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* INCH-POUND *

F-F-2790
November 27, 1991

SUPERSEDING
MIL-F-29177A
8 March 1985

FEDERAL SPECIFICATION

FILTER, AIR-EXTENDED AREA, INITIAL INSTALLATION

This specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE

1.1 Scope. This specification covers replaceable, extended media area type air filters with externally supported, nonsupported, or self-supporting cartridges installed in permanent metal holding frames and housings as required for use in air conditioning, heating, and ventilating systems.

1.2 Classification. Filters covered by this specification shall be of the following types and grades, as specified (see 6.2).

Type I - Prefilter - Externally supported or nonsupported cartridge

Grade A - 30 percent commercially rated efficiency
Grade B - 40 percent commercially rated efficiency

Type II - Afterfilter - Externally supported or nonsupported cartridge

Grade C - 85 percent commercially rated efficiency (minimum of 58 percent per ASHRAE 52 using atmospheric dust)
Grade D - 95 percent commercially rated efficiency (minimum of 78 percent per ASHRAE 52 using atmospheric dust)

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Beneficial comments (recommendations, additions, deletions) and any pertinent
*data which may be of use in improving this document should be addressed to: *
*Commanding Officer (Code 156), Naval Construction Battalion Center, Port *
*Hueneme, CA 93043-5000, by using the self-addressed Standardization *
*Document Improvement Proposal (DD Form 1426) appearing at the end of this *
*document or by letter. *
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FSC 4130

Type III - Afterfilter - Self-supporting cartridge

Grade E - 95 percent rated efficiency (Dioctyl Phthalate (DOP) Test using 0.3 micron particles)
Grade F - 99.97 percent rated efficiency (DOP Test using 0.3 micron particles)

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified (see 6.2), 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.

SPECIFICATION

MILITARY

MIL-P-116 - Preservation, Methods of

STANDARDS

FEDERAL

FED-STD-123 - Marking For Shipment (Civil Agencies)

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129 - Marking For Shipments And Storage
MIL-STD-282 - Filter Units, Protective Clothing, Gas-Mask Components and Related Products: Performance-Test Methods
MIL-STD-794 - Part and Equipment, Procedures for Packaging of
MIL-STD-2073-1 - DOD Material Procedures For Development And Application of Packaging Requirements

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

2.2 Other publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

ASTM:

ASTM A 167 - Stainless and Heat-Resisting Chromium-Nickel, Steel Plate, Sheet, and Strip
ASTM A 176 - Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip
ASTM A 525 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by Hot-Dip Process
ASTM B 209 - Aluminum and Aluminum Alloy Sheet and Plate
ASTM B 633 - Electrodeposited Coatings of Zinc on Iron and Steel
ASTM D 92 - Test for Flash and Fire Points by Cleveland Open Cup
ASTM D 3951 - Commercial Packaging, Standard Practice for

(Application for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

American Society of Heating Refrigerating And Air Conditioning Engineers, Inc. (ASHRAE):

ASHRAE 52 - Method of Testing Air Cleaning Devices Used in General Ventilation for Removing Particulate Matter

(Application for copies should be addressed to the American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc., 1791 Tullie Circle, NE, Atlanta, GA 30329.)

Underwriters Laboratories Inc. (UL):

UL 900 - Air Filter Units

(Application for copies should be addressed to the Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 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 Description. Filters shall be of the extended media area type for use in air conditioning, heating, and ventilating systems. Each filter assembly shall include, but not be limited to, the following basic components:

a. A permanent holding frame.
b. A preformed, sealed, and disposable cartridge of the pleated or extended area type.
c. A factory assembled side or bottom loading housing where so specified (see 3.7.1.2 and 3.7.2.2).
d. One direct reading draft gage per filter bank (see 3.8).

3.2 First article. When specified in the contract or purchase order (see 6.2), a sample shall be subjected to first article inspection (see 4.2.1 and 6.4).

3.3 Standard commercial product. The filters shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this specification but which are a part of the manufacturer's standard commercial product, shall be included in the filters being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs, or brochures, and represents the latest production model.

3.4 Materials. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. Unless otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this specification.

3.4.1 Zinc-coated steel. Galvanized and galvannealed sheet steel shall conform to ASTM A 525. The weight of zinc coating for galvanized steel media shall not be less than that specified in ASTM B 633 for type LS electroplate zinc coating.

3.4.2 Aluminum. Aluminum shall be an alloy conforming to the requirements of ASTM B 209. The alloy shall have mechanical properties, formability, and a surface finish suitable for the intended application.

3.4.3 Corrosion-resistant steel. Unless a particular type of corrosion-resistant steel is specified (see 6.2), corrosion-resistant steel shall conform to any of the 300- or 400-series of ASTM A 167 or A 176, as applicable.

3.4.4 Aluminized steel. Aluminum-coated steel sheets shall be coated with aluminum on both sides by the hot-dip process. The total weight of coating on both sides of the sheet shall be not less than .40 ounces per square foot (122 grams per square meter) of sheet.

3.4.5 Dissimilar metals. Joints between dissimilar metals, including bolts, nuts, rivets, and other fastenings and fittings shall be protected against galvanic corrosion by the proper selection of materials, plating isolation, insulation, area relationships or other means, providing equivalent protection.

3.5 Fire and casualty hazards. Filters shall meet the fire-resistant requirements of UL 900. Filters shall be either UL class 1 or UL class 2, at the option of the contractor, unless UL class 1 filters only are specified in the invitation for bids (see 6.2). Classifications under UL 900 shall be interpreted as follows:

a. Class 1 - Filters which, when clean, do not contribute fuel when attacked by flame and emit only negligible amounts of smoke.
b. Class 2 - Filters which, when clean, burn moderately when attacked by flame or emit moderate amounts of smoke or both.

Adhesive coatings used on filters shall have a flashpoint of not less than 325 degrees (o) Fahrenheit (163o Centigrade) as determined by ASTM D 92.

3.6 Health requirements. The media shall be nontoxic and without any detectable odor. The media shall have no adverse effect on the health of personnel handling same or on occupants of spaces served by the media. Questions pertinent to these effects shall be referred by the procuring activity to the appropriate medical authority who will act as an advisor to the procuring agency.

3.7 Construction. The equipment shall be designed and constructed to facilitate field maintenance. All adjustments and replaceable accessories shall be readily accessible. Conditions which can be hazardous to personnel or deleterious to equipment shall not be permitted.

3.7.1 Type I and II filters.

3.7.1.1 Holding frames. When specified (see 6.2), each filter shall be provided with a permanent holding frame. The permanent holding frame shall be manufactured of not less than 16-gage material as specified in 3.4. The permanent holding frame shall be equipped with suitable cartridge or media retainer clips along with cartridge supporting wirework and gaskets as required by design. There shall be no air leakage between the permanent holding frame and cartridge that may cause air to bypass the filter. The permanent holding frame shall be provided with matching rivet holes to facilitate installation. The dimensions of the holding frame shall be as specified in 3.11.

3.7.1.2 Filter housing. When specified (see 6.2), a factory assembled side or a bottom access filter housing(s) shall be provided. The housing(s) shall be manufactured of minimum 16-gage material as specified in 3.4. The housing(s) shall be completed with mating flanges, quick opening, double skin insulated or rigidly insulated access doors, and gasketed channels to provide a leakproof support for the filters. When specified (see 6.2), a nominal 2-inch prefilter track shall be provided.

3.7.1.3 Filter cartridge. Filter cartridge shall be a preformed, sealed, and disposable cartridge of the pleated or extended area type.

3.7.2 Type III filter.

3.7.2.1 Holding frame. When specified (see 6.2), each filter shall be furnished with a permanent holding frame. The frame shall be manufactured of not less than 16-gage material as specified in 3.4. The holding frame shall be equipped with suitable cartridge retainer clips. The dimensions of the holding frame shall be as specified in 3.11.

3.7.2.2 Filter housing. When specified (see 6.2), a factory assembled side or a bottom access filter housing(s), with a nominal 2-inch prefilter track, shall be provided. The housing(s) shall be manufactured of minimum 16-gage material as specified in 3.4. The housing(s) shall be completed with mating flanges, quick opening, double skins insulated or rigidly insulated access doors, support channels, positive edge seals, and a filter sealing mechanism to provide a leakproof installation for the filter.

3.7.2.3 Filter cartridge. A preformed, close-pleated replaceable type filter cartridge shall be provided. The filter cartridge shall consist of a frame, media, fire-retardant sealers, and a gasket on downstream face, where required, to prevent any air bypass leakage. If separators are provided, they shall be aluminum.

3.8 Draft gage. One direct reading draft gage shall be furnished with each filter bank complete with tips and necessary accessory items to provide zero adjustment and accurate operation.

3.9 Type I and II filters. Type I and type II filter performance requirements shall be as follows for each grade. Testing procedures and equipment shall be as specified in 4.5.1.

3.9.1 Pressure drop. Pressure drop shall be measured by the difference in pressure in the duct immediately before and after the filter.

3.9.1.1 Initial pressure drop. With clean filters, the average initial pressure drop of the nine filters, measured in inches water gage (wg) (Pascals (Pa)), shall not exceed the values listed at the specified rated airflow capacity, measured in cubic feet per minute (cfm) (cubic meters per hour (cu m/hr)).

	Rated Airflow		
Grade	1,500cfm(2,550cu m/hr)	2,000cfm(3,400cu m/hr)	2,500cfm(4,250 cu m/hr)
	inches wg (Pa)	inches wg (Pa)	inches wg (Pa)
A	0.25 (62.5)	0.30 (75.0)	0.40 (100.0)
B	0.25 (62.5)	0.35 (87.5)	0.45 (112.5)
C	0.40 (100.0)	0.45 (112.5)	0.55 (137.5)
D	0.55 (137.5)	0.60 (150.0)	0.65 (162.5)

3.9.1.2 Final pressure drop. The final pressure drop of each filter cartridge, when operated at rated airflow capacity, shall not exceed the following:

Grade	Rated Airflow: 1,500cfm (2,550 cu m/hr) inches wg	1,500cfm (2,550 cu m/hr) (Pa)	2,000cfm (3,400 cu m/hr) inches wg	2,000cfm (3,400 cu m/hr) (Pa)	2,500cfm (4,250 cu m/hr) inches wg	2,500cfm (4,250 cu m/hr) (Pa)
A	0.70	(175.0)	0.70	(175.0)	0.80	(200.0)
B	0.80	(200.0)	0.80	(200.0)	1.00	(250.0)
C	1.00	(250.0)	1.00	(250.0)	1.00	(250.0)
D	1.00	(250.0)	1.00	(250.0)	1.20	(300.0)

3.9.2 Average synthetic dust weight arrestance. The average synthetic dust weight arrestance shall not be less than the following:

Grade	Rated Airflow: 1,500cfm (2,550 cu m/hr) percent	2,000cfm (3,400 cu m/hr) percent	2,500cfm (4,250 cu m/hr) percent
A	85	85	85
B	94	94	94
C	98	99	99
D	100	100	100

3.9.3 Average dust spot efficiency. The average dust spot efficiency shall not be less than the following:

Grade	Initial Efficiency (percent)	Average Efficiency (percent)
A	Less than 20	Less than 20
B	Less than 20	35
C	58	76
D	78	88

3.9.4 Average dust holding capacity. The average dust holding capacity shall not be less than the following:

Grade	Rated Airflow: 1,500cfm (2,550 cu m/hr) grams	2,000cfm (3,400 cu m/hr) grams	2,500cfm (4,250 cu m/hr) grams
A	600	1000	1000
B	500	600	700
C	300	400	470
D	220	300	380

3.10 Type III filter.

3.10.1 Initial pressure drop. With clean filters, the initial pressure drop shall not exceed the values listed at the given rated air flow capacity. (In no case shall media velocity exceed 11 feet per minute.)

Grade	Rated Airflow: 6-inch depth 650cfm (1,105 cu m/hr) inches wg	6-inch depth 650cfm (1,105 cu m/hr) (Pa)	12-inch depth 1,000cfm (1,700 cu m/hr) inches wg	12-inch depth 1,000cfm (1,700 cu m/hr) (Pa)
E	1.0	(250.0)	1.0	(250.0)
F	1.0	(250.0)	1.0	(250.0)

3.10.2 Final pressure drop. The final pressure drop of each filter, when operated at rated capacity, shall not exceed the following:

Grade	Rated Airflow 6-inch depth 650cfm(1,105 cu m/hr)	Rated Airflow 12-inch depth 1,000cfm(1,700 cu m/hr)
	inches wg (Pa)	inches wg (Pa)
E	2.0 (500.0)	2.0 (500.0)
F	2.0 (500.0)	2.5 (625.0)

3.10.3 Efficiency. The efficiency of the type III filters shall be determined in accordance with MIL-STD-282 using 0.3 micron particle of thermally generated DOP smoke and shall not be less than the following:

Grade	Initial Efficiency
	percent
E	95
F	99.97

3.11 Dimensions. Unless otherwise specified (see 6.2), the actual outside face dimensions of the holding frame shall be 24 inch by 24 inch (610 millimeters (mm) by 610 mm) and with the depth as manufacturer's standard. The nominal face dimensions of the filter cartridge shall be 23.5 inch by 23.5 inch (598 mm by 598 mm) with the depth as required by design to comply with the requirements as specified in 3.7. The actual face dimension of the cartridge shall be not less than 1/4 inch (6 mm) in either width or length from the nominal media face dimensions (for grades A through E). Grade F filter cartridge dimension shall be 24.0 inch (610 mm) by 24.0 inch (610 mm), +0 inch (+0 mm), -1/16 inch (-2 mm), including the header frame, and depth as required by design.

3.12 Interchangeability. All air filter units of the same classification furnished with similar options under a specific contract shall be identical to the extent necessary to insure interchangeability of component parts, assemblies, accessories, and spare parts.

3.13 Treatment and painting. Unless otherwise specified (see 6.2), when media frames, holding frames, and housings are furnished they shall be treated and painted in accordance with the manufacturer's standard practice. All surfaces of the frames or housings, other than corrosion-resisting steel, shall be protected against corrosion and present a neat appearance.

3.14 Marking.

3.14.1 Commercial marking. Each filter shall be marked with the following:

a. The name or trade name of the manufacturer or vendor.
b. A distinctive model number, catalog designation, or equivalent marking.

If a manufacturer produces air-filter units of the same model at more than one manufacturing facility, each filter shall have a distinctive marking. Such markings shall identify the filter as the product of a particular facility and may be in code.

3.14.2 Military marking. When specified (see 6.2), additional Military marking for each filter shall be furnished. Military marking shall be as permanent as the normal life expectancy of the filter, and shall include the applicable National Stock Number and such other essential information as may be specified or approved by the procuring activity. Letters, numerals, and other characters shall be such as to be clearly legible.

3.15 Workmanship.

3.15.1 Steel fabrication. The steel used in fabrication shall be free from kinks, sharp bends, and other conditions which would be deleterious to the finished product. Manufacturing processes shall not reduce the strength of the steel to a value less than intended by the design. Manufacturing processes shall be done neatly and accurately. All bends shall be made by controlled means to insure uniformity of size and shape.

3.15.2 Bolted connections. Boltholes shall be accurately punched or drilled and shall have the burrs removed. Washers or lockwashers shall be provided in accordance with good commercial practice, and all bolts, nuts, and screws shall be tight.

3.15.3 Riveted connections. Rivet holes shall be accurately punched or drilled and shall have the burrs removed. Rivets shall be driven with pressure tools and shall completely fill the holes. Rivet heads, when not countersunk or flattened, shall be of approved shape and of uniform size for the same diameter of rivet. Rivet heads shall be full, neatly made, concentric with the rivet holes, and in full contact with the surface of the member.

3.15.4 Welding. Welding procedures shall be in accordance with a nationally recognized welding code. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Welds shall be of sufficient size and shape to develop the full strength of the parts connected by the welds. Welds shall transmit stress without permanent deformation or failure when the parts connected by the weld are subjected to proof and service loadings.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this document where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this document shall not relieve the contractor of the responsibility of ensuring that all products or supplies

submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements specified herein and in applicable referenced documents.

4.1.3 Standards compliance. The contractor shall make available to the contracting officer or his authorized representative evidence of compliance with the applicable standard(s) cited in 3.5. The Government reserves the right to examine and test all filters to determine the validity of the certification.

4.1.4 Certification.

4.1.4.1 Certification for grade A, B, C, and D type filters. The contractor shall submit an individual test report for each grade A, B, C, and D type filters, prepared by an independent testing laboratory with test equipment specified in ASHRAE 52 using a 24.5 inch by 24.5 inch (622 mm by 622 mm) duct section for the filter under test and acceptable to the contracting officer, indicating that the filters comply with the requirements of 3.9. All filters tested shall have been procured by the independent testing laboratory from the open market independent of the manufacturer's knowledge of these filters. The procurement procedure used by the independent laboratory may be reviewed by the procurement activity upon request. The following applicable data shall be recorded for each filter or assembly tested:

a. The results obtained by the independent laboratory of the performance tests, as required in 4.5.
b. Media area in net effective square feet (square meters).
c. The type and physical characteristics of the filter backer mat material employed.
d. The number of pleats and their individual length, widths, and height.
e. The method of securing pleat sides in a pleat form.

    (1) Type of fasteners used with a physical description of same.
    (2) Number of rows of fasteners and the number of fasteners per row.
    (3) The sealing method used on fasteners and other penetrations of media.

f. A full description of media employed as to the type of fiber, approximate fiber size, thickness of media, and dispersement of fibers.
g. The percentage of open area of the face plate and description of the face plate construction.
h. A description of the filter sag, if any, during testing.
i. A description of methods by which tested filter was procured by the independent testing laboratory.

4.1.4.2 Certification for grade E and F type filters. The manufacturer shall submit certification that grade E and F filters are subjected to Quality Assurance procedures which include periodic tests in accordance with MIL-STD-282, to verify the filters meet the performance requirements of 3.10. This is to be done on DOP (dioctyl phthalate) smoke penetration test equipment for high efficiency particulate air filter production.

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

a. First article inspection (see 4.2.1).
b. Quality conformance inspection (see 4.2.2).

4.2.1 First article inspection. The first article inspection shall be performed on each type and grade of filter specified when a first article is required (see 3.2 and 6.2). This inspection shall include the examination of 4.4 and the tests of 4.5. The first article may be either a first production item or a standard production item from the supplier's current inventory provided the item meets the requirements of the specification and is representative of the design, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

4.2.2 Quality conformance inspection. The quality conformance inspection shall include the examination of 4.4, the tests of 4.5, and the packaging inspection of 4.6. This inspection shall be performed on the samples selected in accordance with 4.3.

4.3 Sampling. Sampling and inspection procedures shall be in accordance with MIL-STD-105. The unit of product shall be one filter. All filters offered for delivery at one time shall be considered a lot for the purpose of inspection.

4.3.1 Sampling for examination. Guidance for inspection level and an Acceptable Quality Level (AQL) as specified (see 6.5).

4.3.2 Sampling for packaging inspection. The sample unit shall be one unit prepared for shipment. Guidance for inspection level and an Acceptable Quality Level (AQL) as specified (see 6.5).

4.4 Examination. Each filter shall be examined for compliance with the requirements specified in section 3 of this specification. 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 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.

4.5 Performance tests.

4.5.1 Type I and type II filters. The tests conducted to determine filter performance for each grade shall be as follows. Testing procedures and equipment shall be as specified in ASHRAE 52, and shall be conducted only on full size (24 inch by 24 inch (610 mm by 610 mm) nominal header) units for each specified filter at their rated airflow.

4.5.1.1 Initial resistance test. Initial resistance tests shall be performed in accordance with the following preparatory arrangements.

a. Nine individual filters for each grade shall be tested for initial resistance at 50, 75, 100, and 125 percent of rated air flow. The initial resistance at each air flow will be recorded. With clean filters, the initial pressure drop shall not exceed the values listed in 3.9.1.1 at the specified rated airflow capacity.
b. The nine test filters shall be tested as a unit (3 units wide and 3 units high) according to ASHRAE 52 (Initial Resistance vs. Airflow) at 50, 75, 100, and 125 percent of the rated airflow. The initial resistance at each airflow will be recorded.
c. Three samples, representing the lowest initial resistance, the highest initial resistance, and the filter that matches the nine bank initial resistance, shall be taken from this group and shall be tested as specified herein. The tests shall be conducted to the maximum final pressure drop specified in 3.9.1.2 at the specified rated airflow capacity.

4.5.1.2 Average synthetic dust weight arrestance test. The three filters specified in 4.5.1.1c shall be tested per ASHRAE 52 for synthetic dust weight arrestance. The average of these three arrestances shall not exceed the values specified in 3.9.2.

4.5.1.3 Average dust spot efficiency. The three filters specified in 4.5.1.1c shall be tested per ASHRAE 52 for dust spot efficiency. The average of these three efficiencies shall not exceed the values specified in 3.9.3.

4.5.1.4 Average dust holding capacity. The three filters specified in 4.5.1.1c shall be tested per ASHRAE 52 for dust holding capacity. The average of these three capacities shall not exceed the values specified in 3.9.4.

4.5.2 Type III filters. Performance test shall be conducted on one filter of each type and grade of filter to determine conformance to 3.10. The laboratory conditions and testing methods shall be in accordance with MIL-STD-282 as specified in 3.10. Failure of the filter to meet the test shall constitute cause for rejection.

4.6 Preparation for delivery inspection. The preservation, packaging, packing, and marking of the item shall be inspected to verify conformance to the requirements of section 5.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or commercial, as specified (see 6.2).

5.1.1 Level A. The complete filters shall be preserved and packaged in accordance with method III of MIL-P-116.

5.1.2 Commercial. Material shall be preserved in accordance with ASTM D 3951.

5.2 Packing. Packing shall be level A, B, or C as specified (see 6.2).

5.2.1 Levels A and B. Packing shall be in accordance with MIL-STD-2073-1 for the applicable level specified. Containers shall be selected from table VII for the appropriate level. Open crates shall not be used for Level A packing.

5.2.2 Commercial. Material shall be packed in accordance with ASTM D 3951.

5.3 Marking.

5.3.1 Military agencies. Shipments to military agencies shall be marked in accordance with MIL-STD-129.

5.3.2 Civil agencies. Shipments to civil agencies shall be marked in accordance with FED-STD-123.

6. NOTES

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

6.1 Intended use. Filters covered by this specification are intended for use in ventilation, air conditioning, and heating systems to remove particulate matter found in the atmosphere.

6.2 Acquisition Requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Filter type and grade (see 1.2).
c. Issue of document required, if different than as specified (see 2.1.1).
d. When a first article is required for inspection and approval (see 3.2, 4.2.1, and 6.4).
e. When particular materials are required for media holding frames and filter housings (see 3.4.3, 3.7.1.1, 3.7.1.2, 3.7.2.1, and 3.7.2.2).
f. When UL class 1 filters only shall be furnished (see 3.5). NOTE: Consult the UL Building Material List for types under 1.2 to which a UL class 1 rating applies.
g. When a permanent holding frame for each filter is required (see 3.7.1.1 and 3.7.2.1).
h. When filter housing is required with a side or bottom access as required by the contracting officer (see 3.7.1.2 and 3.7.2.2).
i. When type II filter housing shall be provided with prefilter track (see 3.7.1.2).
j. Dimensions of the holding frame, if other than specified (see 3.11).
k. When treatment and painting is to be other than specified (see 3.13).

l. When Military marking is required and the information to be included (see 3.14.2).
m. Level of preservation, packaging and level of packing required (see 5.1 and 5.2).

6.3 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DoD Federal Acquisition Regulations (FAR) Supplement, Part 27, Sub-Part 27.475-1 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data should be delivered by the contractor in accordance with the contract or purchase order requirements.

6.4 First article. When a first article inspection is required, the item will be tested and should be a first production item or it may be a standard production item from the contractor's current inventory as specified in 4.2.1. The first article should consist of the number of filters as required in 4.5 of this specification. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, test, and approval of the first article.

6.5 Sampling procedures.

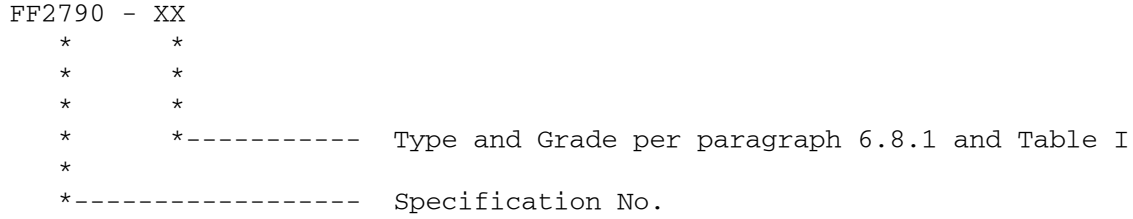
6.5.1 Sampling for examination. Recommended Inspection Level is II and Acceptable Quality Level is 4.0 percent defective (see 4.3).

6.5.2 Sampling for packaging inspection. Recommended Inspection Level is II and Acceptable Quality Level is 4.0 percent defective (see 4.3).

6.6 Improved design and material. It is not the intent of this specification to prohibit the procurement of filters incorporating newly developed designs and materials having greater reliability, less maintenance and longer life than those specified herein, provided that such designs and materials have been evaluated and approved for use in filters.

6.7 Supersession data. This specification supersedes MIL-F-29177A dated 8 March 1985.

6.8 Part or Identifying Number (PIN). The PIN to be used for filters acquired to this specification are created as follows:



6.8.1 Types and grades. The type and grade of the filters are identified by a two character code as shown in Table I.