SAE International

SURFACE VEHICLE RECOMMENDED PRACTICE

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Coolant Filter Test Procedure

RATIONALE

J2709 has been reaffirmed to comply with the SAE five-year review policy.

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1. SCOPE

This SAE Recommended Practice is applicable to coolant filters installed on mobile or stationary equipment. It describes a body of tests used to characterize the stuctural integrity and filtration performance of coolant filters.

1.1 Purpose

The purspose of this document is to provide a standardized method for evaluating the performance characteristics on bench equipment. This combined with data collected from "in-service" applications may be used for establishing standards of performance for coolant filters tested in this manner.

2. REFERENCES

2.1 Applicable Publications

The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply only.

2.1.1 ISO Publications

Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ISO 4548-12 Methods of test for full-flow lubricating oil filters for internal combustion engines—Part 12: Filtration efficiency using particle counting, and contaminant retention capacity

ISO 4548-7 Methods of test for full-flow lubricating oil filters for internal combustion engines—Part 7: Vibration fatigue test

ISO 2941 Hydraulic fluid power—Filter elements—Verification of collapse/burst resistance

2.1.2 ASTM Publications

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D 2570 Standard Test Method for Simulated Service Corrosion Testing of Engine Coolants

ASTM D 4985 Standard Specification for Low Silicate Ethylene Glycol Base Engine Coolant for Heavy Duty Engines Requiring a Pre-Charge of Supplemental Collant Additive (SCA)

3. TEST CONDITIONS

The measuring instruments shall be capable of measuring to the levels of acccuracy given in Table 1. The last column in the table gives the limits within which the test conditions shall be maintained.

TABLE 1 - INSTRUMENT ACCURACY AND TEST CONDITION VARIATION

Test Condition	Units	Measurement Accuracy	Allowed Test Condition Variation
Flow	L/min	± 2%	± 5%
Pressure	Pa	± 5%	-
Temperature	°C	± 1 °C	± 2 °C
Volume	l	± 5%	± 10%
		±	±
		±	±

4. MULTIPASS EFFICIENCY AND CAPACITY

The test procedure determines the contaminant capacity of a filter, its particulate removal characteristics and differential pressure. Test filter in accordance with ISO 4548-12.

CAUTION: Some coolant filters have chemical additive packages built within that will dissolve into the system fluid. It is suggested that these additive packages be removed prior to multipass testing the cartridge.

5. VIBRATION FATIGUE TEST

This test determines the ability of the filter to withstand the vibratory forces that occur during engine operation. Test filter in accordance with ISO 4548-7.

6. FILTER CORROSION TEST

This test determines the ability of the filter to withstand the affects of corrosive water on the filter components.

6.1 Test Fluid

The test liquid shall be 44% by volume low silicate glycol-based coolant prepared with corrosive water. The coolant shall meet ASTM D 4985 requirements, (Do not add Supplemental Coolant Additives). The corrosive water can be prepared by dissolving the following amounts of anhydrous sodium salts in a quantity of distilled or deionized water:

Sodium sulfate 148 mg
Sodium chloride 165 mg
Sodium bicarbonate 138 mg

The resulting solution should be made up to a volume of 1 L with distilled or deionized water at 20 °C.

6.2 Test Apparatus

The test stand shall be composed of the following: system reservoir with lid to contain / condense evaporated test fluid, pump, bypass circuit with valve, temperature and differential pressure gages, test filter base, flow meter and backpressure valve.

The test circuit is shown in Figure 1.

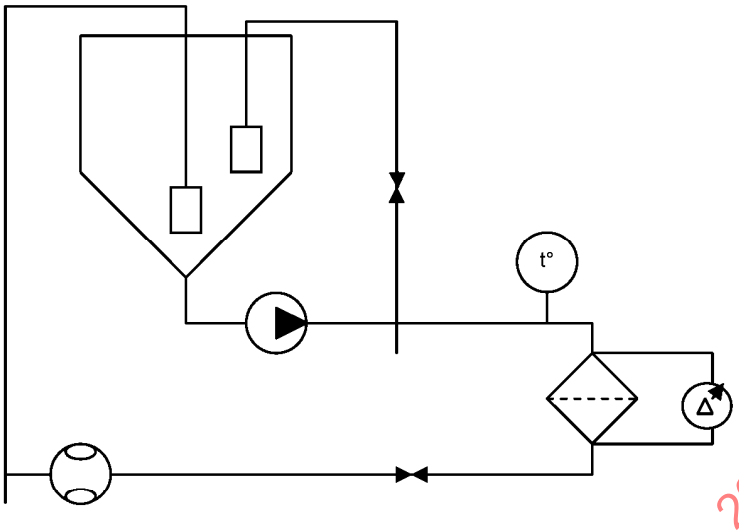

FIGURE 1 - SKETCH OF TYPICAL FLOW TEST STAND

6.3 Test Conditions

6.3.1 Coolant Flow Rate

Set the flow rate by adjusting the upstream pressure to 103 kPa.

6.3.2 Test Temperature

The test coolant shall be maintained at a temperature of 88 ± 3 °C.

6.3.3 Test Duration

The test shall be run for 1064 hours of operation.

6.4 Test Procedure

6.4.1 Starting the Test

Mix system test fluid as prescribed in section 6.1. The amount of test fluid required is based on the size of the test system reservoir and the test filter. Install test filter and start pump. Run the system for 5 minutes to ensure that the system is operating properly and to remove trapped air.

6.4.2 Presoaking Test Filter

Shut system down. Allow test filter to remain in the coolant for 24 hrs under static conditions, no flow, and no heat.

6.4.3 Pressurizing the Unit

Start pump, apply heat and bring the system up to the test temperature. Adjust flow rate for 103 kPa upstream filter pressure. Maintain this pressure through out the test when the unit is under operation.

6.4.4 Conducting the Test

Take initial differential pressure readings. Operate the system continually except for two 8-hour shutdowns per week. The interval between shutdowns should be about 3 days. Follow this schedule, at 152 hours net hours of operation per week, until 1064 hours of operation have been completed or test filter has reached termination pressure (termination pressure to be set between manufacturer and customer, a value of 172 kPa to be used as a default termination pressure reading).