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Coolant filter for automobile engine

汽车发动机水滤清器

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Coolant filter for automobile engine

1 Scope

This document specifies the technical requirements, test methods, inspection rules, marking, packaging, transportation, storage of circulating coolant filters for automobile engine (hereinafter referred to as coolant filters).

This document applies to split-flow coolant filters for automobile engines, which have a rated volume flow below 4 L/min. For the split-flow coolant filters for engines, which have a flow rate greater than 4 L/min AND other purposes, they may also refer to this document.

2 Normative references

The contents of the following documents constitute the indispensable clauses of this document through normative references in the text. Among them, for dated reference documents, only the version corresponding to that date is applicable to this document; for undated reference documents, the latest version (including all amendments) is applicable to this document.

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

GB/T 8243.1-2003 Methods of test for full-flow lubricating oil filters for internal combustion engines - Part 1: Differential pressure/flow characteristics

GB/T 8243.3-2003 Methods of test for full-flow lubricating oil filters for internal combustion engines - Part 3: Resistance to high differential pressure and to elevated temperature

GB/T 8243.5-2018 Methods of test for full-flow lubricating oil filters for internal combustion engines - Part 5: Test for cold start simulation and hydraulic pulse durability

GB/T 8243.6-2017 Methods of test for full-flow lubricating oil filters for internal combustion engines - Part 6: Static burst pressure test

GB/T 8243.7-2017 Methods of test for full-flow lubricating oil filters for internal combustion engines - Part 7: Vibration fatigue test

The coolant filter shall be manufactured, in accordance with the product drawings and technical documents, which are approved by the prescribed procedures. The technical requirements shall comply with the provisions of this document.

4.2 Performance

4.2.1 Original resistance

Under the rated volume flow, the original resistance (pressure difference) of the coolant filter shall not be greater than 50 kPa.

4.2.2 Filtration efficiency and ash capacity

At the rated volume flow rate, the filtration efficiency for the particles, which are larger than 10 μm (c), shall not be lower than 10%. The ash capacity of the coolant filter shall be not less than 5 g.

4.2.3 Tightness

After being immersed in the coolant solution, the coolant filter shall be subject to the tightness test. Under the atmospheric pressure of 400 kPa, after holding the pressure for not less than 30 s, it is not allowed to have leakage.

4.2.4 Fatigue performance of hydraulic pulse

After being immersed in the coolant solution, the coolant filter is subjected to a hydraulic pulse fatigue test, at 0 kPa ~ 600 kPa, in accordance with the parameters and test medium, which are specified in GB/T 8243.5-2018. After 50000 pulses, defects such as cracking, deformation, leakage are not allowed.

4.2.5 Resistance to static pressure

After being immersed in the coolant solution, the coolant filter shall be subject to a rupture-resistance test. Under an oil pressure of 800 kPa, the pressure holding time shall be no less than 1 min; no damage or leakage is allowed.

4.2.6 Resistance to high-and-low-temperature

After the test of resistance to high-and-low-temperature, carry out inspections according to the steps of 5.3.3. Under 400 kPa air pressure, the pressure holding time shall be no less than 30 s; no leakage is allowed. Disassemble the filter element of coolant filter. Visually inspect it; it shall be free from abnormal phenomena such as degumming and cracking.

4.2.7 Vibration resistance

The coolant filter is installed in the way of vehicle installation. After 1×10^7

L of concentrated test liquid. When needed, use 9 volumes of distilled water, to dilute 1 volume of concentrated test solution.

5.3 Performance test

5.3.1 Flow-resistance test

5.3.1.1 The flow-resistance test shall be carried out in accordance with GB/T 8243.1-2003.

5.3.1.2 Unless otherwise agreed between the filter manufacturer and the user, it shall select the deionized water or other suitable test media, for the flow-resistance test, so that the kinematic viscosity can reach $0.7 \text{ m}^2/\text{s} \pm 0.3 \text{ m}^2/\text{s}$, when simulating general working conditions. If deionized water is selected as the test medium, the test temperature shall be controlled at $36 \text{ }^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$.

5.3.2 Filtration efficiency and ash capacity test

5.3.2.1 The test of filtration efficiency and ash capacity of the coolant filter shall be carried out in accordance with GB/T 8243.12-2007. For the coolant filter, which is equipped with corrosion inhibitor, the corrosion inhibitor shall not be carried during the test, so as not to affect the efficiency test result.

5.3.2.2 The pressure difference at the termination of the test shall be carried out according to the value, which is determined by the engine manufacturer. If not agreed, the pressure difference at the termination of the test shall be carried out at the recommended value of 70 kPa.

5.3.3 Tightness test

5.3.3.1 Immerse the coolant filter in the prepared coolant solution.

5.3.3.2 Carry out 336 h immersion test on the coolant filter; the immersion temperature is $104 \text{ }^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$.

5.3.3.3 After the immersion is completed, drain the coolant solution in the coolant filter; conduct a tightness test according to QC/T 919-2013.

5.3.3.4 During the test, visually inspect the coolant filter, to see if there is bubble to escape.

5.3.4 Test of hydraulic impulse fatigue

5.3.4.1 Immerse the coolant filter in the prepared coolant solution.

5.3.4.2 Carry out 336 h immersion test on the coolant filter. The immersion temperature is $104 \text{ }^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$.

Carry out the test in accordance with the provisions of 10.1 in GB/T 8243.3-2003.

5.3.10 Test of anti-corrosion of corrosion inhibitor

For the corrosion inhibitor sample, it shall be the test solution of the minimum concentration, which is recommended by the corrosion inhibitor manufacturer, prepared by corrosive water as prepared in 5.2.2. It shall carry out the test in accordance with SH/T 0085-1991.

6 Inspection rules

6.1 Each product can only exit-factory, after passing the inspection by the quality inspection department AND being accompanied by a product certificate.

6.2 Exit-factory inspection

6.2.1 The inspection items shall be the items, which are specified in 4.5 and 4.6.

6.2.2 When the ordering organization samples the products, it shall be carried out in accordance with the provisions of GB/T 2828.1. The sampling scheme and the acceptable quality level (AQL) value shall be determined, through negotiation, between the supplier and the buyer.

6.3 Type inspection

Type inspection shall be carried out in one of the following situations:

- a) Identification of type finalization of new products;
- b) After normal production, when there are major changes in structure, materials, processes, that may affect the performance;
- c) During normal production, an inspection shall be carried out once every 2 years;
- d) When there is a big difference between the result of the exit-factory inspection and the result of the latest type inspection;
- e) When the national quality supervision agency puts forward a requirement for type inspection.

6.3.1 The items of the type inspection shall be carried out in accordance with all the items, which are specified in Chapter 4 (Requirements).

6.3.2 The sampling scheme is determined, through negotiation, between the supplier and the buyer. However, it shall not be less than 3 pieces for a single

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