QC

AUTOMOBILE INDUSTRY STANDARD

OF THE PEOPLE'S REPUBLIC OF CHINA

ICS 43.060.40

CCS T 13

QC/T 1165-2022

Carbon canister air filter for gasoline passenger car

汽油乘用车碳罐用空气滤清器

Issued on: April 08, 2022 **Implemented on: October 01, 2022**

Issued by: Ministry of Industry and Information Technology of PRC

Table of Contents

Carbon canister air filter for gasoline passenger car

1 Scope

This document specifies the technical requirements, test methods, inspection rules, marking, packaging, transportation and storage of carbon canister air filter for gasoline passenger car.

This document is applicable to carbon canister air filter for gasoline passenger car, which has a rated volume flow rate of 22.7 L/min ~ 70 L/min (referred to as canister air filters). Other canister air filters can also be used as a reference.

2 Normative references

The contents of the following documents constitute the essential provisions of this document through normative references in the text. Among them, for dated references, only the version corresponding to the date applies to this document; for undated references, the latest version (including all amendments) applies to this document.

GB/T 2423.1-2008 Environmental testing - Part 2: Test methods - Tests A: Cold

GB/T 2423.2-2008 Environmental testing - Part 2: Test methods - Tests B: Dry heat

GB/T 2423.55-2006 Environmental testing for electric and electronic products - Part 2: Test methods - Test Eh: hammer tests

GB/T 2828.1-2012 Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection

GB/T 14041.1-2001 Hydraulic fluid power - Filter elements - Part 1: Verification of fabrication integrity and determination of the first bubble point

GB/T 28949-2012 Inlet air cleaning equipment for internal combustion engines and compressors - Performance testing

GB/T 28950.1-2012 Road vehicles and internal combustion engines - Filter vocabulary - Part 1: Definitions of filters and filter components

GB/T 28950.2-2012 Road vehicles and internal combustion engines - Filter vocabulary - Part 2: Definitions of characteristics of filters and their components

GB/T 28957.1-2012 Road vehicles - Test dust for filter evaluation - Part 1: Silicon

dioxide test dust

3 Terms and definitions

The terms and definitions, which are defined in GB/T 28949-2012, GB/T 28950.1-2012, GB/T 28950.2-2012, as well as the following terms and definitions, apply to this document.

3.1

Carbon canister air filter

A filter, which is specially designed, to filter the dusty air drawn into the canister.

3.2

Filtration efficiency

The percentage -- of the mass of the dust filtered by the test piece TO the mass of the added dust.

4 Technical requirements

4.1 General requirements

The technical requirements of the canister air filter shall comply with the provisions of this document.

4.2 Original resistance

Under the rated air volume flow rate, the original resistance of the canister air filter shall not be greater than 150 Pa.

4.3 Filtration efficiency

Under the rated air volume flow rate, when the intake resistance reaches 750 Pa, the filtration efficiency of the canister air filter shall not be less than 99%.

4.4 Ash capacity

Under the rated air volume flow rate, when the air intake resistance reaches 750 Pa, the ash holding capacity of the canister air filter shall not be less than 21 g, OR as agreed upon by the supplier and the buyer.

4.5 Structural integrity of filter element

The initial bubbling pressure of the carbon canister's air filter element shall be as

5.1.6.1.3 The original resistance is the static pressure value, which is measured at the pressure measuring point, downstream of the test piece. During the test, measure and record the static pressure value of the downstream pressure measuring point, under each air flow, based on 50%, 75%, 100%, 125%, 150% of the rated air flow (or as agreed between the supplier and the buyer).

5.1.6.1.4 Record the ambient temperature, relative humidity, atmospheric pressure during the test.

5.1.6.2 Filtration efficiency

5.1.6.2.1 Properly connect the test piece with the test bench, according to Figure 1.

5.1.6.2.2 Start the air extractor, to pump air at the rated air flow rate for at least 15 minutes, to stabilize the state of the test piece.

5.1.6.2.3 Weigh the test piece and the absolute filter. Record the initial mass of the test piece and the absolute filter.

5.1.6.2.4 Properly connect the ash adding tooling, test piece and test equipment.

5.1.6.2.5 Start the test bench. Adjust the flow rate to the test flow rate and make it stable. Record the resistance value.

5.1.6.2.6 Start to add ash to the air. The ash concentration is 1 g/m^3, OR according to the ash concentration, which is agreed upon by the supplier and the buyer.

5.1.6.2.7 Continue the test, until it reaches the specified test termination resistance value of 750 Pa.

5.1.6.2.8 Weigh the test piece and the absolute filter. Record the mass of the test piece and the absolute filter, after the test. Calculate the mass increment of the test piece and the absolute filter.

5.1.6.2.9 Calculate the filtration efficiency, according to formula (1)

$$E = \frac{\Delta m_U}{\Delta m_U + \Delta m_F} \times 100\% \qquad \cdots\cdots (1)$$

Where:

E - Filtration efficiency, in percentage (%);

Δm_U - The mass increment of the test piece, in grams (g);

Δm_F - The mass increment of the absolute filter, in grams (g).

5.1.6.2.10 Record the ambient temperature, relative humidity, atmospheric pressure

during the test.

5.1.6.3 Ash capacity

5.1.6.3.1 The ash holding capacity test can be carried out, simultaneously with the filtration efficiency test.

5.1.6.3.2 Weigh the test piece and the absolute filter. Record the initial mass of the test piece and the absolute filter.

5.1.6.3.3 Properly connect the ash adding tooling, test piece, test equipment.

5.1.6.3.4 Start the test bench. Adjust the flow rate to the test flow rate and make it stable. Record the pressure difference.

5.1.6.3.5 Start to add ash to the air. The ash concentration is 1 g/m^3, OR according to the ash concentration agreed upon by the supplier and the buyer.

5.1.6.3.6 Continue the test, until the specified test termination resistance value is reached.

5.1.6.3.7 Weigh the test piece and the absolute filter. Record the mass of the test piece and the absolute filter, after the test.

5.1.6.3.8 Calculate the ash capacity C, according to formula (2):

$$C=B-D \qquad \cdots\cdots (2)$$

Where:

C - Ash capacity, in gram (g);

B - The mass of the test piece after the test, in grams (g);

D - The mass of the test piece before the test, in grams (g).

5.1.6.3.9 Record the ambient temperature, relative humidity, atmospheric pressure during the test.

5.2 Low temperature impact resistance

Place the canister air filter in a low-temperature box at -30 °C ± 2 °C for 4 hours. Within 30 seconds after taking out, according to the requirements of the test Ehc: vertical drop weight in Chapter 6 of GB/T2423.55-2006, carry out the drop weight impact test on the visible surface of the canister air filter, at room temperature. The standard drop weight is a steel ball, which has a mass of 500 g and a free fall height of 0.4 m. The drop weight impact point is at a visible surface position of the canister air filter. After the test, check whether the canister air filter is cracked or deformed.

6.3 Exit-factory inspection

The exit-factory inspection item is 4.10.

6.4 Type inspection

The type inspection items are all items specified in Chapter 4. In case of any of the following situations, type inspection shall be carried out:

a) Type identification of new products;

b) After normal production, if the product structure, material, process have changed significantly, which may affect the product performance;

c) According to the requirements of the product audit quality control plan, when the periodic performance inspection is required;

d) When the national quality supervision agency requests type inspection;

e) When requested by the user.

6.5 Spot check

When the buyer conducts spot check on product quality, it shall conduct spot checks in accordance with the provisions of GB/T 2828.1-2012. The inspection items, group-batching principles, sampling plans, judgment and re-inspection rules shall be implemented, in accordance with the technical documents, which are agreed between the manufacturer and the customer.

7 Marking, packaging, transportation, storage

7.1 Marking

7.1.1 The outer surface of each product shall be marked with:

a) The name or trademark of the manufacturer;

b) Product name and model;

c) Instructions for use and care.

7.1.2 The certificate shall indicate:

a) The name or trademark of the manufacturer;

b) Product name and model;

c) Production date or serial number.

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