



HVAC Particle Filter

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This specification defines the general requirements, test conditions and test methods for function, material and static load tests for particulate pollen filters in addition to those described in GMW14780. In case of conflicting requirements, the requirements according to this specification shall be valid.

1.2 Applicability. Applies to particulate pollen filters.

1.3 Remarks. Not applicable.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

DIN 71460-1	EN 10204	FMVSS 302	ISO 12103
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2.2 GM Standards/Specifications.

B 040 1365	GMW3059	GMW3232	GMW14780
B 040 1990	GMW3205	GMW3235	

2.3 Additional References.

- Component Technical Specification (CTS).
- Drawing specifications.
- Filter housing drawing.
- Test methods.
- TSI Incorporated. (www.tsi.com)

3 Test Preparation and Evaluation

3.1 Resources.

3.1.1 Facilities.

3.1.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.1.1.3 Test stand according to DIN 71460-1 General Aerosol measurements techniques (dust generators, particle counter).

3.1.1.4 Basically, all comparable test equipment can be used beyond the facilities and test equipment stated herein, so far as the equivalence is documented and agreed upon between supplier and customer.

3.1.2 Equipment. Conforming to the relevant test methods.

3.1.3 Test Vehicle/Test Piece. Not applicable.

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3.1.4 Test Time.

Calendar time: See 4.4.1

Test hours: See 4.4.1

Coordination hours: See 4.4.1

3.1.5 Test Required Information. Not applicable.**3.1.6 Personnel/Skills.** Not applicable.

3.2 Preparation. Samples for initial sample approval and release according to this specification, 12 filters of the same type are required. The test samples shall be supplied with a specific test report according to EN 10204-2.3.

3.2.1 State of Filter. Within this specification varying states of the filter are required. The following terms will be used.

3.2.1.1 New. The filter was not exposed to any ageing test (equivalent to state in the as-received condition by the supplier).

3.2.1.2 Aged. The filter was subject to the ageing test stated in 4.4.

3.2.1.3 Unloaded. The filter has not yet been loaded with test dust.

3.2.1.4 Loaded +50 Pa. The filter has been loaded with test dust up to an additional pressure drop of +50 Pa (compared to initial pressure drop new).

3.2.1.5 Loaded +200 Pa. The filter has been loaded with test dust up to an additional pressure drop of +200 Pa (compared to initial pressure drop new).

3.3 Conditions. Unless otherwise specified in the relevant tests, the tests shall be performed in the as-received condition at $(+23 \pm 5) ^\circ\text{C}$.

3.3.1 Environmental Conditions. Not applicable.

3.3.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

3.4 Instructions. Not applicable.

3.5 Data. Not applicable.

3.6 Safety. This standard may involve hazardous materials, operations, and equipment. This standard does not propose to address all the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

3.7 Documentation. Samples of components or material released to this standard shall be tested for conformity with the requirements of this standard and approved by the responsible GM department prior to the start of delivery of production level components or materials.

Any change to the component or material, e.g., design, function, properties, manufacturing process and/or location of manufacture requires a new release of the product. It is the sole responsibility of the supplier to provide the customer, unsolicited, with documentation of any change or modification to the product/process, and to apply for a new release.

If not otherwise agreed to, the entire verification test shall be repeated and documented by the supplier prior to start of delivery of the modified or changed product. In some cases, a shorter test can be agreed to between the responsible GM department and the supplier.

3.7.1 Test Results. With reference to this specification, the test results shall be presented in a test report.

4 Requirements and Procedure

If a strict test sequence is required, this will be described in Appendix A, Table A1. Tests not listed there, may be performed at any time.

4.1 General Requirements. The particulate filters shall fulfill the requirements to GMW14780.

4.1.1 Materials. All used materials shall fulfill the drawing specifications.

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4.1.1.1 Filter. The material of the filter shall be free from cellulose. In case of deviation, the microbiological safety shall be proven according to a procedure that needs to be agreed upon between supplier and customer.

4.1.1.1.1 Environmental Protection. Not applicable.

4.1.1.1.2 Fogging Characteristics. Test to GMW3235-B-1 mg maximum.

4.1.1.1.3 Flammability. Must comply with FMVSS 302, test to GMW3232.

4.1.1.1.4 Odor propagation to GMW3205 A1/B1-Rating 6 minimum.

4.1.1.1.5 Chemical Resistance. The filter shall be resistant to all chemicals found in the vehicle environment. The resistance against B 040 1365; B 040 1990 shall be guaranteed without detrimental changes. Additional test media can be determined by single determinations.

4.1.2 Temperature Resistance. All used materials shall not show any detrimental changes after storage for 24 h at -40 °C and subsequently 24 h at +100 °C.

4.2 Pressure Drop.

4.2.1 Pressure Drop at Normal Operating Conditions. The pressure drop curve of the filters shall be determined by pressure difference upstream and downstream of the filter. The test shall be run on test equipment according to DIN 71460-1 at a volumetric airflow range from (0 to 600) m³/h. The pressure drop of a new or aged filter shall remain below the curve determined by Table 1. For fine dust variant only, deviation of maximum 6.5% is allowed for airflow > 300 m³/h.

Table 1: Permissible Values of the Pressure Drop Curve

Volumetric Airflow (m ³ /h)	A - Pressure Drop New Condition (Pa)	B - Pressure Drop After Ageing (Pa)
0	0	0
100	20	22
200	40	44
300	65	72
400	90	99
500	120	132
600	160	176

m³ = cubic meter; Pa = Pascal

4.2.2 Pressure Drop at High Airflow. To determine the stiffness of the material of the filter, the filter shall be operated at high airflow (= 800 m³/h). Depending on the state of the filter, the deflection (bend) and the pressure drop shall not be exceeded as shown in Table 2.

The deflection shall be measured in the center of the filter, or at a point of maximum deflection as determined by visual inspection. If the housing of the filter is provided with a deflection limiter, this shall be taken into consideration during measurement.

No irreversible deformations are permitted anywhere at the filter. Especially, the pleat of the filter shall remain unchanged. Permanent pleat to pleat contact is not permissible.

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