

METRIC

MIL-PRF-46736E

21 August 1998

SUPERSEDING

MIL-PRF-46736D(AT)

12 April 1996

PERFORMANCE SPECIFICATION

FILTER ELEMENT, INTAKE AIR CLEANER: DRY TYPE

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers dry type air cleaner filter elements used in single and multi-stage air cleaners (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirement documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplements thereto, cited in the solicitation (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/BLUE, Warren, MI 48397-5000 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 2940

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SPECIFICATIONS

FEDERAL

P-D-245 - Detergent, Laundry and Hand Dishwashing (Granular).

DEPARTMENT OF DEFENSE

MIL-PRF-62048 - Air Cleaners, Automotive: Heavy Duty, Dry-Type (for Internal Combustion Engines).

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE J726 - Air Cleaner Test Code, Recommended Practice.

(Applications for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.1.1.

3.2 Design, materials, and manufacturing processes. Unless otherwise specified (see 6.2), the design, materials, and manufacturing process selection shall be the prerogative of the contractor as long as all articles submitted to the Government fully meet the operating, interface, ownership and support, and operating environment requirements specified.

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3.2.1 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.3 Operating requirements.

3.3.1 Flame resistance. The air filter element shall be self extinguishing after removal of flame source nor shall it smolder.

3.3.2 Crush resistance. Unless otherwise specified (see 6.2), the filter element shall be capable of withstanding a 1339 Newtons (N) [300 pounds (lb)] compressive end to end static load.

3.3.3 Efficiency. The efficiency of the filter element installed in the designed air cleaner housing (assembly) at rated air flow shall not be less than 99.5%. The particle size distribution by volume shall be as follows in table I.

TABLE I. Particle size distribution by volume, percent
(%).

Size, Microns (æm)	Fine grade (% less than)	Coarse grade (% less than)
5.5	38 ± 3	13 ± 3
11	54 ± 3	24 ± 3
22	71 ± 3	37 ± 3
44	89 ± 3	56 ± 3
88	97 ± 3	84 ± 3
176	100	100

3.3.4 Dust capacity. Unless otherwise specified (see 6.2), the time for the assembly to reach load capacity (see 6.5.1) shall be not less than 4 hours for single stage air cleaner design and 20 hours for a multi-stage air cleaner design when feeding dust at a rate specified in 4.3.2.

3.3.5 Post service airflow restriction. Unless otherwise specified by the procuring activity (see 6.2), following dust capacity test (termed loaded to capacity); (see 6.5.1) and followed by a cleaning, the assembly's air flow restriction shall not increase by more than 0.248 kilopascal (kPa) (1 in. of water).

3.3.6 Backfire. Unless otherwise specified (see 6.2), the filter element shall withstand, without damage, the stresses resulting from an air gage pressure ranging from 69 to 690 kilopascals (kPa) [10 to 100 pounds per square in. gage (psig)].

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3.3.7 Differential pressure. The assembly shall be capable of withstanding without damage, a differential pressure of 12.44 kPa (50 in. of water) between the inside and outside of the assembly.

3.4 Interface requirements.

3.4.1 Envelope interface. The filter shall fully interface with the air cleaner assembly as specified in MIL-PRF-62048 for which it was designed. Envelope and/or interface dimensions and rated airflow shall be in accordance with the applicable drawing (see 4.3 and 6.2).

3.5 Ownership and support requirements.

3.5.1 Washing durability. The assembly shall evidence no damage and shall meet the requirements of 3.3.4, after the filter element has been loaded to capacity (see 6.5.1), then washed with soap conforming to P-D-245 (type I or type II), rinsed, and dried. Low/no sudsing commercial detergents may be substituted for P-D-245 (type I or type II).

3.5.2 Marking. The filter element shall be marked with the National Stock Number (NSN), the manufacturer's name and part number, and the maximum airflow capacity in cubic meter per minute (m^3/min) [cubic foot per minute (ft^3/min)].

3.5.3 Quality and safety. Workmanship shall be such that the air cleaner filter element shall be free of cracked end caps, surfaces out of alignment or out of contour, and missing portions of material. Sheet metal parts shall be free of burrs, blisters, tears and excessive thinning at drawn sections, or any condition that might present a safety hazard to operating or maintenance personnel.

3.6 Operating environment requirements.

3.6.1 Seal ozone resistance. The filter element end cap seals shall be capable of withstanding air having a high ozone concentration.

3.6.2 Vibration. Unless otherwise specified (see 6.2), the filter element shall withstand the effects of severe vibration which may be encountered during all operating conditions and ambient temperatures.

3.6.3 Efficiency after vibration. The assembly shall meet the requirements of 3.3.4 before and after being subjected to vibration in accordance with 3.6.2 at an ambient temperature of 27 ± 3 degree Celsius ($^{\circ}\text{C}$) (80 ± 5 degrees Fahrenheit ($^{\circ}\text{F}$)).

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4. VERIFICATION

4.1 Classification of inspection. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.1.1).
- b. Conformance inspection (see 4.1.2).

4.1.1 First article inspection. First article inspection shall be performed on the initial production ready production-representative units of an order (up to 10 units) or when required by the contract. When a first article inspection is required (see 3.1 and 6.3), it shall include all verifications listed in table II.

4.1.2 Conformance inspection. Conformance inspection shall include the examinations and tests listed in table II as defined by the contract.

TABLE II. Classification of inspections.

Title	Requirement	Verification
Design, materials, and manufacturing processes	3.2 & 3.2.1	4.3.1
Operating requirements	3.3	4.4
Flame resistance	3.3.1	4.4.1
Crush resistance	3.3.2	4.4.2
Efficiency	3.3.3	4.4.3
Dust capacity	3.3.4	4.4.4
Post service airflow restriction	3.3.5	4.4.5
Backfire	3.3.6	4.4.6
Differential pressure	3.3.7	4.4.7
Interface requirements	3.4	4.3
Envelope interface	3.4.1	4.3
Ownership and support requirements	3.5	4.5
Washing durability	3.5.1	4.5.1
Marking	3.5.2	4.5.2
Quality and safety	3.5.3	4.5.3
Operating environment requirements	3.6	4.6
Seal ozone resistance	3.6.1	4.6.1
Vibration	3.6.2	4.6.2
Efficiency after vibration	3.6.3	4.6.3

4.2 Order of inspection. The verification tests shall be performed in the order as specified in table III.

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TABLE III. First article test sequence.

Sample number	Tests	Paragraph
1	Efficiency	4.4.3
	Washing durability	4.5.1
	Efficiency	4.4.3
2	Efficiency after vibration	4.6.3
	Backfire <u>1/</u>	4.4.6
	Crush resistance	4.4.2
	Flame resistance	4.4.1
3	Dust capacity	4.4.4
	Post service airflow restriction	4.4.5
	Differential pressure	4.4.7
4	Efficiency	4.4.3
	Vibration	4.6.2
	Efficiency	4.4.3
Material sample	Seal ozone resistance	4.6.1

1/ Not necessary when filter element is to be used on diesel engines exclusively.

4.3 Verification methods. Acceptable verification methods included in this section are visual inspection and measurement, sample tests, full-scale demonstration tests, simulation, modeling, engineering evaluation, component properties analysis, and similarity to previously-approved or previously-qualified designs.

4.3.1 Verification alternatives. The manufacturer may propose alternative test methods, techniques, or equipment, including the application of statistical process control, tool control, or cost effective sampling procedures to verify performance. See the contract for alternatives that replace verification methods required by this specification.

4.3.2 Inspection conditions. Unless otherwise specified herein, the filter element shall meet the performance requirements specified below when installed in an air cleaner housing conforming to MIL-PRF-62048. The filter element and air cleaner housing is referred to herein as “air cleaner assembly”. The filter element and assembled components are referred to herein as “filter element assembly”. The specific validation equipment for the filter element shall be in accordance with appendix A. Unless otherwise specified herein, performance requirements shall be met with a clean, new element (see 6.2) under the following conditions:

- a. Ambient temperature - 21.2 to 32.2°C (70 to 90°F).
- b. Relative humidity - 30 to 65 %.
- c. Air flow - The rated airflow shall be as specified in the applicable contract and variable airflow shall be as specified in

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figure 1 (see 6.2). Specified values of airflow are for standard atmospheric conditions of 760 millimeters (mm) of mercury barometric pressure and 27°C (80°F) ambient temperature providing an air density of 1.17 kilogram per cubic meter (kg/m^3). Actual airflow values during testing shall be corrected to standard conditions and shall be within plus or minus two percent of specified values.

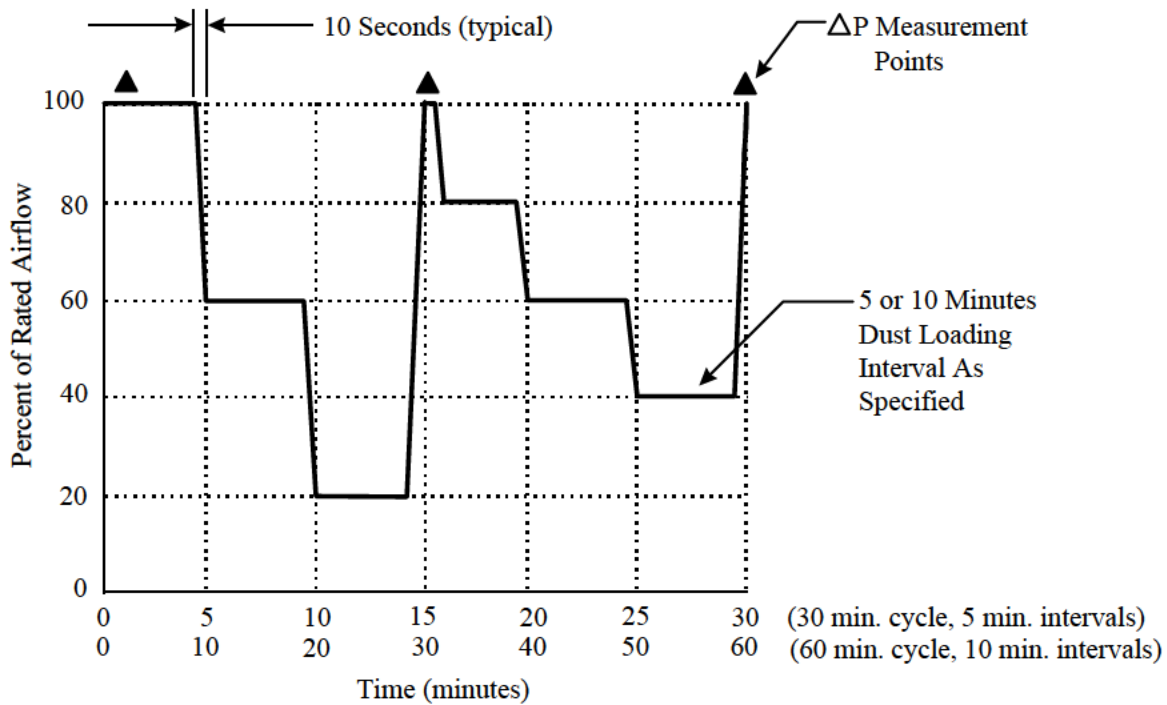


FIGURE 1. Variable airflow cycle.

- d. Airflow restriction - Unless otherwise specified by the procuring activity, actual airflow restriction values shall be corrected to airflow with a density of 1.17 kg/m^3 and shall be accurate to $\pm 0.025 \text{ kPa}$ (0.1 in. of water).
- e. Test dust - The test dust shall be of two grades labeled fine and coarse. The chemical analysis of test dust shall be as specified in SAE J726. The particle size distribution by volume and/or weight for the two grades shall be as specified in SAE J726.
- f. Dust feeding rate - When the feeding of dust is required as part of any test, the dust shall be fed at an average rate of 0.883 gram per cubic meter (g/m^3) (0.025 gram per cubic foot (g/ft^3)) for

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the actual air flow. See figure 1 for percentage of rated airflow variations. The dust rate shall not vary more than $\pm 0.177 \text{ g/m}^3$ (0.005 g/ft^3) during any part of applicable test.

- g. Scavenge airflow rate - The scavenge air flow rate shall be set per MIL-PRF-62048 requirements (see A.3.5). Air cleaners equipped with scavenge air aspirators or similar types (non-electric blowers) shall provide a 10% scavenge flow of the actual air flowing through the air cleaner.

4.4 Operating requirements verification.

4.4.1 Flame resistance. One side of filter element media shall be exposed to a flame until the media burns or glows. The flame shall then be removed and the filter element media shall be observed.

4.4.2 Crush resistance. The filter element shall be placed in a device capable of measuring pressure (load) applied to the element end to end (excluding the gaskets) and the specified load shall be applied. Upon removal of the load, there shall be no physical evidence of structural damage to any part of the filter element or reduction in filter element end to end length (not including end cap gaskets height).

4.4.3 Efficiency. The air cleaner assembly shall be set up in accordance with figures 2 or 3, of MIL-PRF-62048 and the air adjusted to rated flow. Fine dust shall be fed at $0.883 \pm 0.176 \text{ g/m}^3$ air until 110 grams have been fed or until 30 minutes have been reached, whichever results in a greater quantity of dust. In air cleaners where the rated airflow face velocity through the filter element media is 183 cm per minute or less, the dust shall be fed for 60 minutes. The restriction at the start of the test, and at 10 minute intervals throughout the test shall be determined. The master filter and conductors shall be removed from the test setup taking care to retain all the entrapped dust, and re-weighed. All dust and master filter weighings shall be accurate to 0.01 gram. Other weighings shall be accurate to 0.1 grams. The efficiency shall be computed using the following formula:

$$\text{Dust Efficiency (\%)} = \frac{(W_2 - W_3) \times 100}{W_1}$$

Where: W1 - Weight of dust fed.
 W2 - Weight of absolute filter and entrapped dust.
 W3 - Original weight of absolute filter.

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4.4.4 Dust capacity. Unless otherwise specified by the procuring activity (see 6.2), after pretest preparations, an absolute filter of proper size shall be installed between the air cleaner and the flow meter. The air cleaner setup shall remain as specified in 4.4.3. Airflow shall be started and adjusted to rated flow of the element. The initial restriction at the start of the test and at the measurement points shown at figure 1 shall be measured. Coarse dust shall be fed at the rate as specified in 4.3.2f. A fiberglass batting shall be installed in the absolute filter frame at all times. It shall be replaced with a clean fiberglass batting when the net static pressure drop across the absolute filter reaches 2.48 kPa (10 in. of water) above the original restriction. All batting shall be weighted before and after testing as specified in A.3.2.1. The dust capacity test shall be terminated when the air flow restriction reaches 4.98 kPa (20 in. of water) at the rated air flow or when the specified dust capacity in hours is achieved. The absolute filter shall be removed taking care to remove all entrapped dust. The accumulated efficiency shall be determined using the dust efficiency equation in 4.4.3 including the specified accuracy of all measurements, and dust efficiency shall not be less than 99.9% in reference to the dust capacity test. This requirement shall be met when the assembly is operated at variable airflows and fed coarse grade dust. During dust capacity test, an accumulative efficiency shall be measured. The accumulated efficiency after completion of dust capacity test shall not be less than 99.9%. This requirement shall be met when the assembly is operated at variable airflows and fed coarse grade dust.

4.4.5 Post service airflow restriction. Following the dust capacity test, the filter element shall be removed from the air cleaner. The filter element shall be cleaned by using compressed air of not more than 690 kPa (100 psig) to remove the dust. The air hose nozzle shall be inserted into each pocket or serration of the filter element to blow out the deposited dust, using a back and forth motion along the length of each serration and a direct flow into each pocket from the inside out. After cleaning, the element shall be reassembled into the air cleaner. Airflow shall be started and adjusted to the rated flow of the element. The restriction shall be noted.

4.4.6 Backfire. The filter element used in the efficiency test shall be cleaned, soaked for 5 hours in water, then removed from the water and allowed to drip for 5 minutes. The element shall be installed in the air cleaner and the assembly shall be set up as shown in figure 2. The capacity of the compressed air chamber shall equal 579 cubic centimeter (cm^3) for each m^3/min [1 cubic in. (in^3) for each ft^3/min] of rated airflow of the element. Starting at 69 kPa (10 psig) in the chamber, the compressed air shall be released instantly to the assembly. The air pressure in the chamber shall be increased in increments of 69 kPa (10 psig) until 690 kPa (100 psig) is reached, or until structural damage occurs. The test shall be repeated 5 times at each pressure.

4.4.7 Differential pressure test. Following post service airflow restriction, the filter element assembly need not be installed in its intended air cleaner housing for the test. The filter element shall be connected to a flow source capable of a minimum 12.44 kPa (50 in. of water) negative pressure (vacuum) at the rated air flow of the filter element as specified in figure 3. Dust shall be fed to the filter element at a rate not to exceed $88.3 \text{ g}/\text{m}^3$ ($2.5 \text{ g}/\text{ft}^3$) until the differential pressure (pressure drop) reaches 12.44 kPa (50 in. of water). At this condition, the filter element

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shall be inspected for dust tracking and structural damage. Signs for dust tracking shall be observed on clean side of filter element. If filter element is installed in air cleaner housing for differential pressure test then reference SAE J726 air cleaner test code industrial air cleaner test procedures, airflow restriction and pressure drop test.

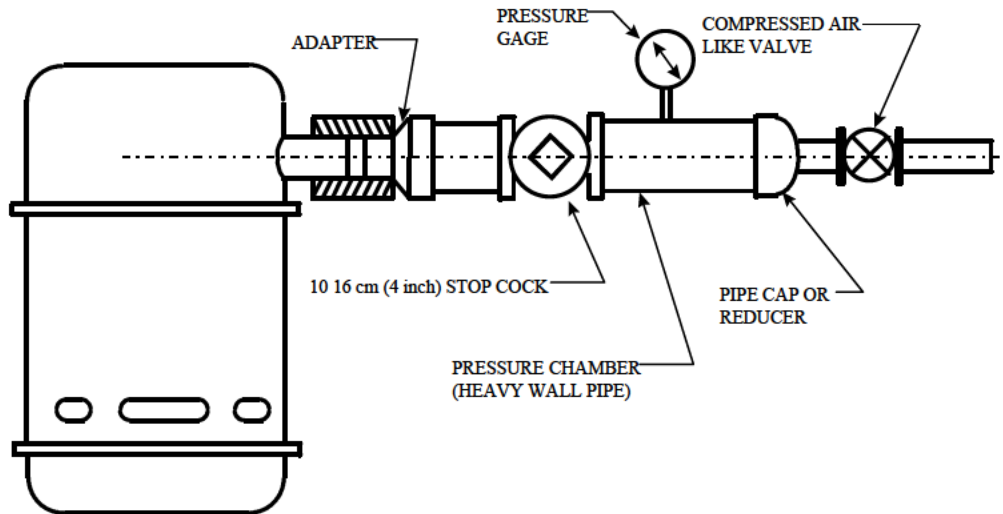


FIGURE 2. Backfire test setup.

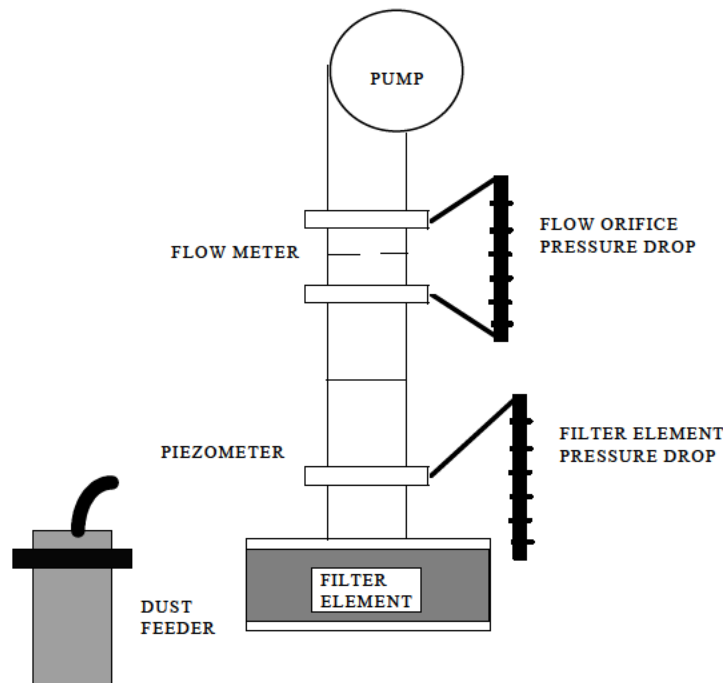


FIGURE 3. Differential pressure test setup.

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4.5 Ownership and support requirements verification.

4.5.1 Washing durability. The filter element shall be installed in the air cleaner. The efficiency at rated air flow shall be determined in accordance with 4.4.3. After completing the initial efficiency test, dust shall be fed between a minimum rate of 1.77 g/m^3 and a maximum rate of 10 g/m^3 of constant rated airflow until a restriction of 4.98 kPa (20 in. of water) is reached. The filter element shall be removed from the housing, cleaned with compressed air, then immersed and water agitated for 6 hours in a solution of warm water $32 \pm 5.5^\circ\text{C}$ ($90 \pm 10^\circ\text{F}$) and soap conforming to P-D-245 (type I or type II) or a low sudsing commercial detergent. The filter element shall then be removed from the solution and flushed with tap water at low pressure until all solution and dirt are removed. The rinse water shall be flowing clean. Excess water shall be allowed to drain from the filter element for one hour. The element shall be dried in an oven for 6 hours or until there is no change in oven weighing of the element over two consecutive 10 minute intervals. The filter element shall then meet the efficiency requirements of 3.3.4.

4.5.2 Marking. The marking shall be visually verified (see 4.3).

4.5.3 Quality and safety. The filter element shall be visually examined for quality and safety (see 4.3).

4.6 Operating environment requirements verification.

4.6.1 Seal ozone resistance. The test as specified in 4.6.1.1 through 4.6.1.3 shall be performed to determine seal ozone resistance.

4.6.1.1 Test specimens. A minimum of two $5 \times 2.54 \times 0.16 \text{ cm}$ test specimens shall be subjected to the seal ozone resistance test.

4.6.1.2 Apparatus. The apparatus shall include an insulated test chamber, with an ozone-generating source outside the chamber. Means shall be provided for measuring the ozone concentration, for controlling the temperature of air in the chamber and for circulating air. The apparatus shall also include a means for holding and stretching the specimens.

4.6.1.3 Procedure. Specimens shall be elongated 12.5%. The stressed specimens, while still elongated in the stretching apparatus, shall be conditioned at room temperature for not more than 45 minutes; and then exposed for 7 days in the test chamber in which air, having an ozone concentration of 50 ± 5 parts of ozone per 100 000 000 parts of air by volume, is circulated at a temperature of $38 \pm 3^\circ\text{C}$ ($100 \pm 5^\circ\text{F}$). The specimens shall be examined frequently. There shall be no evidence of cracks during or after exposure.

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4.6.2 Vibration resistance. Unless otherwise specified by the procuring activity (see 6.2), the filter element shall be mounted on a vibrating machine in a manner simulating intended use when installed in an air cleaner. The filter element shall be subjected to simple harmonic motion having an amplitude of 0.08 cm (0.03 in.) [0.15 cm (0.06 in.) maximum total excursion], the frequency being varied uniformly between the approximate limits of 10 to 55 hertz (Hz). The entire frequency range, from 10 to 55 Hz and return to 10 Hz, shall be traversed in approximately one minute. The duration of the vibration shall be eight hours in the vertical axis and 4 hours in each of the horizontal axis. The test shall be conducted first in an ambient temperature of $65.5 \pm 3^{\circ}\text{C}$ ($150 \pm 5^{\circ}\text{F}$), then repeated in an ambient temperature of $-54 \pm 3^{\circ}\text{C}$ ($-65 \pm 5^{\circ}\text{F}$). Upon completion, the filter element shall be examined.

4.6.3 Efficiency after vibration. The tests shall be conducted as follows:

- a. Efficiency test shall be conducted and the efficiency determined as specified in 4.4.3.
- b. Without cleaning the element, the vibration resistance test shall be conducted in accordance with 4.6.2, but at a temperature of $27 \pm 3^{\circ}\text{C}$ ($80 \pm 5^{\circ}\text{F}$) only.
- c. The filter element shall be cleaned as specified in 4.4.5 and efficiency test of 4.4.3 shall be conducted. The efficiency shall be not less than 99.5%.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The filter elements are military unique because of its applications and physical performance used specifically on military vehicles. Because of its rigid military performance, the filter element has no commercial applications.

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6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1 and 2.3).
- c. When first article is required (see 3.1).
- d. If design, materials, or manufacturing processes should be other than as specified (see 3.2).
- e. If crush resistance should be other than as specified (see 3.3.2).
- f. If time to reach dust capacity should be other than as specified (see 3.3.4).
- g. If post service airflow restrictions should be other than as specified (see 3.3.5).
- h. If backfire should be other than as specified (see 3.3.6).
- i. Applicable drawing for envelope and interface dimensions and rated air flow (see 3.4.1).
- j. If vibration requirement should be other than as specified (see 3.6.2).
- k. If inspection conditions should be other than specified (see 4.3.2).
- l. If dust capacity test should be other than specified (see 4.4.4).
- m. If vibration resistance test should be other than specified (see 4.6.2).
- n. Packaging requirements (see 5.1).
- o. If filter element should be mounted other than as specified (see A.3.5).

6.3 First article. When requiring a first article inspection, contracting documents should provide specific guidance to offerors. This guidance should cover whether the first article is a first article sample, a first production item, or the number of test items. These documents should also include specific instructions regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Pre-solicitation documents should provide Government waiver rights for samples for first article inspection to bidders offering a previously acquired or tested product. Bidders offering such products who wish to rely on such products who wish to rely on such production testing must furnish evidence with the bid that prior Government approval is appropriate for the pending contract.

6.4 Conformance inspection. Affordable conformance inspection with confidence varies depending upon a number of procurement risk factors. Some of these factors include: Contractor past performance, Government schedules and budget, product material and design maturity, manufacturing capital equipment and processes applied, the controlled uniformity of those processes, labor skill and training, and the uniformity of measuring processes and techniques. During the solicitation, contracting documents should indicate those tests desired from table II and their designated frequency based on a risk assessment for the procurement.

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6.5 Definitions.

6.5.1 Load capacity and loaded to capacity. “Load capacity” and “loaded to capacity” mean that the dust load has caused the air cleaner restriction to reach 4976 Pa (20 in. of water).

6.5.2 Chemical make-up and manufacturer. Historically the coarse and fine dust is used by Powder Technology Inc.

TABLE IV Chemical analysis of test dust 1/

Chemical	% of weight
SiO ₂	65 - 76
Al ₂ O ₃	11 - 17
Fe ₂ O ₃	2.5 - 5.0
Na ₂ O	2 - 4
CaO	3 - 6
MgO	0.5 - 1.5
TiO ₂	0.5 - 1.0
V ₂ O ₃	0.10
ZrO	0.10
BaO	0.10
Loss of ignition	2.4

1/ Dust capacity differences may occur between different dust batches. Therefore, it is recommended that comparison testing of filters be performed using a single batch of dust per test program whenever possible.

6.6 Subject term (key word) listing.

Diesel engine
Gasoline engine
Impurities
Material
Porous
Purification

6.7 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

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APPENDIX A

SPECIAL TEST EQUIPMENT

A.1 SCOPE

A.1.1 Scope. This appendix details the special test equipment necessary for the validation of the filter elements. This appendix is a mandatory part of the specification. The information contained herein is intended for compliance.

A.2 APPLICABLE DOCUMENTS

(This section is not applicable to this appendix.)

A.3 PROCEDURE

A.3.1 Piezometer tubes, adapters, manometer, and flowmeter. Piezometer tubes conforming to SAE J726 and equal to, or the next size larger [maximum of 1.3 cm (0.5 in.) larger] shall be installed at the outlet and where applicable at the inlet of the air cleaner. Transition ducts (if required) shall be installed between the flanges of the air cleaner inlet (or outlet) and the piezometer tubes. Transition ducts shall have sides at angles no greater than 7 degrees as measured from the centerline of the transition piece. A smooth approach (ideal flow orifice), (see SAE J726 and figure 4), shall be installed on the front of the inlet piezometer tube where applicable. Adapters installed after the outlet piezometer tubes shall have sides at angles no greater than 7 degrees, as measured from the centerline of the transition piece. A water type manometer shall be installed between the two piezometer tubes, as applicable. A flowmeter of adequate capacity shall be connected to the outlet of the adapter.

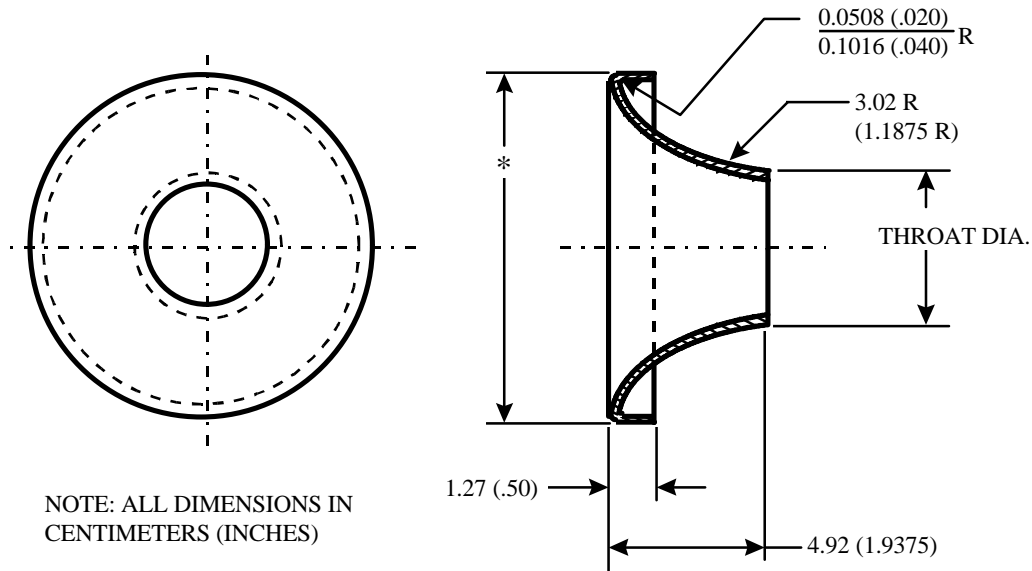
A.3.2 Absolute filter. The absolute filter shall consist of a 1.3 cm (0.5 in.) fiberglass batting installed in a holder in such a manner as to filter all air passing through the outlet of the air cleaner. The absolute filter shall be as specified in SAE J726.

A.3.2.1 Preparation of absolute filter. The fiberglass batting shall be hung in an air oven and dried for 5 hours at a temperature of 93.3 to 115.5°C (200 to 240°F), and then weighed to the nearest 0.01 gram. This drying time may be reduced and the batting considered as dry if there is no change in weight of the batting at two consecutive 10 minutes intervals. A similar drying and weighing (conducted in oven) shall be performed after each test.

A.3.3 Dust feeder. The dust feeder shall be as specified in SAE J726, without the required use of a dust injection nozzle in the dust feeding system.

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APPENDIX A



NOTE: ALL DIMENSIONS IN
CENTIMETERS (INCHES)

* $19.05 (7.500) + 0.0254 (.010)$ OR $10.16 (4.000) + 0.0254 (.010)$
DEPENDENT ON PIEZOMETER TUBE DIAMETER

Throat diameter		Airflow	
cm	in.	m ³ /min	cfm
16.03	6-5/16	56.63	2000
15.56	6-1/8	53.80	1900
15.24	6.0	50.97	1800
14.76	5-13/16	48.14	1700
14.29	5-5/8	45.31	1600
13.81	5-7/16	42.48	1500
13.34	5-1/4	39.64	1400
12.70	5.0	36.81	1300
12.22	4-13/16	33.98	1200
11.75	4-5/8	31.15	1100
11.11	4-3/8	28.32	1000
10.48	4-1/8	25.49	900
9.53	3-3/4	22.65	800

Throat diameter		Airflow	
cm	in.	m ³ /min	cfm
8.89	3-1/2	19.82	700
8.57	3-3/8	16.99	600
7.94	3-1/8	14.16	500
6.99	2-3/4	11.33	400
6.03	2-3/8	8.495	300
4.92	1-15/16	5.663	200
4.45	1-3/4	4.672	165
3.81	1-1/2	3.398	120
3.49	1-3/8	2.832	100
3.18	1-1/4	2.407	85
2.54	1.0	1.557	55
2.06	13/16	0.991	35
1.59	5/8	0.566	20
1.11	7/16	0.283	10

FIGURE 4. Ideal flow nozzle.

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A.3.4 Air cleaner preparation. Unless otherwise specified herein, a clean unused filter element shall be installed in the air cleaner for each test (the filter elements is not considered “used” after use in a restriction test). Further, the air cleaner assembly (less filter element) shall be cleaned thoroughly with compressed air if it has been subjected previously to a test in which dust was used.

A.3.5 Filter element mounting. Unless otherwise specified (see 6.2), the filter element shall be tested in an air cleaner housing intended for its application which shall be mounted in its normal operating attitude and shall be electrically grounded.

Custodians:

Army - AT
DLA - CC

Preparing Activity:

Army - AT

(Project 2940-0176)

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1. DOCUMENT NUMBER

MIL-PRF-46736E

2. DOCUMENT DATE (YYMMDD)

980821

3. DOCUMENT TITLE

Filter Element, Intake Air Cleaner: Dry Type

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)

b. ORGANIZATION

c. ADDRESS (Include Zip Code)

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(1) Commercial

(2) AUTOVON

(If applicable)

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