

Translated English of Chinese Standard: QC/T1110-2019  
[www.ChineseStandard.net](http://www.ChineseStandard.net) → Buy True-PDF → Auto-delivery.  
[Sales@ChineseStandard.net](mailto:Sales@ChineseStandard.net)

**QC**

AUTOMOBILE INDUSTRY STANDARD  
OF THE PEOPLE'S REPUBLIC OF CHINA

ICS 43.060.20

T 30

**QC/T 1110-2019**

---

**Automotive diesel fuel heating system**

汽车柴油机燃油加热装置

**Issued on: November 11, 2019**

**Implemented on: April 01, 2020**

---

**Issued by: Ministry of Industry and Information Technology of PRC**

## Table of Contents

Foreword.....	7
1 Scope .....	8
2 Normative references .....	8
3 Terms and definitions .....	9
4 Requirements .....	9
5 Test method.....	12
6 Inspection rules .....	15
7 Signs, labels, instructions for use .....	17
8 Packaging, transport, storage.....	17

# Automotive diesel fuel heating system

## 1 Scope

This standard specifies the terms and definitions, requirements, test methods, inspection rules of automotive diesel fuel heating system.

This standard applies to automotive diesel fuel heating systems which mainly use electric heating. Other heating methods can be implemented with reference to this standard.

## 2 Normative references

The following documents are essential to the application of this document. For the dated documents, only the versions with the dates indicated are applicable to this document; for the undated documents, only the latest version (including all the amendments) is applicable to this standard.

GB 252 General diesel fuels

GB/T 2423.17 Environmental testing for electric and electronic products - Part 2: Test method - Test Ka: Salt mist

GB 7258-2017 Technical specifications for safety of power-driven vehicles operating on roads

GB 8410 Flammability of automotive interior materials

GB 18296 Safety property requirements and test methods for automobile fuel tank and its installation

GB/T 18297-2001 Performance test code for road vehicle engines

GB 19147 Automobile diesel fuels

GB/T 28046.2-2001 Road vehicles - Environmental conditions and testing for electrical and electronic equipment - Part 2: Electrical loads

GB/T 28953 Automotive diesel - Spin-on fuel filters for diesel engines - Mounting and connecting dimensions

QC/T 413-2002 Basic technical requirements for automotive electric equipment

QC/T 471 Specifications for auto diesel engines

QC/T 518 Tightening torque for automotive threaded fasteners

QC/T 772-2017 Test methods of diesel-fuel filter for automobiles

### **3 Terms and definitions**

The following terms and definitions apply to this standard.

#### **3.1**

##### **Diesel fuel heating function**

Under specified conditions, the efficiency of heating diesel oil to a set temperature.

#### **3.2**

##### **Diesel fuel heating unit**

Components, which have diesel heating function and are capable of heating diesel as required, including but not limited to fuel tank heating unit, fuel filter heating unit, fuel pipe heating unit.

#### **3.3**

##### **Automotive diesel fuel heating system**

A device, which is composed of a diesel heating unit and a temperature controller, uses on-board energy to heat the fuel, to ensure that the fuel supply system of the diesel engine normally supplies diesel (hereinafter referred to as the heating device).

### **4 Requirements**

#### **4.1 General requirements**

**4.1.1** The heating device shall meet the requirements of this standard AND be manufactured according to the product drawings and technical documents, which are approved by the prescribed procedures.

**4.1.2** The working environment conditions of the heating device shall comply with the provisions in 3.1.2 of QC/T 413-2002.

**4.1.3** The rated operating voltage of the heating device shall be 12 V (DC) or 24 V (DC).

**4.1.4** The heating device shall comply with the provisions in 8.6.9 of GB 7258-2017.

#### **4.2.5 Requirements for temperature resistance**

For heating devices installed on the engine, the minimum operating temperature shall not be higher than  $-41\text{ }^{\circ}\text{C}$ ; the maximum operating temperature shall not be lower than  $120\text{ }^{\circ}\text{C}$ . For heating devices installed in other locations, the minimum operating temperature shall not be higher than  $-41\text{ }^{\circ}\text{C}$ ; the maximum working temperature shall comply with the requirements in 3.1.3 of QC/T 413-2002.

#### **4.2.6 Vibration resistance**

The heating device installed on the engine shall be able to pass the vibration test, which is specified in 5.9.2 of QC/T 772-2017. The heating device installed in other positions shall be able to pass the vibration test, which is specified in GB/T 18296. The heating device after the test shall comply with the provisions in 3.2 of QC/T 413-2002.

#### **4.2.7 Requirements for salt spray resistance**

It shall meet the requirements in 3.13 of QC/T 413-2002.

#### **4.2.8 Reliability requirements**

Under the conditions specified in 8.1 of GB/T 18297-2001, the continuous normal working time of the heating device shall not be less than 1000 h.

#### **4.2.9 Safety requirements**

**4.2.9.1** The heating device shall comply with the provisions on flame retardancy in 8.6.2 of GB 7258-2017.

**4.2.9.2** When heating is controlled manually, the temperature of the heated diesel oil is not allowed to exceed  $45\text{ }^{\circ}\text{C}$ ; when the temperature of the diesel oil exceeds  $45\text{ }^{\circ}\text{C}$ , it shall be turned off (stop heating). When heating is automatically controlled, the temperature of the heated diesel oil shall not exceed  $38\text{ }^{\circ}\text{C}$  (set as required, not allowed to exceed  $45\text{ }^{\circ}\text{C}$ ).

#### **4.2.10 Overvoltage resistance of power supply**

It shall meet the provisions of 4.3 in GB/T 28046.2.

#### **4.2.11 Resistance to reverse polarity of power supply**

It shall meet the requirements of 3.7.1 in QC/T 413-2002.

### **4.3 Installation requirements**

#### **4.3.1 Heating device**

When installing the heating device, the connection shall be firm and reliable; it shall be

easy to disassemble, maintain, and service. There shall be no interference with other parts. The tightening torque of threaded fasteners shall comply with the provisions of QC/T 518. The heating device shall have no adverse effect on the fuel supply to the engine.

#### **4.3.2 Fuel tank**

The fuel tank, which is equipped with diesel heating unit, shall comply with the provisions of GB 18296.

#### **4.3.3 Fuel pipe**

There shall be no leakage in the fuel pipe on which the diesel heating unit is installed.

#### **4.3.4 Fuel filter**

The fuel filter, which is equipped with the diesel heating unit, shall comply with the provisions of GB/T 28953.

#### **4.3.5 Engine**

Engines and their accessories, which are equipped with heating devices, shall comply with the provisions of Chapter 5 of GB 7258-2017.

## **5 Test method**

### **5.1 Test conditions and appearance inspection**

#### **5.1.1 Test conditions**

The diesel oil used for the test shall be No.0 light diesel oil; the temperature measurement accuracy shall be 1%; the power supply voltage used for the test shall be 12/24 V (DC).

#### **5.1.2 Appearance inspection**

The appearance and sign of the product are inspected visually; the external dimensions of the product are inspected by general or special measuring tools.

### **5.2 Heating capacity test**

**5.2.1** In the ambient temperature test chamber, when the ambient temperature and the fuel oil temperature of the diesel engine are both at -10 °C, after the heating device starts to heat for 20 minutes, it shall be possible to ensure that the diesel engine, that meets the requirements of QC/T 471, is started normally on the test bench; its idling continuous running time is not less than 20 min. Other test requirements shall be implemented, in accordance with the relevant provisions of QC/T 471. Figure 1 is a

### **5.5 Electromagnetic compatibility test**

It shall be carried out according to the provisions of 4.9.1.1 and 4.9.2 in QC/T 413-2002.

### **5.6 Resistance to temperature and humidity performance test**

It shall be carried out according to the provisions of 4.10 and 4.11 in QC/T 413-2002.

### **5.7 Vibration resistance test**

For the heating device installed on the engine, the vibration resistance test shall be carried out, according to the provisions in 5.9.2 of QC/T 772-2017; for the heating devices installed in other positions, the vibration resistance test shall be carried out, according to the provisions in GB 18296.

### **5.8 Salt spray resistance test**

It shall be carried out according to the provisions of GB/T 2423.17.

### **5.9 Reliability test**

The heating device shall be installed on the test equipment; it shall work continuously for 1000 h, under the low-temperature start-up test conditions, which are specified in GB/T 18297-2001.

### **5.10 Safety (flame-retardancy) test**

It shall be carried out according to the provisions of GB 8410.

### **5.11 Power supply overvoltage resistance test**

It shall be carried out according to the provisions of 4.3 in GB/T 28046.2-2001.

### **5.12 Performance test of resistance to reverse polarity of power supply**

It shall be carried out according to the provisions of 4.7.1 in QC/T 413-2002.

### **5.13 Installation test**

For the fuel tank equipped with the heating device, the vibration resistance test shall be carried out, according to the provisions of GB 18296; for the fuel filter and the fuel pipe equipped with the heating device, the vibration resistance test shall be carried out according to the provisions of 5.7.

## **6 Inspection rules**

### **6.1 Inspection types**

Product inspection is divided into exit-factory inspection and type inspection.

## **6.2 Exit-factory inspection**

Products can only leave the factory after passing the inspection; meanwhile it shall be accompanied by corresponding product quality certificates or marks. The inspection items of the exit-factory inspection are as shown in Table 1.

## **6.3 Type inspection**

### **6.3.1 Several situations in which type inspection shall be carried out.**

In case of any of the following conditions, the manufacturer shall carry out type inspection:

- Product finalization identification of new products or old products after trans-plant production;
- After formal production, where there are major changes in structure, materials, processes, that may affect product performance;
- Not less than once every 3 years for products, which are produced in batches or large quantities;
- When the production is resumed after being discontinued for more than one year;
- When the exit-factory inspection results are significantly different from the previous type inspection results;
- When the national supervisory agency requests type inspection.

### **6.3.2 Number of samples**

Products for type inspection shall be selected from the same batch (not less than 100 sets) of products that have passed the exit-factory inspection; the samples taken shall not be less than 12 sets.

### **6.3.3 Inspection items**

For the inspection items of type inspection, see Table 1.

### **6.3.4 Qualification**

The type inspection of the product shall comply with all the inspection items specified. When one inspection item is unqualified, it shall re-take double number of products, for re-inspection on the unqualified item. If there is still unqualified, the batch of products is judged as unqualified. However, when the heating test, heating control test or heating protection function test fails, it shall not be re-taken for reinspection, BUT shall be



**This is an excerpt of the PDF (Some pages are marked off intentionally)**

**Full-copy PDF can be purchased from 1 of 2 websites:**

1. <https://www.ChineseStandard.us>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Select your country (currency), for example: USA (USD); Germany (Euro).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Tax invoice can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with download links).

2. <https://www.ChineseStandard.net>

- SEARCH the standard ID, such as GB 4943.1-2022.
- Add to cart. Only accept USD (other currencies - <https://www.ChineseStandard.us>).
- Full-copy of PDF (text-editable, true-PDF) can be downloaded in 9 seconds.
- Receiving emails in 9 seconds (with PDFs attached, invoice and download links).

Translated by: Field Test Asia Pte. Ltd. (Incorporated & taxed in Singapore. Tax ID: 201302277C)

About Us (Goodwill, Policies, Fair Trading...): <https://www.chinesestandard.net/AboutUs.aspx>

Contact: Wayne Zheng, [Sales@ChineseStandard.net](mailto:Sales@ChineseStandard.net)

Linkin: <https://www.linkedin.com/in/waynezhengwenrui/>

**----- The End -----**