

METRIC

MIL-PRF-46736D

12 April 1996

SUPERSEDING

MIL-F-46736C(AT)

12 April 1991

PERFORMANCE SPECIFICATION

FILTER ELEMENT, INTAKE AIR CLEANER: DRY TYPE (METRIC)

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 addition 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 requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

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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MIL-PRF-46736D

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 that issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplements thereto cited in the solicitation (see 6.2).

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 Defense Printing Service Detachment Office (Customer Service), 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 issue 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.

MIL-PRF-46736D

3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a first article sample shall be subjected to first article inspection in accordance with 4.2.

3.2 Materials. Materials used shall be in accordance with the manufacturer's materials specifications for air filters. The materials shall be capable of meeting all of the operational and environmental requirements specified herein (see 4.5.1).

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 Design and construction. Unless otherwise specified by the procuring activity/acquisition document (see 6.2), the filter shall conform to the manufacturer's design and construction for dry type intake air filter elements except to assure performance in accordance with the requirements specified herein, when installed in the air cleaner assembly specified in MIL-PRF-62048 for which it was designed. Design features shall provide for use of the filter element in either gasoline or diesel fueled engines. Construction dimensions and rated airflow shall be in accordance with the applicable drawing or MS standard (see 4.5.1 and 4.5.2).

3.3.1 Flame resistance. After the filter media of the filter element is exposed to a flame until it burns or glows, the filter media shall not continue to burn or smolder when the flame is removed (see 4.5.3).

3.3.2 Crush resistance. Unless otherwise specified (see 6.2), the 1335 Newtons (N) [300 pounds (lbs)] compressive (end to end) static load shall be applied to the filter element end caps, excluding gaskets which are molded to the filter element ends or are separately attached. 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 length (end to end, not including filter element end cap gaskets height) (see 4.5.4).

3.3.3 Seal ozone resistance. The filter element end cap seals shall be capable of withstanding 7 days exposure to air having ozone concentration of 50 plus or minus (\pm) 5 parts of ozone per 100 000 000 parts of air by volume at a temperature of 38 ± 3 degrees Celsius ($^{\circ}$ C) [100 ± 5 degrees Fahrenheit ($^{\circ}$ F)]. There shall be no evidence of cracks after exposure (see 4.5.5).

MIL-PRF-46736D

3.4 Performance. Unless otherwise specified herein, the filter element shall meet the performance requirements specified below when installed in an air cleaner conforming to MIL-PRF-62048 (see 4.5.6). 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”. 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 percent (%).
- c. Air flow - The rated airflow shall be as specified in the applicable drawing or MS standard and variable airflow shall be as specified in figure 1. Specified values of airflow are for standard atmospheric conditions of 101.3 kilopascals (kPa) (407 inches of water) barometric pressure and 26.7°C (80°F) ambient temperature providing an air density of 1.17 kilogram per cubic meter (kg/m^3) [0.073 pounds per cubic foot (lb/ft^3)]. Actual airflow values during testing shall be corrected to standard conditions and shall be within plus or minus two percent of specified values.
- d. Airflow restriction - Unless otherwise specified by the procuring activity/acquisition document (see 6.2), actual airflow restriction values shall be corrected to airflow with a density of 1.17 kg/m^3 and shall be accurate to plus or minus 24.9 Pa (0.1 inch 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) for 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 gram per cubic foot (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 (paragraph A.3.5). Air cleaners equipped with scavenge air aspirators or similar types (non-electric blowers) shall provide a 10% scavenge

MIL-PRF-46736D

flow of the actual air flow being flowed through the air cleaner.

3.4.1 Efficiency. The efficiency of the filter element installed in the air cleaner housing (assembly) for which it was designed, at rated air flow shall not be less than 99.5% after being fed fine grade dust for 30 minutes or until 110 grams are fed, whichever results in a greater quantity of dust, or 60 minutes if the rated airflow face velocity of filter media is 183 cm/min (6 ft/min) or less (see 4.5.6.1).

3.4.2 Dust capacity. Unless otherwise specified on the applicable drawing or MS standard, 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. 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 (see 4.5.6.2).

3.4.3 Post service airflow restriction. Unless otherwise specified by the procuring activity/acquisition document (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 249 Pa (1 inch of water) (see 4.5.6.3).

3.4.4 Washing durability. The assembly shall evidence no damage and shall meet the requirements of 3.4.1, after the filter element has been loaded to capacity (see 6.5.1), then washed with soap conforming to P-D-245, rinsed, and dried. Low/no sudsing commercial detergents may be substituted for P-D-245 (see 4.5.6.4).

3.4.5 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 inch (psig)] (see 4.5.6.5).

3.4.6 Differential pressure. The filter element shall be capable of withstanding without damage, a differential pressure of 24.88 kPa (100 inches of water) between the inside and outside of the assembly (see 4.5.6.7).

3.4.7 Environmental.

3.4.7.1 Vibration. Unless otherwise specified (see 6.2), the filter element shall be vibration tested when installed in an air cleaner housing, termed "air cleaner assembly" for which it was designed. The filter element shall show no evidence of structural or assembly damage after being subjected to vibration for 8 hours in the vertical axis and 4 hours in each of the horizontal axes (see 4.5.6.6.1).

MIL-PRF-46736D

3.4.7.2 Efficiency after vibration. The filter element assembly shall meet the requirements of 3.4.1 after being subjected to vibration in accordance with 3.4.7.1 (see 4.5.6.6.2).

3.5 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 m³/min (cfm) (see 4.5.2).

3.6 Workmanship. 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 (see 4.5.2).

4. VERIFICATION

4.1 Classification of inspection. The inspection conditions specified herein are classified as follows (see table I):

- a. First article inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.2 First article inspection. Unless otherwise specified (see 6.2), first article inspection shall be performed on preproduction or initial production samples on each of the four samples listed in table II. The sequence of tests to be performed on individual elements must be per table II. The order of elements to be tested may not necessarily follow the sequence listed.

4.3 Conformance inspection. Conformance inspection shall include the examinations of 4.4 and the tests of 4.5.

4.4 Examination. Each filter element assembly shall be examined for compliance with the requirements specified in 3.2 through 3.6. Any redesign or modification of the contractor's standard product to comply with specified requirements, or any necessary redesign or modification following failure to meet the specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirements or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

MIL-PRF-46736D

TABLE I. Classification of inspections.

Title	Requirement	Inspection	First article	Quality conformance test
Materials and construction	3.2, 3.3	4.5.1	X	
Defects	3.3, 3.5, 3.6	4.5.2	X	X
Flame resistance	3.3.1	4.5.3	X	
Crush resistance	3.3.2	4.5.4	X	
Seal ozone resistance	3.3.3	4.5.5	X	
Efficiency	3.4.1	4.5.6.1	X	X
Dust capacity	3.4.2	4.5.6.2	X	
Post service airflow restriction	3.4.3	4.5.6.3	X	
Washing durability	3.4.4	4.5.6.4	X	
Backfire	3.4.5	4.5.6.5	X <u>1/</u>	
Vibration resistance	3.4.7.1	4.5.6.6.1	X	
Efficiency after vibration	3.4.7.2	4.5.6.6.2	X	
Differential pressure	3.4.6	4.5.6.7	X	

1/ Not necessary when filter element is to be used on diesel engines exclusively (see 6.2).

4.5 Methods of inspection.

4.5.1 Materials and construction. Conformance to 3.2 and 3.3 shall be determined by inspection of contractor records providing proof or certification that design, construction, processing, and materials conform to requirements. Applicable records shall include drawings, specifications, design data, receiving inspection records, processing and quality control standards, vendor catalogs and certifications, industry standards, test reports, and rating data.

4.5.2 Defects. Conformance to 3.3, 3.5 and 3.6 shall be determined by examination for the defects listed in table III. Examination shall be visual or by measurement with standard inspection equipment (SIE).

4.5.3 Flame resistance. To determine conformance to 3.3.1, one side of filter element media shall be exposed to a flame until the media burns or glows. Remove the flame and observe the filter element media.

MIL-PRF-46736D

4.5.4 Crush resistance. To determine conformance to 3.3.2, the filter element shall be placed in a device capable of measuring pressure (load) applied to the element from end to end. The element shall be subjected to a static load of 1335 N (300 lbs) and filter element physically examined and end to end height recorded both before and after applying static load.

4.5.5 Seal ozone resistance. To determine conformance to 3.3.3, the following test shall be performed.

4.5.5.1 Test specimens. A minimum of two test specimens shall be subjected to the seal ozone resistance test. Specimens shall be representative of seal being tested.

4.5.5.2 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.

4.5.5.3 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 less 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.

4.5.6 Performance. Unless otherwise specified herein, performance tests shall be conducted on the filter element assembly. Unless otherwise specified herein, test conditions shall be in accordance with 3.4.

4.5.6.1 Efficiency. To determine conformance to 3.4.1, 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. Feed fine dust at $0.883 \pm 0.176 \text{ g/m}^3$ ($0.025 \pm 0.005 \text{ g/ft}^3$) 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 (6 ft/min) 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 recorded. The master filter and conductors shall be removed from the test setup taking care to retain all the entrapped dust, and reweighed. All dust and master filter weighing shall be accurate to 0.01 gram whenever possible, but never less than 0.1 grams. The efficiency shall be computed using the following formula:

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

MIL-PRF-46736D

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

4.5.6.2 Dust capacity. Unless otherwise specified by the procuring activity/acquisition document (see 6.2) to determine conformance to 3.4.2. The air cleaner shall be setup as specified in paragraph 4.5.6.1. An absolute filter of the proper size shall be installed between the air cleaner and the flow meter. Airflow shall be started and adjusted to rated flow of the element. Record the initial restriction at the start of the test and at the measurement points shown at figure 1. Coarse dust shall be fed at the rate specified in 3.4f. An absolute filter shall remain in place at all times. It shall be replaced with a clean fiberglass batting if 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 weighed before and after testing as specified in Appendix 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 recorded using the dust efficiency equation in paragraph 4.5.6.1 including the specified accuracy of all measurements. Unless otherwise specified on the applicable drawing or MS standard, verify that the operational time was at least 4 hours for a single stage air cleaner assembly design and 20 hours for multi-stage air cleaner assembly designs.

4.5.6.3 Post service airflow restriction. To determine conformance to 3.4.3, 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.

4.5.6.4 Washing durability. To determine conformance to 3.4.4, the filter element shall be installed in the air cleaner, the efficiency at rated air flow shall be determined and recorded in accordance with 4.5.6.1. After completing the initial efficiency test, dust shall be fed between a minimum rate of 1.77 g/m^3 (0.050 g/ft^3) and a maximum rate of 10 g/m^3 (0.283 g/ft^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 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 should be dried in an oven for 6 hours or until there is no change in oven

MIL-PRF-46736D

weighing of the element over two consecutive 10 minute intervals. The filter element shall then meet the efficiency requirements of paragraph 3.4.1.

4.5.6.5 Backfire. To determine conformance to 3.4.5, 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 3. The capacity of the compressed air chamber shall equal 579 cm³ for each m³/min [1 cubic inch (in³) for each cfm] 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.

4.5.6.6 Environmental.

4.5.6.6.1 Vibration resistance. Unless otherwise specified by the procuring activity/acquisition document (see 6.2), to determine conformance to 3.4.7.1, the filter element shall be vibrated tested when installed in the intended for air cleaner housing, termed "air cleaner assembly." The filter element shall be subjected to simple harmonic motion having an amplitude of 0.08 cm (0.03 in) [0.16 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 ± 3°C (150 ± 5°F), then repeated in an ambient temperature of -54 ± 3°C (-65 ± 5°F). Upon completion, the filter element shall meet the requirements of 3.4.1.

4.5.6.6.2 Efficiency after vibration. To determine conformance to 3.4.7.2, the tests shall be conducted as follows:

- a. The vibration resistance test shall be conducted in accordance with 4.5.6.6.1, but at a temperature of 21.1 to 32.2 °C (70 to 90 °F) only.
- b. The efficiency test of 4.5.6.1 shall be conducted. The efficiency shall be not less than 99.5%.

4.5.6.7 Differential pressure test. To determine conformance to 3.4.6 following post service airflow restriction, the filter element assembly need not be installed in it's intended air cleaner housing for the test. Connect the filter element to a flow source capable of a minimum 24.88 kPa (100 in of water) negative pressure (vacuum) at the rated air flow of the filter element (see figure 4). Feed dust to the filter element at a rate not to exceed 88.3 g/m³ (2.5 g/ft³) until the differential pressure (pressure drop) reaches 24.88 kPa (100 in of water). At this condition

MIL-PRF-46736D

inspect filter element 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.

TABLE II. First article test sequence.

Sample number	Tests	Paragraph
1	Efficiency	4.5.6.1
	Washing durability Efficiency	4.5.6.4
	Efficiency	4.5.6.1
2	Efficiency after vibration	4.5.6.6.2
	Backfire <u>1/</u>	4.5.6.5
	Crush resistance	4.5.4
	Flame resistance	4.5.3
3	Dust capacity	4.5.6.2
	Post service airflow restriction	4.5.6.3
	Differential pressure	4.5.6.7
4	Efficiency	4.5.6.1
	Vibration resistance	4.5.6.6.1
	Efficiency	4.5.6.1
Material sample	Ozone resistance	4.5.5

1/ Not necessary when filter element is to be used on diesel engines exclusively (see 6.2).

MIL-PRF-46736D

TABLE III. Classification of defects.

Category	Defect	Method of examination
<u>Major:</u> 101	Dimensions affecting interchangeability out of tolerance (see 3.3).	SIE <u>1/</u>
102	Nonconformance in design and construction (see 3.3).	Visual
103	Faulty workmanship affecting performance (see 3.6).	Visual
<u>Minor:</u> 201	Dimensions not affecting interchangeability out of tolerance (see 3.3).	SIE
202	Marking improper (see 3.5).	Visual
203	Faulty workmanship affecting appearance (see 3.6).	Visual

1/ SIE = Standard Inspection Equipment.

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 of 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. Filter elements covered by this specification are intended for use in intake air cleaners conforming to MIL-PRF-62048 used with internal-combustion engines for automotive applications.

MIL-PRF-46736D

6.2 Acquisition requirements. Acquisition documents should 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. If first article samples are not required (see 3.1).
- d. Applicable drawing or standard title, number, and date (see 3.3).
- e. If design changes are required (see 3.3).
- f. If crush resistance data should be other than as specified (see 3.3.2).
- g. If test conditions should be other than specified (see 3.4).
- h. If post service airflow restrictions should be other than as specified (see 3.4.3).
- i. If first article sample should be subjected to backfire inspection (see 3.4.5 and tables I and II).
- j. If vibration resistance test should be other than specified (see 3.4.7.1).
- j. If dust capacity test should be other than specified (see 4.5.6.2).
- k. If vibration resistance test should be other than specified (see 4.5.6.6.1).
- l. Packaging requirements (see 5.1).

6.3 Subject term (key word) listing.

Impurities; Engine, gasoline and diesel
Material, porous, purification

6.4 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.

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 4.98 kPa (20 in of water).

MIL-PRF-46736D

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 this specification.

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] than, 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 2) 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) batt of fiberglass 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 6 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.

MIL-PRF-46736D

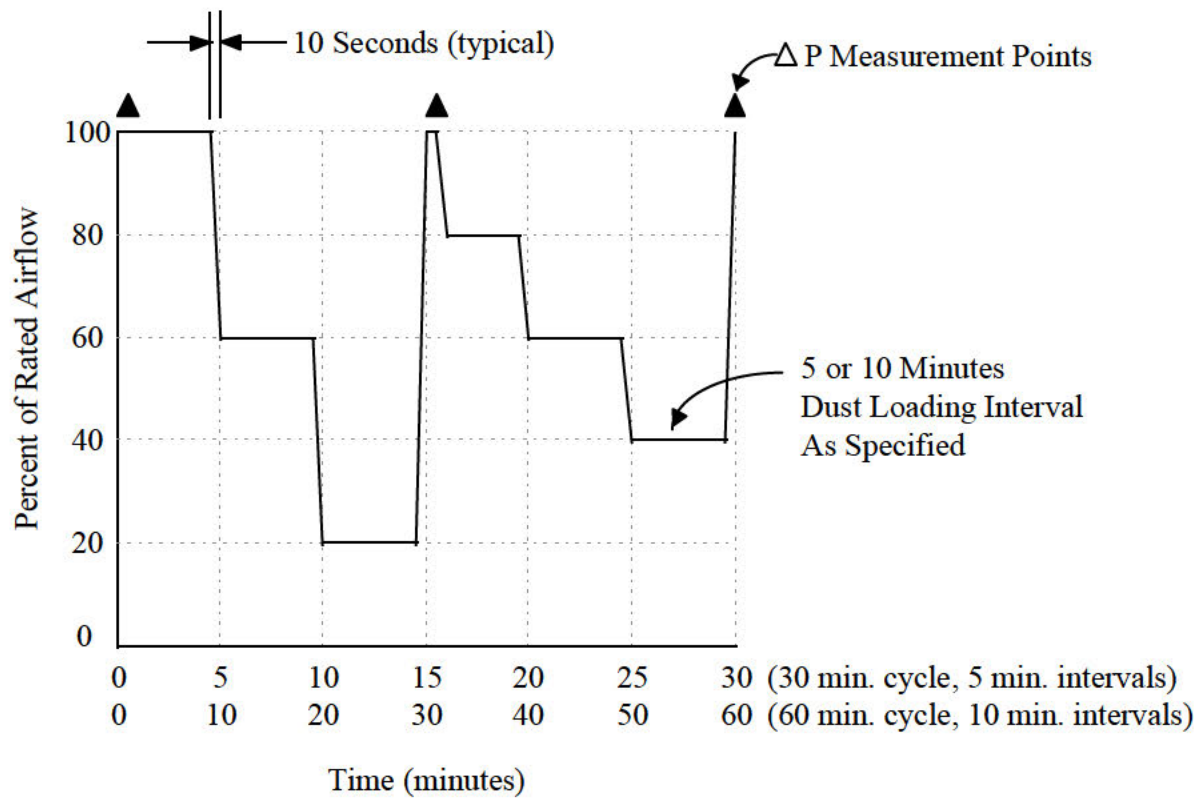
APPENDIX A

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 element 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 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.

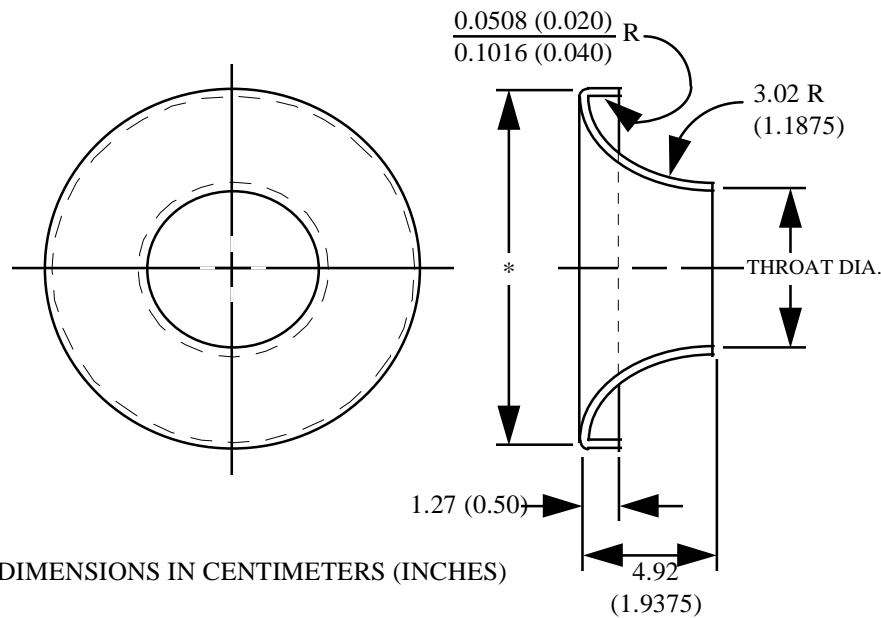
MIL-PRF-46736D

APPENDIX A

FIGURE 1. Variable airflow cycle.

MIL-PRF-46736D

APPENDIX A



* 19.05 (7.500) + 0.0254 (0.010) OR 10.16 (4.000) + 0.0254 (0.010)
 DEPENDING ON PIEZOMETER TUBE DIAMETER

Throat Diameter		Airflow		Throat Diameter		Airflow	
cm	in	m ³ /min	cfm	cm	in	m ³ /min	cfm
16.03	6-5/16	56.63	2000	8.89	3-1/2	19.82	700
15.56	6-1/8	53.80	1900	8.57	3-3/8	16.99	600
15.24	6.0	50.97	1800	7.94	3-1/8	14.16	500
14.76	5-13/16	48.14	1700	6.99	2-3/4	11.33	400
14.29	5-5/8	45.31	1600	6.03	2-3/8	8.495	300
13.81	5-7/16	42.48	1500	4.92	1-15/16	5.663	200
13.34	5-1/4	39.64	1400	4.45	1-3/4	4.672	165
12.70	5.0	36.81	1300	3.81	1-1/2	3.398	120
12.22	4-13/16	33.98	1200	3.49	1-3/8	2.832	100
11.75	4-5/8	31.15	1100	3.18	1-1/4	2.407	85
11.11	4-3/8	28.32	1000	2.54	1.0	1.557	55
10.48	4-1/8	25.49	900	2.06	13/16	0.991	35
9.53	3-3/4	22.65	800	1.59	5/8	0.566	20
				1.11	7/16	0.283	10

FIGURE 2. Ideal flow nozzle.

MIL-PRF-46736D

APPENDIX A

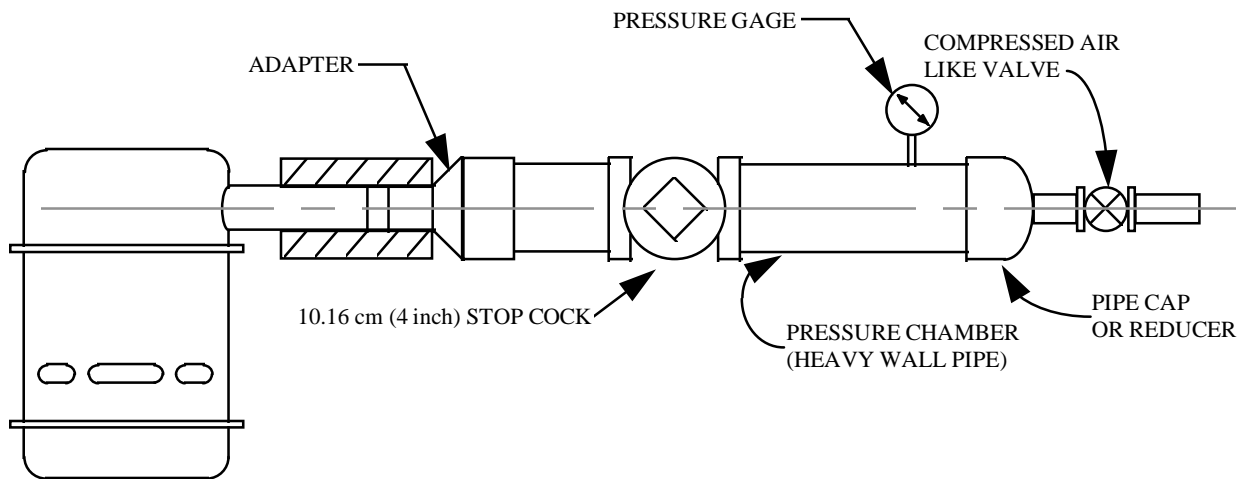


FIGURE 3. Backfire test setup.

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APPENDIX A

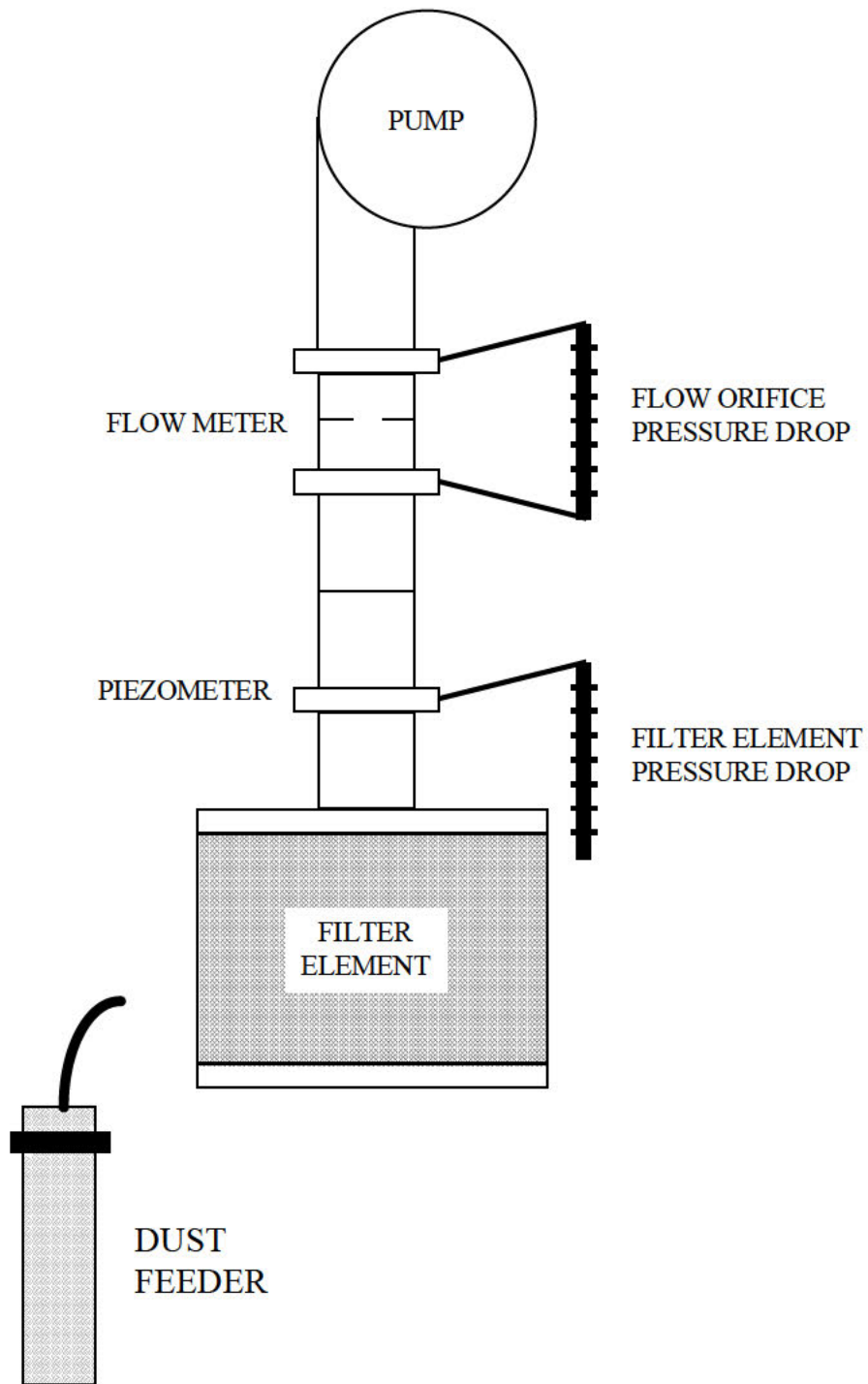


FIGURE 4. Differential pressure test setup.

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Custodian:
Army - AT

Preparing activity:
Army - AT

Review activity:
DLA - CS

(Project 2940-0155)

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INSTRUCTIONS

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3. DOCUMENT TITLE Filter Element, Intake Air Cleaner: Dry Type (Metric)		
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)		
5. REASON FOR RECOMMENDATION		
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