

[INCH-POUND]
F-F-320C
June 26, 1998
SUPERSEDING
F-F-320B
June 23, 1985

FEDERAL SPECIFICATION

FILTERS, ELECTRONIC AIR CLEANING, IONIZING PLATE TYPE

The General Services Administration has authorized the use of this specification by all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers electronic air cleaning filters having ionizing sections and charged, plate-type collector sections, designed for use in nonresidential air cleaning systems.

1.2 Classification. The filter units shall be of the following types, styles, classes, groups, and size, as specified (see 6.2):

- Type I - Oiled-plate type with traveling or oscillating washwater and adhesive-oil system, ionizing type.
- Type II - Dry-plate type with washwater/detergent system and permanent after-filters, ionizing type.
- Type III - Dry-plate type with disposable after-filter media, ionizing type.

- Style A - Roll-type filter, vertical, standard type.
- Style B - Roll-type filter, vertical, compact design.
- Style C - Roll-type filter, horizontal.
- Style D - Extended media-type, stationary filter.

- Class 1 - Standard efficiency.
- Class 2 - High efficiency.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data which may improve this document should be sent to Officer in Charge, Seabee Logistics Center (Code 15E2), 4111 San Pedro Street, Port Hueneme, CA 93043-4410, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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- Group 1 - Factory-assembled units.
- Group 2 - Field-assembled units.
- Size - 1,000 to 175,000 cubic feet per minute (cfm) (0.47 cubic metre per second (m³/s) to 82.59 m³/s).

2. APPLICABLE DOCUMENTS

2.1 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

AIR-CONDITIONING AND REFRIGERATION INSTITUTE (ARI)

- ARI 850 - Standard for Commercial and Industrial Air Filter Equipment.

(Private sector and civil agencies may purchase copies of this voluntary standard from the Air-Conditioning and Refrigeration Institute, 4301 North Fairfax Drive, Suite 425, Arlington, VA 22203.)

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.

(Private sector and civil agencies may purchase copies of this voluntary standard from the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., 1791 Tullie Circle, NE, Atlanta, GA 30329.)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

- NFPA 70 - National Electrical Code.
- NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.

(Private sector and civil agencies may purchase copies of these voluntary standards from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269-0901.)

UNDERWRITERS LABORATORIES, INC. (UL)

- UL 867 - Electrostatic Air Cleaners.
- UL 900 - Test Performance of Air Filter Units.

(Private sector and civil agencies may purchase copies of these voluntary standards from the Underwriters Laboratories, Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.)

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(DoD activities may obtain copies of those adopted voluntary standards listed in the DoD Index of Specifications and Standards free of charge from Defense Automated Printing Services, Attn: DoDSSP, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 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. The filter units shall consist essentially of electronic ionizing-type, particulate collecting cells, sheet metal enclosure panels, power pack(s), and additional devices or systems for washing away or storing collected particulate accumulations. Group 1 units shall be factory-assembled except for the power pack and wash systems, which may be shipped unmounted at the option of the supplier. Group 1 units shall be designed for floor mounting unless suspension mounting is specified (see 6.2). Group 2 units shall be shipped with all components necessary for field assembly at the site, including the following:

- a. The ionizing-collecting cells.
- b. Power pack(s).
- c. Top and side enclosure panels.
- d. Safety interlocks.
- e. Warning signs.
- f. After-filters.
- g. Fasteners and miscellaneous hardware.

3.1.1 Type I. Type I units shall be equipped with one or more motorized, traveling, or oscillating manifold(s), to spray washwater and apply adhesive-oil. The manifold(s) shall be of adequate size to provide proper distribution of the washwater and adhesive-oil. The water and adhesive systems shall be complete with all necessary piping, spray arms or nozzles, flexible hoses, electric motor drives, adhesive pump with suction hose, and specified controls.

3.1.2 Type II. Type II units shall be equipped with a fixed, traveling, or oscillating washwater manifold(s) as required to provide full, effective spray coverage of the collector cells. The washwater manifold(s) shall also serve to distribute a pumped detergent over the plate surfaces prior to or during the wash cycle. As an alternative, a separate detergent manifold may be used. A detergent pump with suction hose shall be furnished with each unit. The manifold(s) shall include a separate connection for the detergent line. When specified (see 6.2), group 1 units with fixed manifolds, having capacities of 3,000 cfm (1.41 m³/s) or less, may be provided with a detergent dispenser or pump.

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3.1.3 Type III. For type III units, the ionizing-collecting cells shall serve to build up concentrations of agglomerated dust particles. The dust particles, after dislodgment from the plates by the moving airstream, shall be collected by the disposable after-filter. The roll-type after-filter in style A and style C units shall be located in a filter housing attached directly to the ionizing-collecting cell enclosure. For style B units, the ionizing-collecting cells shall be nested between the upper and lower media rolls in a single housing to form a compact unit not greater than 24 inches (609.6 millimetre (mm)) in depth (front to back).

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

3.3 Codes and standards. The after-filters shall conform to the requirements of UL 900 for UL class 1 or UL class 2 filters as applicable. In addition, when specified (see 6.2), filter units shall conform to the requirements of UL 867.

3.3.1 Certification. Prior to approval of the sample unit submitted for first article inspection, or if a sample unit is not required under terms of the contract, prior to the first shipment, the supplier shall submit to the contracting officer or his authorized representative satisfactory evidence that the after-filters and filter units meet UL requirements. Acceptable evidence of meeting these requirements shall be the UL listing and marking authorized by Underwriters Laboratories, Inc., or a certified test report from a nationally recognized independent testing laboratory, selected by the supplier and approved by the contracting officer. The report shall state that an after-filter and filter unit of the same model being furnished under this specification has been examined and tested and meets the requirements of UL 900 and, when applicable, UL 867.

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

3.4.1 System of measurement. The dimensions used in this specification are not intended to preclude the use of the metric system of measurement in the fabrication and production of the material, individual parts, and finished product, provided form, fit, and function requirements are satisfied.

3.5 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 is allowed under this specification.

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3.5.1 **Metals.** Metals shall be corrosion-resistant or shall be suitably processed to resist corrosion. Dissimilar metals shall not be used in intimate contact unless they have been suitably protected against electrolytic corrosion. Where it is necessary that any combination of such dissimilar metals be assembled, an interposing material compatible to each shall be used. Coated metal parts shall not be used where the electrical resistance of the surface due to the protective finish has a deleterious effect on electrical performance. Galvanized sheet metal shall be a commercial grade with a total zinc coating (both sides) of not less than 1.25 ounces per square foot (381 grams per square metre).

3.6 **Design.** The filter units covered by this specification shall be designed for horizontal or vertical airflow in air-conditioning and ventilating systems covered by NFPA 90A. Group 1 units shall be of the side access design in which the collecting cells can be removed through an access panel or door on one side of the unit. When facing the unit in the direction of the air flow, access shall be either on the left or right side, as specified (see 6.2). Group 1 units shall be leg-mounted or pedestal-mounted. The units shall be furnished with an integral drain pan and a drain connection(s) of sufficient size to handle the rated volume of washwater at supply pressures to 75 pound-force per square inch gage (psig) (517 kilopascal gage (kPa (gage))). Group 2 units shall be designed for installation in a duct system wherein access to the front and rear of the units is provided through doors supplied and located in adjoining duct sections by the installing contractor. The components of group 2 units shall be designed for assembly at the site without the use of special tools. The wash systems for both group 1 and group 2 units shall operate effectively at water supply pressures at the manifold connection as low as 30 psig (207 kPa (gage)). The design of the filter units shall be such as to protect against or prevent conditions which would be hazardous to personnel or deleterious to the units. When project drawings accompany the solicitation for bids, additional design details relating to the specific installation of the filter unit shall be as specified in the drawings.

3.7 **Performance.** The size of the filter units shall be designated by the rated capacity of standard air, expressed in cfm (m^3/s), which the units are designed to handle (see table I). When tested as specified in 4.4.2, the average atmospheric dust spot efficiency at rated capacity shall be not less than the applicable efficiency specified in table I. The mean rate of air movement through the gross face area of the filter unit at rated capacity and efficiency shall be not less than the applicable face velocity specified in table I. The initial resistance of the clean filter units at rated airflow rates with after-filters in place shall be not greater than the resistance specified in table I. The range of capacities for each group, type, style, and class shall also be as specified in table I.

3.7.1 **Ozone level.** The ozone concentration in the effluent air of the filter units shall be not greater than 0.050 parts per million when tested in accordance with ARI 850.

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TABLE I. Performance requirements.

Group	Factory-assembled (group 1)			Field-assembled (group 2)					
Type	I	II	III	I	II	III			
Style	-	-	C	-	-	A	B	C	D
Class	-	-	-	-	-	-	-	-	1 2
Minimum rated face velocity, ft/min (m/s)	400 (2 032)	400 (2 032)	400 (2 032)	400 (2 032)	400 (2 032)	400 (2 032)	400 (2 032)	400 (2 032)	400 (2 032)
Minimum efficiency at rated capacity and face velocity	90	90	90	90	90	90	90	90	90
Maximum initial resistance with after-filters in place, inches (mm) water gage	0.25 (6.35)	0.25 (6.35)	0.50 (12.70)	0.25 (6.35)	0.25 (6.35)	0.25 (6.35)	0.50 (12.70)	0.50 (12.70)	0.60 (15.24)
Range of capacities, cfm (m ³ /s)	1,000 to 40,000 cfm (0.47 to 18.88 m ³ /s)			1,000 to 175,000 cfm (0.47 to 82.59 m ³ /s)					

3.8 Details of components.

3.8.1 Enclosure panels. Group 1 units shall be housed in a factory-assembled cabinet which includes top and side panels, a base mounting, and for units with washwater systems, a drain pan. Side access doors or detachable panels shall be provided to permit removal of the collector cells. Sheet metal panels and the drain pan shall have a thickness of not less than 18 gauge (1.27 mm). Group 2 units shall be furnished with side panels and a top plate for assembly at the site. The group 2 panels shall have a thickness of not less than 16 gauge (1.59 mm). Enclosure panels for both group 1 and group 2 units shall be galvanized sheet steel unless alternate materials or protective coatings are authorized under the contract (see 6.2). Cabinets for group 1 units shall be equipped with slide rails to facilitate end removal of the cells.

3.8.2 Ionizing-collecting cells. The ionizing-collecting cells shall be of the two-stage electrostatic type. The cell shall consist of an ionizing section and a section composed of alternately grounded and charged plates on which the particulate matter is collected. The cells shall be designed to permit disconnection or removal of one cell without affecting the remaining cells in the bank. The physical separation between the collector plates shall be sufficient to withstand the design potential of the power supply under all normal operating conditions. Where a potential difference exists between the ionizing grid and the collector plates, a physical separation sufficient to withstand this differential under rated operating conditions shall be incorporated in the design.

3.8.3 Power packs. Each filter unit shall be supplied with a power pack(s) of proper quantity and size to convert the specified primary power to the required secondary voltages and current outputs for the ionizing and plate sections. Typical voltages for the ionizing and plate sections are 12,000 and 6,000 volts direct current, respectively. Each power pack shall be equipped with:

- A power pilot-light.
- A current-indicating device in the secondary circuit.
- Overload protection that provides automatic shutoff in the event of a dead short circuit, but permits continuous operation under temporary overload or momentary short circuit.

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- d. A means of adjustment for maintenance of the required secondary output under conditions of variable line voltage and loading.
- e. All necessary high voltage cables and connectors.

A safety switch interlock system(s) shall also be provided to automatically deenergize the equipment when any access door or access panel of the filter enclosure or power pack is opened. The system shall also prevent opening of such doors or panels until the equipment has been deenergized. Each power pack shall be enclosed in a sheet metal housing and shall be conspicuously labeled to indicate high voltage. High voltage warning signs for filter access doors and panels shall also be furnished with each unit.

3.8.3.1 Primary power circuits. Primary power circuits shall not be directly grounded. When capacitive type of grounding is necessary, such capacitance shall be as small as practicable. Leads from primary power source supplies shall be individually protected against damaging overload between the service connection and any other part of the system, equipment, or unit, as applicable.

3.8.3.2 Overload protection. Protective devices shall be provided within the equipment for primary circuits and such other circuits as required for protection of the equipment from damage due to conditions such as overload and heating due to dirt and humidity. All parts which are likely to carry overload, due to dirt or excessive humidity, shall be designed to withstand the overload. Where this is impracticable, circuit breakers, relays, fuses, or other devices shall be included to protect the affected parts. The use of secondary protective devices shall be held to a minimum consistent with good engineering practice.

3.8.3.3 Wiring. Wiring, conductors, conduit, control enclosures, and other components of the equipment's electrical system shall conform to and be installed in accordance with provisions of NFPA 70.

3.8.3.4 Power characteristics. Unless otherwise specified (see 6.2), the units shall be designed for operation on a nominal 115-volt, 60-hertz, power supply.

3.9 After-filters. Each unit shall be equipped with permanent, panel-type filters; disposable, roll-type filters; or disposable, extended media-type filters in accordance with the specified type and style of filter unit.

3.9.1 Panel-type filters. Type I and type II units shall be equipped with after-filters which shall also serve as spray eliminators during the washing cycle. The after-filters shall be of the permanent, cleanable type, and shall be constructed with corrosion-resistant metal frames and media.

3.9.2 Roll-type filters. The media for roll-type filters shall be progressively dense glass fibers having a nominal thickness during exposure to the airstream of not less than 0.50-inch (12.7 mm). The media shall be reinforced on the air-leaving side by a wire or scrim backing to prevent necking and shedding. The media shall be charged with an adhesive which will not flow

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in storage when subjected to temperatures up to 210 degrees Fahrenheit (99 degrees Celsius) and shall be UL-listed as specified in 3.3. The media roll shall be not less than 65 feet (19.81 m) long. The filter section shall include:

- a. A drive assembly with motor overload protection.
- b. An adjustable timer control.
- c. A media runout switch.
- d. An indicating light.
- e. A spring-loaded pressure plate to ensure recompression as the media rewinds.
- f. A full roll of clean media.

3.9.3 Extended media-type filters. Type III, style D filters shall be of the stationary, multiple-pocket, replaceable cartridge type held in place by corrosion-resistant holding frames. The media shall be glass or acrylic fibers or a combination thereof and shall be dry or adhesive coated in accordance with the manufacturer's standard practice. An initial supply of filter cartridges shall be furnished with filter units. The ratio of total media area to face area shall be not less than 35 to 1 for class 1, standard efficiency filters and 20 to 1 for class 2, high efficiency filters.

3.10 Wash system controls. Type I and type II units shall be equipped with one of the following wash control systems, as specified (see 6.2):

- a. Manual.
- b. Semiautomatic.
- c. Automatic.

3.10.1 Manual. For manual controls, the system fan and unit power pack(s) shall be deenergized by the operator. The water supply control valve shall then be manually opened and the drive motor for traveling manifolds manually energized. The washing cycle shall continue until it is manually terminated. Adhesive application on type I units and detergent dispensing on type II units shall also be accomplished by manual actuation of the pumps and, when applicable, the manifold drive.

3.10.2 Semiautomatic. Units with semiautomatic controls shall be equipped with a washwater solenoid valve, strainer, and control system. The following sequence of operations shall occur automatically when the control switch is manually actuated:

- a. The system fan and power pack(s) shall be deenergized. (The controls shall contain provisions for interlocking the system fan with the filter unit controls at the site at the time of installation.)
- b. For type II units, the detergent pump and, when applicable, drive motor for moving manifolds, shall be energized for a timed detergent application period followed by a timed soaking period.
- c. The washwater solenoid valve shall then open and the drive motors for washwater manifolds on type I units shall be energized.

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- d. A timed drain period, as recommended by the manufacturer, shall follow the wash cycle. If recommended by the manufacturer to expedite drying, the system controls shall function to energize the fan.
- e. On type I units, the adhesive pump and drive motor for the adhesive manifold shall be energized for a timed adhesive application period followed by a timed drain period.
- f. Completion of all phases of wash, adhesive application, and drying or drain cycles shall be signaled by an indicator light on the power pack, control box, or manifold housing.

3.10.3 Automatic. Automatic controls for type I and type II units shall be as specified in 3.10.2 except that the control system shall include a clock timer. The timer shall be designed and connected to automatically initiate the sequence of operations specified in 3.10.2 at any preselected interval up to seven days or to six weeks, as specified (see 6.2).

3.11 Accessories. When specified (see 6.2), one or more of the following accessories and supplies shall be furnished:

- a. Aluminum, wire-mesh trash screen assembly.
- b. Baffles to ensure even distribution of air over the face of the collector cell bank.
- c. Prefilter assembly.
- d. Spare ionizing wire in quantities specified.
- e. Adhesive oil in quantities specified.
- f. Extra rolls or cartridges for after-filter units on type III units.

Additional requirements for any of the above accessories or supplies shall be as specified in the contract (see 6.2).

3.12 Identification marking. Identification shall be permanently and legibly marked directly on the filters or on a corrosion-resisting metal plate securely attached to the filter at the source of manufacture. Identification shall include the manufacturer's model and serial number, name, and trademark to be readily identifiable to the manufacturer.

3.13 Treatment and painting. Unless otherwise specified (see 6.2), the filter units shall be treated and painted in accordance with the manufacturer's standard practice. All surfaces of the filter units other than corrosion-resisting steel shall be protected against corrosion and present a neat appearance.

3.14 Instruction plates. The filters shall be equipped with instruction plates suitably located, describing any special or important procedures to be followed in operating and servicing the equipment. Plates shall be of a material which will last and remain legible for the life of the equipment. Plates shall be securely affixed to the equipment with nonferrous screws or bolts of not less than 0.125-inch (3.175 mm) diameter.

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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 ensure uniformity of size and shape.

3.15.2 Bolted connections. Bolt holes 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 weld are subjected to proof and service loadings.

3.15.5 Castings. All castings shall be sound and free from patching, misplaced coring, warping, or any other defect which reduces the casting's ability to perform its intended function.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract, the contractor may use his 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 the specification, where such inspections are deemed necessary to ensure that supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must 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

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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 requirements specified herein and in applicable referenced documents.

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).
- c. On-site inspection (see 4.2.3).

4.2.1 First article inspection. The first article inspection shall be performed on filters when a first article is required (see 3.3, 6.2 and 6.3). This inspection shall include the examination of 4.3 and the tests of 4.4. 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 4.3 and the tests of 4.4.

4.2.3 On-site inspection. When specified (see 6.2), inspection shall be performed at the site after installation. This inspection shall be in addition to quality conformance inspection at the factory and shall be supplemental to first article inspection, if such inspection is specified. On-site inspection shall consist of all examinations and tests deemed necessary by the procuring activity to verify compliance with the requirements of this specification. On-site inspection shall be performed by the filter manufacturer or the installing contractor, as specified (see 6.2). The manufacturer shall have the privilege of representation at tests performed by others. Detailed requirements and schedule for the on-site tests shall be as specified in the contract or order (see 6.2).

4.3 Examination. Each filter selected shall be examined for compliance with the requirements specified in section 3 of this document. 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.

4.4 Tests. The first article shall receive the tests of 4.4.1 and 4.4.2. Each production unit shall receive the test of 4.4.1. Failure to pass any test shall constitute cause for rejection.

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4.4.1 Operational test. Each group 1 unit shall be operated for not less than one hour to verify that all controls, meters, indicating lights, and safety controls function properly and that no arcing or current leakage occurs between live and grounded parts. Components for group 2 units shall be checked individually to verify that performance after assembly at the site will meet the requirements of this specification. Group 2 units may be factory-assembled and tested as a unit at the option of the manufacturer, and then dismantled for shipment.

4.4.2 Performance test. The first article sample, when required, shall be tested to verify compliance with the performance requirements of 3.7 and 3.7.1. The tests shall be conducted at the voltage setting recommended by the manufacturer at the specified airflow rate in cfm (m^3/s). Arrestance efficiency determinations shall be made as specified in ASHRAE 52 using atmospheric air. The test shall also verify compliance with the requirements of 3.8.2 relating to collector cell performance and, when applicable, with requirements relating to wash, adhesive, and detergent systems.

5. PACKAGING

5.1 Packaging requirements. The preservation, packing, and marking shall be as specified in the contractor or order.

6. NOTES

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

6.1 Intended use. The equipment covered by this specification is intended for use in nonresidential air cleaning systems for removing dust, smoke particles, and other particulate matter ranging in size down to 0.01 micrometre.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this document.
- b. Types, styles, classes, groups, and size required (see 1.2).
- c. When group 1 units are to be designed for suspension mounting (see 3.1).
- d. When a detergent dispenser or pump will be acceptable on type II, group 1 units of 3,000 cfm ($1.41 \text{ m}^3/\text{s}$) or less (see 3.1.2).
- e. When a first article is required (see 3.2, 4.2.1, and 6.3).
- f. When conformance with UL 867 is required (see 3.3).
- g. Whether access for group 1 units is on the right or left side (see 3.6).
- h. When alternate materials or protective coatings for the enclosure panels are to be authorized (see 3.8.1).
- i. When units are to be designed for operation on a power supply other than as specified (see 3.8.3.4).
- j. Type of wash control system required for type I or type II units (see 3.10).

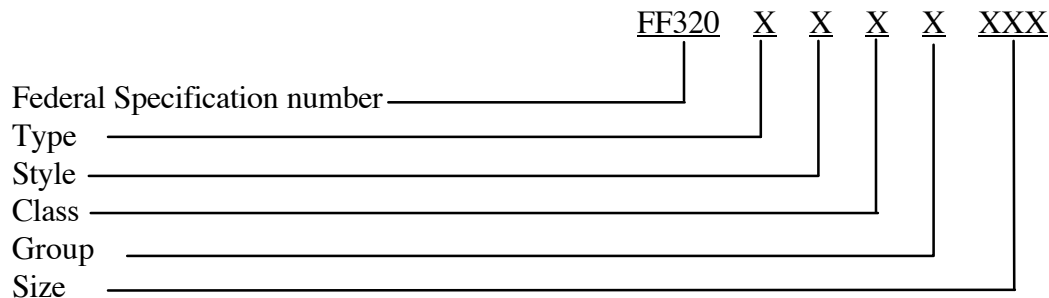
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- k. Whether the maximum interval setting for the timer is to be seven days or to six weeks (see 3.10.3).
- l. Type and quantity of accessories or supplies required, if any, and supplementary requirements therefore (see 3.11).
- m. When treatment and painting are to be other than as specified (see 3.13).
- n. When on-site inspection is required (4.2.3).
- o. When required, whether on-site inspection is to be performed by the installing contractor or the filter manufacturer (see 4.2.3).
- p. Detailed requirements and schedule for on-site tests, when required (see 4.2.3).

6.3 First article. When a first article inspection is required, the item will be tested and should be a first article sample 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 one unit. The contracting officer should include specific instruction in acquisition documents regarding arrangements for examination, test, and approval of the first article.

6.4 Classification cross reference. Classifications used in this specification (see 1.2) are identical to those found in the superseded Federal Specification F-F-320B.

6.5 Part or identifying number (PIN). The specification number, type, style, class, group, and size are combined to form PINs for filters covered by this document (see 1.2). PINs for the filters are established as follows:



6.5.1 Cataloging data. For cataloging data purposes, PIN code numbers for filters are assigned as follows:

1 = Type I
 2 = Type II
 3 = Type III

A = Style A
 B = Style B
 C = Style C
 D = Style D

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1 = Class 1

2 = Class 2

1 = Group 1

2 = Group 2

CFM = Size example: 1,000 cfm ($0.47 \text{ m}^3/\text{s}$) = Size 001
175,000 cfm ($82.59 \text{ m}^3/\text{s}$) = Size 175

6.6 Subject term (key word) listing.

Ionizing sections

Roll-type filter

Stationary filter

MILITARY INTERESTS:

Custodians:

Navy - YD1

Air Force - 99

Review Activities:

Air Force - 84

DLA - CC

CIVIL AGENCY COORDINATING ACTIVITY:

GSA-FSS

Preparing Activity:

Navy - YD1

(Project 4460-0066)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER
F-F-320C

2. DOCUMENT DATE (YYMMDD)
980626

3. DOCUMENT TITLE

FILTERS, ELECTRONIC AIR CLEANING, IONIZING PLATE 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)*

d. TELEPHONE *(Include Area Code)*
(1) Commercial
(2) AUTOVON
(if applicable)

7. DATE SUBMITTED
(YYMMDD)

8. PREPARING ACTIVITY

a. NAME

DANNY MUI

b. TELEPHONE *Include Area Code)*

(1) Commercial 805-982-5666 (2) AUTOVON 551-5666

c. ADDRESS *(Include Zip Code)*

OFFICER IN CHARGE, SEABEE LOGISTICS CENTER
CODE 15E2, 4111 SAN PEDRO ST.
PORT HUENEME, CA 93043-4410

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:

DEFENSE QUALITY AND STANDARDIZATION OFFICE
5203 Leesburg Pike, Suite 1403, Falls Church, VA 22401-3466
Telephone (703) 756-2340 AUTOVON 289-2340