2 Normative references

The following documents are indispensable for the application of this document. For the dated references, only the editions with the dates indicated are applicable to this document. For the undated references, the latest edition (including all the amendments) are applicable to this document.

GB/T 3177 Geometrical product specifications (GPS) - Inspection of plain workpiece sizes

GB/T 6791 Road vehicles - Spark-plugs and their cylinder head housing - Basic characteristics and dimensions

3 Test methods and requirements

3.1 General

3.1.1 Test conditions

Unless otherwise specified, all tests of spark-plug shall be carried out at room temperature $(23\pm 5)^{\circ}\text{C}$ and normal humidity $(65\pm 20)\%$.

3.1.2 Regulations for names of parts of spark-plug

See Appendix A for the names of the parts of spark-plug involved in the following test items.

3.2 General characteristics

3.2.1 Test method

USE visual inspection to check the requirements specified in 3.2.2.

Visual inspection refers to the inspection using the naked eye (normal vision and color discrimination ability) within the most comfortable judge distance under suitable lighting conditions.

3.2.2 Requirements

Spark-plug shall meet the following characteristics:

- a) The outer sealing washer shall be free of gaps and obvious damage.
- b) The heat capacity chamber must be clean and free of foreign matter.
- c) The center and side electrodes shall be in the correct positions.
- d) The housing is not allowed to have visible corrosion, no burrs and damage to the threads. The housing and the insulator shall be reliably fixed without abnormalities.
- e) The insulator must be smooth and consistent. There must be no abnormal phenomena such as breakage, cracking, or impact bruise.
- f) The identification shall be clear and consistent and meet the manufacturer's or client's requirements.

3.3 Sizes

3.3.1 Test methods

The size inspection method shall meet the requirements of GB/T 3177.

3.3.2 Requirements

The size inspection items shall be determined by the manufacturer of spark-plug. Key sizes shall comply with the provisions of GB/T 6791 or conform to the client agreement, such as installation height, hexagonal size, thread size, electrode gap, etc.

3.4 Mechanical properties

3.4.1 Housing mechanical strength

3.4.1.1 Test device

Table 3 -- Resistance value at room temperature and normal humidity (in ohms)

Types	Resistance value
Conductive spark-plug	≤ 5
Resistor type spark-plug	1000~9000

3.7.2 Flashover property

3.7.2.1 Test method

According to the mounting torque specified in GB/T 6791, install the spark-plug, as shown in Figure 5, on the appropriate air chamber device. Compressed air of (2 ± 0.2) MPa [(20 ± 2) bar] is applied to the air chamber, to test the flashover voltage of the spark-plug at higher air pressure.

At the connecting screw, LOAD a 50 Hz pulse voltage. The pulse voltage rise rate shall be greater than 600 V/ μ s. The open circuit peak voltage shall be above 40 kV. Then USE the flashover voltage measurement and analysis equipment to detect the flashover situations and flashover voltage of the spark-plug under high air pressure conditions.

3.7.2.2 Requirement

Under a compressed air condition of (2 ± 0.2) MPa [(20 ± 2) bar] for 30 s, at the spark-plug gap, a continuous spark shall be generated; and the flashover voltage shall not exceed 30 kV at the maximum.

3.7.3 Withstand voltage property

3.7.3.1 Test method

According to the mounting torque specified in GB/T 6791, install the spark-plug, as shown in Figure 5, on the appropriate air chamber device. Compressed air of (4 ± 0.2) MPa [(40 ± 2) bar] is applied to the air chamber, to ensure that no discharge spark is generated between the electrodes during the test.

At the connecting screw, LOAD a 50 Hz pulse peak voltage to the value specified in Table 4. The pulse voltage rise rate shall be greater than 600 V/ μ s.

In order to avoid flashover creepage on the surface of insulator head, a high-pressure resistant rubber sheath may be used to insulate the insulator head from the air; and silicone grease shall be applied in the sheath. To avoid flashover at the ignition end or flashover creepage of insulator skirt surface, the side electrode can be removed (Example 1); or the end face of insulator skirt is covered by an insulated hose. The epoxy resin is filled in the hose and cured, to completely insulate the center electrode from the air (Example 2).

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