

INCH-POUND

MIL-PRF-52308G

23 November 1995

SUPERSEDING

MIL-F-52308F

8 September 1987

PERFORMANCE SPECIFICATION

FILTER ELEMENT, FLUID PRESSURE

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

1. SCOPE

1.1 Scope. This specification covers a filter element for use in filter-separator vessels for handling liquid petroleum fuels (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 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 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 4330

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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2.2 Government documents.

2.2.1 Specifications and standards. The following specifications and standards 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 supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

DEPARTMENT OF DEFENSE

- MIL-S-8660 - Silicone Compound.
- MIL-F-8901 - Filter-Separators, Liquid Fuel, and Filter Coalescer Elements, Fluid-Pressure: Inspection Requirements and Test-Procedures For.

STANDARDS

DEPARTMENT OF DEFENSE

- MIL-STD-810 - Environmental Test Method and Engineering Guidelines.
- MS29513 - Packing, Preformed, Hydrocarbon Fuel Resistant, "O" Ring.

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

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation (see 6.2).

CODE OF FEDERAL REGULATIONS

- 40 CFR 162.1 - Protection of Environment.

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.)

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

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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).

AMERICAN SOCIETY FOR QUALITY CONTROL (ASQC)

ASQC Z1.4 - Sampling Procedures and Tables for Inspection by Attributes.

(Application for copies may be obtained from the American Society For Quality Control, P.O. Box 305, 611 E. Wisconsin Ave., Milwaukee, WI 53201-4606.)

2.4 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification takes precedence. Nothing in this specification, 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 4.4.

3.2 Materials. Materials used shall be in accordance with the manufacturer's materials specifications for filters. The materials shall be capable of meeting all the operational and environmental requirements specified herein. Asbestos, cadmium, and radioactive material will not be used in this item. Radioactive material is defined by (a) Title 10, Code of Federal Regulations, Part 40, and (b) other radioactive material in which the radioactivity is greater than 0.002 microcuries per gram or 0.01 microcuries total activity for the item. Recovered materials shall be used to the maximum extent practicable (see 4.1 and 6.5).

3.2.1 Material deterioration prevention and control. The filter shall be fabricated from compatible materials, inherently corrosion resistant, or treated to provide corrosion and deterioration protection for the filter's expected service life in any operating and storage environment (see 4.1).

3.2.2 Dissimilar metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion (see 4.1).

3.2.3 Identification of materials and finishes. The contractor shall identify the specific material, material finish or treatment for use with component and subcomponent, and shall make information available upon request to the contracting officer or designated representative. Zinc or

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cadmium plating, or use of brass, bronze, and other copper bearing alloys shall not be permitted (see 4.1).

3.3 Construction and design. Filters shall be fabricated and assembled to the form and dimensions shown in figure 1 and as specified herein. The filter shall incorporate sufficient radial support to withstand a differential pressure of not less than 75 pounds per square inch (psi) (517 kiloPascals (kPa)) without structural failure or permanent deformation. Materials used in fabrication of the filter shall be compatible with petroleum fuels containing water and inhibitors as specified in MIL-F-8901 with no evidence of deleterious effect (see 4.1).

3.3.1 End caps. The end caps shall be mounted perpendicular within 3 degrees to the longitudinal axis of the filter. The O-ring packing and its retaining groove must retain the O-ring seal during installation (see 4.1).

3.4 Performance.

3.4.1 Operation. The filter element shall remove solids and coalesce water in clear drops. When installed in a filter separator vessel the filter, in combination with the canisters, shall remove coalesced water droplets from the fuel at a rate of 20 gpm (76 liters per minute (L/min)) per element (see 4.6.1).

3.4.2 Media migration. The media contamination limits shall conform to the following contamination limit requirements and shall not be exceeded at any rate of flow as specified in MIL-F-8901:

- a. Water. The effluent fuel shall contain not more than 5 parts per million (ppm) by volume of undissolved water.
- b. Solids. The average weight of solids in the effluent fuel samples shall not exceed 0.5 milligram (mg) per liter, and the weight of solids in any single sample shall not exceed 1 mg per liter.
- c. Fibers. The effluent fuel sample shall contain an average of not more than 10 fibers per liter and the number of fibers in any single sample shall not exceed 15 fibers per liter.

3.4.3 Differential pressure. Differential pressure across the filter/separator with new elements installed and clean fuel shall not exceed 10 pounds per square inch (psi) (69 kPa) at any flow rate up to 115 percent of rated flow when measured across the inlet and outlet fuel couplings (see 4.6.2).

3.4.4 Water removal. The filter/separator shall remove water to the limits specified (see 4.6.3) at fuel flow rates up to 115 percent of rated flow, with the influent fuel containing water up

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to 5 percent by volume for portable equipment and up to 10 percent by volume for fixed equipment. The discharge water shall contain not more than 0.5 percent fuel by volume.

3.4.5 Red iron oxide removal. The filter/separator shall remove red iron oxide (see 4.6.4) and up to 3 percent by volume of water to the limits specified (see 4.6.1) at fuel flow rates up to 100 percent of rated flow.

3.4.5.1 Red iron oxide removal capacity. The filter/separator shall remove a quantity of solids at least equal to 10 grams per gallon-per-minute of its rated flow capacity. The pressure differential across the media at rated flow shall not exceed 20 psi (138 kPa) before 30 minutes nor 40 psi (276 kPa) before 70 minutes (see 4.6.4) at a solid injection rate of 0.143 grams per gallon under the following conditions:

- a. Red iron oxide, fuel and 3 percent water mixture.
- b. Dry red iron oxide.
- c. AC test dust, inhibited fuel, and 1 percent by volume of water.

3.4.6 Inhibited fuel. The filter/separator shall remove AC dust and up to 1 percent by volume of water at fuel flow rates up to 100 percent of rated flow on inhibited fuel (see 4.6.5).

3.4.7 Life. When specified (see 6.2), the filter/separator shall remove red iron oxide solid contaminant and water from 0.5 percent up to 3 percent by volume at rated flow, on uninhibited fuel, over a period of up to 125 hours (see 4.6.6).

3.4.8 Environmental conditions.

3.4.8.1 Operating temperatures. The filter/coalescer elements when installed in a filter/separator, shall permit rated flow when operating in ambient temperatures ranging from -25°F to 125°F (-32°C to +52°C) (see 4.6.7.1).

3.4.8.2 Storage temperatures. The filter/coalescer elements shall withstand storage in temperatures ranging from -50°F to +160°F (-46°C to 52°C) after which they shall operate as specified in 3.4.8.1.

3.4.8.3 Fuel and salt water immersion. The filter/coalescer element, being immersed in fuel for 100 hours and after immersion in salty water for 72 hours, shall show no evidence of swelling, corrosion, separation of components, dissolving of adhesive, or deformation which could cause failure during operation (see 4.6.7.2).

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3.4.8.4 Transit drop. Each filter packaged (see 5.1) shall withstand the shocks induced by loading and unloading during transit. Filters shall perform as specified herein when tested as specified in 4.6.7.3.

3.5 Identification marking. Filter marking shall include, as a minimum, the following information permanently marked or stamped on the filter:

- a. NSN: 4330-00-983-0998
- b. Contract or Order No.: (Specify)
- c. Lot: (Specify)
- d. MANUFACTURER'S IDENTIFICATION: (Specify)
- e. DATE OF MFG: (Specify)

3.6 Workmanship. The filter shall be free from burrs, tears, smudges, or any other defect that will impair serviceability of the filter (see 4.1).

4. VERIFICATION

4.1 Materials and design. Conformance to 3.2 thru 3.3.1 and 3.6 shall be determined by inspection of contractor records providing proof or certification that materials and design 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.

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

- a. First article inspection (see 4.4).
- b. Conformance inspection (see 4.5).

4.3 Conditions. The fuel flow rate shall be 20 gpm (76 L/min) per filter except where otherwise specified. Test system arrangement and test fuel shall be as specified in MIL-F-8901.

4.4 First article inspection. The contractor shall furnish filters to determine conformance to this specification (see 6.2). First article inspection shall be conducted as specified in 4.5.3.1 and 4.4.1. Presence of one or more defects or failure of any test shall be cause for rejection.

4.4.1 Tests. The following tests specified herein shall be performed at a Government test facility (see 6.7):

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- a. Filter/coalescer element (see 4.6.1).
- b. Differential pressure and media migration (see 4.6.2).
- c. Red iron oxide (dry) (see 4.6.4).
- d. Water removal (see 4.6.3).
- e. Red iron oxide and water (see 4.6.4).
- f. Inhibited fuel with ECA, water and AC dust (see 4.6.5).
- g. Life (see 4.6.6).
- h. Environmental (see 4.6.7).

NOTE: At the discretion of the Government test activity, the electrical conductivity additive (ECA) may be omitted from the inhibited fuel test.

4.5 Conformance inspection.

4.5.1 Lot. Unless otherwise specified (see 6.2), a lot shall consist of not more than 1,000 filters, identically produced by one shift during a single day.

4.5.2 Sampling.

4.5.2.1 Examination. Sampling for examination shall be in accordance with ASQC Z1.4.

4.5.2.2 Tests. Sampling for tests shall consist of 16 filters selected at random from the first day's production, two filters selected at random from each lot after the first day's production and four additional samples selected at random for each resubmitted lot. Sample filters tested as specified in 4.4.1 and 4.5.4 shall be discarded and not be delivered as production items.

4.5.3 Examination. Samples selected in accordance with 4.5.2.1 shall be examined as specified in 4.5.3.1.

4.5.3.1 Examination procedure. The filters shall be examined as specified herein for the defects specified in table I:

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TABLE I. Classification of defects.

Category	Defect	Method of examination
Critical	None	
<u>Major:</u>		
101	Material not as specified (see 3.2).	Visual
102	Material not resistant to corrosion and deterioration or treated to be made resistant to corrosion and deterioration (see 3.2.1).	Visual
103	Dissimilar metal (see 3.2.2).	Visual
104	The design of the filter not as specified (see 3.3).	Visual
105	O-rings in ends of filter missing or damaged (see 3.3.1).	Visual
106	End caps mounting not as specified (see 3.3.1).	Visual
107	Dimension not as shown in figure 1 (see 3.3).	Visual
108	Identification marking incorrect, missing (see 3.5).	Visual
109	Filter is not free from burrs, tears, and smudges as specified (see 3.6).	Visual

4.5.4 Tests. Samples selected in accordance with 4.5.2.2 shall be tested as specified in 4.5.4.1. Failure of any sample to pass the tests shall be cause for rejection of the lot represented by the sample.

4.5.4.1 Conformance tests. The following tests specified herein shall be performed by the Government using Government test facilities at a site selected by the Government (see 6.7):

- a. Filter/coalescer element (see 4.6.1).
- b. Water removal, 10.0 percent water run (see 4.6.3).
- c. Red iron oxide and water (see 4.6.4).
- d. Red iron oxide (dry) (see 4.6.4).

4.6 Methods of inspection.

4.6.1 Operation. To determine conformance to 3.4.1, the filter element installed in a filter/ separator shall be subjected to a fuel flow rate of 20 gpm (76 L/min) per element.

4.6.2 Differential pressure test. To determine conformance to 3.4.3 and when the filter element installed in the filter/separator. The filter/separator shall be tested as specified in

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MIL-F-8901. The differential pressure shall be measured.

4.6.3 Water removal. To determine conformance to 3.4.4 and when tested as specified in MIL-F-8901 discharge water shall contain not more than 0.5 percent fuel by volume.

4.6.4 Red iron oxide removal test. To determine conformance to 3.4.5 and 3.4.5.1, the filter element shall be installed in the filter separator and tested as specified in MIL-F-8901. The quantity of red iron oxide shall be measured.

4.6.5 Inhibited fuel test. To determine conformance to 3.4.6, the filter element shall be tested as specified in MIL-F-8901. The quantity of AC dust and water shall be measured.

4.6.6 Endurance. To determine conformance to 3.4.7, the filter element shall be tested as specified in MIL-F-8901. After the test, the filter element shall meet the requirements of 3.4.1.

4.6.7 Environmental test.

4.6.7.1 Storage and operating tests. To determine conformance to 3.4.8.1 and 3.4.8.2, the filter element shall be installed in the filter/separator and tested as specified in MIL-F-8901. The filter shall meet the requirements of 3.4.1 under the extreme conditions.

4.6.7.2 Fuel and salt water immersion. To determine conformance to 3.4.8.3, the filter/coalescer element shall be tested as specified in MIL-F-8901. After the test, the filter shall meet the requirements of 3.4.1.

4.6.7.3 Transit drop. Prior to testing as specified in 4.4.1 and 4.5.4.1, each filter contained in its unit package shall be drop tested as specified in MIL-STD-810, method 516.3, procedure IV. Cracks or deformation of end caps, damage to filter media, or nonconformance to 3.4.8.4 shall constitute failure of this test. NOTE: At the discretion of the Government test activity, this test may be omitted from conformance testing to include only those filters being subject to first article inspection.

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

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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 which may be helpful, but is not mandatory.)

6.1 Intended use. The filters covered by this specification are intended for use in filter-separator vessels to remove contaminants and to coalesce water from gasolines, diesel, jet, and rocket fuels.

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, 2.2.2 and 2.3).
- c. If first article inspection is required (see 3.1 and 4.4) and the number of samples.
- d. If endurance test is required (see 3.4.7).
- e. When lot size other than as specified (see 4.5.1).
- f. Selection of applicable level and packaging and packing requirements (see 5.1).

6.3 Disposition of test assemblies. Filters undergoing destructive tests should be indelibly marked "DO NOT USE".

6.4 Subject term (key word) listing.

Filter element
Filter-separator
Fuel.

6.5 Recovered materials. For the purpose of this requirement, recovered materials are those materials which have been collected from solid waste and reprocessed to become a source of raw materials, as distinguished from virgin raw materials. The components, pieces and parts incorporated in the filter may be newly fabricated from recovered materials to the maximum extent practicable, provided the filter produced meets all other requirements of this specification. Used, rebuilt or remanufactured components, pieces and parts should not be incorporated in the filter.

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

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6.7 Government test facilities. The contracting officer should arrange to conduct testing at the USA Ft. Belvoir Research, Development & Engineering Center, ATTN: STRBE-STE, Ft. Belvoir, VA 22060-5606.

6.8 Accepted manufacturers list. The following manufacturers are previously qualified to manufacture MIL-F-52308E/F:

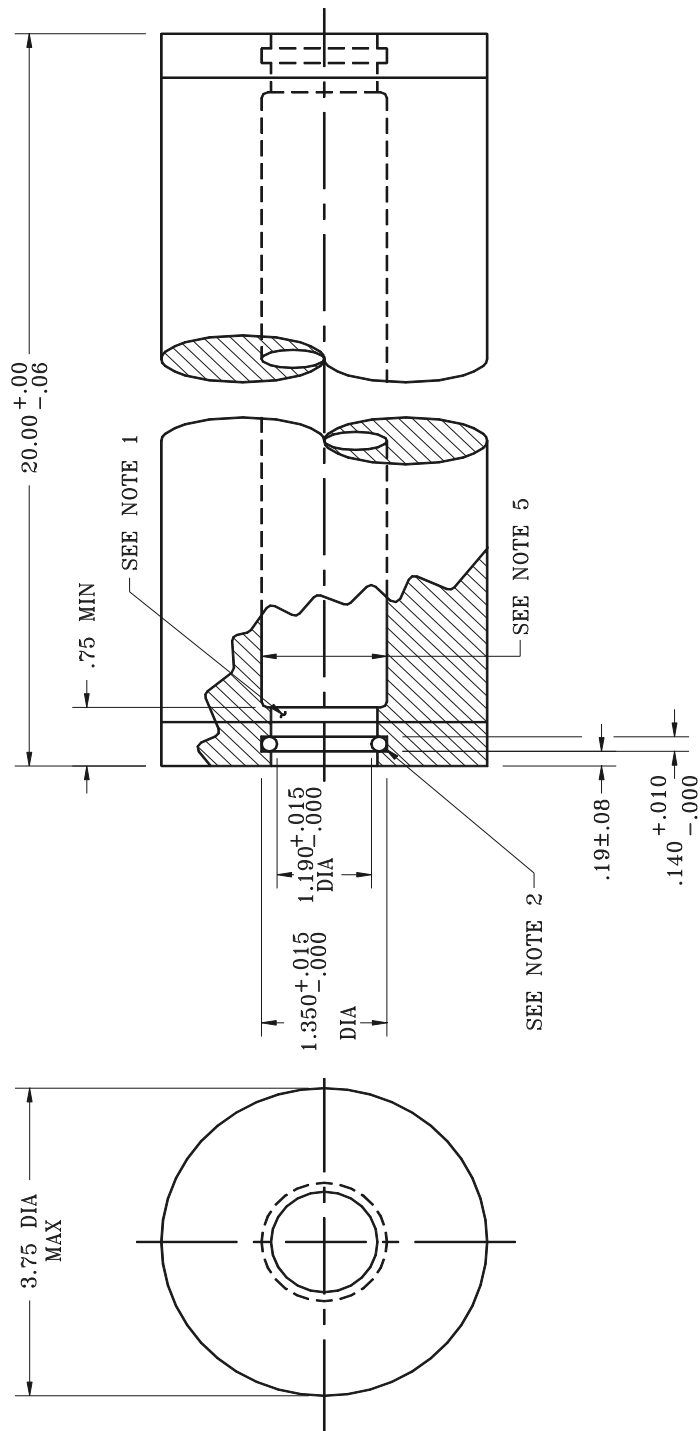
GOVERNMENT DESIGNATION	MANUFACTURER'S DESIGNATION	TEST OR QUALIFICATION REFERENCE	MANUFACTURER'S NAME AND ADDRESS
4330-00-983-0998	2037-03 CP-20452-0	MIL-F-52308	Banner Engineering Corp. Route 3, Box 9 Henryetta, OK 74437 PLANT: Same address Banner Engineering Corp. 505 S. Industrial Blvd. Hugo, OK 74743
4330-00-983-0998	CC-S11C 045800-10	MIL-F-52308	Facet International, Inc. P.O. Box 50096 (74150) 9910 E. 56th Street North Tulsa, OK 74117 PLANT: Facet International, Inc. Cherokee Nation Industrial Park Route 1, Box 434 Stilwell, OK 74960

GOVERNMENT DESIGNATION	MANUFACTURER'S DESIGNATION	TEST OR QUALIFICATION REFERENCE	MANUFACTURER'S NAME AND ADDRESS
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4330-00-983-0998	C1-3520-02-0 C1-3520-02-4	MIL-F-52308	Kaydon Corp. 1571 Forrest Avenue LaGrange, GA 30240 PLANT: Same address
4330-00-983-0998	MC 320001	MIL-F-52308	Murphy's Filtration Element, Inc. Rt. 1, Box 134 1/2 Newell, AL 36270 PLANT: Same address
4330-00-983-0998	I-4208B	MIL-F-52308	Velcon Filters, Inc. 1750 Rogers Avenue San Jose, CA 95122
4330-00-983-0998	I-4208C	MIL-F-52308	Velcon Filters, Inc. of Alabama 2410 Hill Road Route 7, Box I-24 Sylacauga, AL 35150 PLANT: Same address

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FIGURE

element.

1. Filter

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Custodians:

Army - AT

Navy - YD

Air Force - 11

Preparing activity:

Army - AT

(Project 4330-0125)

Review activities:

Navy - AS, MC

Air Force - 99

DLA - CS