F-F-320B
23 June 1985
SUPERSEDING
F-F-320A
March 29, 1971

FEDERAL SPECIFICATION

FILTERS, ELECTRONIC AIR CLEANING, IONIZING PLATE TYPE

This specification was approved by the Assistant Administrator, Office of Federal Supply and Services, General Services Administration, for the use of 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 sizes, 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 design
Style B - Roll-type filter, vertical, compact design
Style C - Boll-type filter, horizontal
Style D - Extended media-type, stationary filter

Class 1 - Standard efficiency
Class 2 - High efficiency

Group 1 - Factory-assembled units
Group 2 - Field-assembled units

Sizes - 1,000 to 175,000 cubic feet per minute (cfm) (see 3.7)

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

Federal Specifications

TT-P-664 - Primer Coating, Synthetic, Rust Inhibiting, Lacquer-Resisting
PPP-B-636 - Boxes, Shipping, Fiberboard
PPP-D-729 - Drums, Shipping and Storage, Steel, 55-Gallon (208 Liters)
PPP-P-704 - Pails, Metal: (Shipping, Steel, 1 through 12 Gallons)
PPP-T-60 - Tape: Packaging, Waterproof

Federal Standard

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

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions as outlined under General Information in the Index of Federal Specifications, Standards, and Commercial Item Descriptions. The Index, which includes cumulative bimonthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification and other Federal specifications and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston, MA; New York, NY; Philadelphia, PA; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Houston, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specification documents, and the Index of Federal Specifications, Standards, and Commercial Item Descriptions from established distribution points in their agencies.)

Military Specifications

MIL-P-116 - Preservation, Methods of
MIL-V-173 - Varnish, Moisture-and-Fungus-Resistant (for the Treatment of Communications, Electronic, and Associated Equipment)
MIL-C-5501 - Cap and Plug, Protective, Dust and Moisture Seal
MIL-E-16298 - Electric Machines having Rotating Parts and Associated Repair Parts: Packaging of
MIL-T-22085 - Tapes, Adhesive, Preservation and Sealing
MIL-P-46093 - Primer Coating, Synthetic (for Brake Drums)

Military Standards

MIL-STD-129 - Marking for Shipment and Storage
MIL-STD-147 - Palletized Unit Loads
MIL-STD-461 - Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference

MIL-STD-462 - Electromagnetic Interference Characteristics, Measurement of
MIL-STD-794 - Parts and Equipment, Procedures for Packaging of
MIL-STD-1186 - Cushioning, Anchoring, Bracing, Blocking and Waterproofing; with Appropriate Test Methods

(Copies of military specifications and standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 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):

850 - Standard for Commercial and Industrial Air Filter Equipment

(Application for copies should be addressed to the Air-Conditioning and Refrigeration Institute, 1815 North Fort Myer Drive, Arlington, VA 22209.)

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (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.)

American Society for Testing and Materials (ASTM):

D3951 - Standard Practice For Commercial Packaging

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

National Fire Protection Association (NFPA):

70 - National Electrical Code
904 - Standard for the Installation of Air Conditioning and Ventilating Systems

(Application for copies should be addressed to the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.)

Underwriters Laboratories Inc. (UL):

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

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

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 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 shall take precedence.

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 as applicable to the type and style specified. 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 ionizing-collecting cells, power pack(s), top and side enclosure panels, safety interlocks, warning signs, after-filters, 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, or 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), a dispenser for feeding a controlled amount of detergent directly into the washwater line will be acceptable in lieu of a detergent pump for Group 1 units with fixed manifolds having capacities of 3,000 cfm or less.

3.1.3 Type III. For type III units, the ionizing-collecting cells shall serve to build up concentrations of agglomerated dust particles, which, after dislodgement 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 more than 24 inches in depth (front to back).

3.2 First article. When specified (see 6.2),the contractor shall furnish a filter unit for first article inspection and approval (see 4.2.1 and 6.4).

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, stating 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 insure interchangeability of component parts, assemblies, accessories, and spare parts.

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. None of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this specification unless otherwise specified.

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.

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 and 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 gauge (psig). 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. In other respects, the design of the filter units shall be in accordance with accepted engineering practices and 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, 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 not exceed 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.

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 minimum thickness of 18 gauge. Drain pans shall be galvanized or protected by a bituminous coating. 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 minimum thickness of 16 gauge. 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 consisting 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. A power pilot light.
b. A current-indication device in the secondary circuit.
c. 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.
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 or systems 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, or to 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 electrical system shall conform to and be installed in accordance with provisions of NFPA 70 applicable to the type of equipment covered by this specification.

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, alternating current 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 one-half inch. 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 in storage when subjected to temperatures up to 210 degrees Fahrenheit and shall be UL-listed as specified in 3.3. The media roll shall be at least 65 feet long. The filter section shall include a drive assembly with motor overload protection, an adjustable timer control, a media runout switch, an indicating light, a spring-loaded pressure plate to ensure recompression as the media rewinds, and 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.
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 signalled 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.

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

3.13 Electromagnetic interference control. When specified (see 6.2), the units shall meet the electromagnetic interference control requirements and test limits for class C3 equipment as specified in MIL-STD-461.

3.14 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.

3.15 Fungus resistance. When specified (see 6.2), electrical components and circuit elements, including terminal and circuit connections, shall be coated with varnish conforming to MIL-V-173, except that:

a. Components and elements inherently inert to fungi or in hermetically sealed enclosures need not be coated.
b. Current-carrying contact surfaces, such as relay contact points, shall not be coated.

3.16 Instruction plates. The filter units 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 1/8-inch diameter.

3.17 Workmanship.

3.17.1 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.

3.17.2 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.

3.17.3 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.

3.17.4 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.

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

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 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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

4.1.2 Standards compliance. The contractor shall make available to the contracting officer or his authorized representative evidence of compliance with the applicable standard cited in 3.3. The Government reserves the right to examine and test all filter units to determine the validity of the certification.

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 one filter when a first article is required (see 3.2 and 6.2). 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, the tests of 4.4, and the preparation for delivery inspection of 4.5.

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 purchase order (see 6.2).

4.3 Examination. Each filter unit 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.

4.4 Tests. The first article shall receive the tests of 4.4.1, 4.4.2, and when applicable, 4.4.3. Each production unit shall receive the test of 4.4.1. Failure to pass any test shall constitute cause for rejection.

4.4.1 Operational test. Each group 1 unit shall be operated for at least 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, or 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. 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.

4.4.3 Electromagnetic interference control tests. When electromagnetic interference control is specified (see 3.13), the first article shall be tested by the supplier in accordance with applicable test methods of MIL-STD-462.

4.5 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.

5.1.1.1 Methods of preservation. Cleaning processes, drying procedures, preservatives, and methods of preservation specified in the following paragraphs are listed in MIL-P-116 and shall conform to the requirements of MIL-P-116 and any applicable specifications.

5.1.1.2 Cleaning and drying. Prior to the application of preservative compounds or paint, surfaces shall be cleaned by process C-1 and dried by any applicable procedure of MIL-P-116.

5.1.1.3 Disassembly. Disassembly shall be the minimum necessary to protect parts subject to damage or loss, and to accomplish reduction in cube. Removed bolts, nuts, pins, screws, and washers shall be reinstalled in mating parts and secured to prevent their loss.

5.1.1.4 Unprotected surfaces. Unprotected exterior metal surfaces requiring the application of a contact preservative in accordance with MIL-P-116 and not specifically provided for herein shall be preserved with P-1.

5.1.1.5 Exposed gears. All unpainted surfaces of exposed gears shall be coated with type P-1 preservative or with primer conforming to TT-P-664 or MIL-P-46093.

5.1.1.6 Exposed drive chains. Exposed drive chains shall be coated with enough type P-9 preservative to insure penetration of the preservative to the inner surface of the rollers, pins, and bushings. After the excess preservative has drained, the entire chain and the unpainted surfaces of the sprocket shall be coated with type P-1 preservative.

5.1.1.7 Openings. All openings in piping shall be sealed with caps or plugs conforming to MIL-C-5501 or with tape conforming to MIL-T-22085, type II or PPP-T-60, type IV.

5.1.1.8 Electrical motors. Preserve level A by the alternate method of MIL-E-16298.

5.1.1.9 Technical publications. Technical publications for each piece of equipment shall be preserved using method IC-1 or IC-3.

5.1.1.10 Service parts. The preservative application criteria and applicable methods of preservation of MIL-P-116 shall be used to preserve service parts.

5.1.1.11 Adhesive. The adhesive, if furnished, shall be packaged in pails or drums, as specified (see 6.2). Pails shall conform to PPP-P-704, type II and drums shall conform to PPP-D-729, type II or IV.

5.1.1.12 Consolidation. Service parts and publications for each filter unit shall be consolidated in containers conforming to PPP-B-636, class weather-resistant. Contents shall be cushioned, blocked, and braced to prevent movement in accordance with MIL-STD-1186. Quantities of adhesive furnished in less than 55-gallon drums may be consolidation packaged at the contractor's option.

5.1.2 Commercial. Material shall be preserved and packaged in accordance with ASTM D3951.

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

5.2.1 Levels A and B. Packing shall be in accordance with MIL-STD-794 for the level specified. Containers shall be selected from table I for the appropriate level. Only closed containers shall be selected. Adhesive in less than 55-gallon drums that is not consolidation packaged shall be palletized in accordance with MIL-STD-147 or packed in accordance with MIL-STD-794 for the level specified.

5.2.2 Commercial. Material shall be packed in accordance with ASTM D3951.

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

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 micron.

6.2 Ordering data. Purchasing. Should select the preferred options permitted herein and include the following information in procurement documents:

a. Title, number, and date of this specification.
b. Type, group and size required; style for type III units and class for style D units (see 1.2).
c. When group 1 units shall be designed for suspension mounting (see 3.1).
d. When detergent dispensers will be acceptable on type II, group 1 units of 3,000 cfm or less (see 3.1.2).
e. When a first article is required (see 3.2, 4.2.1, and 6.4).
f. When conformance with UL 867 is required (see 3.3).

g. Whether access for group 1 units shall be 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).
k. Whether the maximum interval setting for the timer is to be seven days or 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 electromagnetic interference control is required (see 3.13).
n. When treatment and painting are to be other than as specified (see 3.14).
o. When treatment for fungus resistance is required (see 3.15).
p. When on-site inspection is required (see 4.2.3).
q. When required, whether on-site inspection is to be performed by the installing contractor or the filter manufacturer (see 4.2.3).
r. Specify detailed requirements and schedule for on-site tests, when required (see 4.2.3).
s. Level of preservation and packaging and level of packing required (see 5.1 and 5.2).
t. Whether adhesive, when required, is to be packaged in pails or drums (see 5.1.1.11).

6.3 Data requirements. When this specification is used in an acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL) and invokes the provisions of DoD Federal Acquisition Regulations (FAR) Supplement 27.410-6, the data requirements will be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved CDRL (DD Form 1423) incorporated into the contract. When the provisions of DoD FAR 27.410-6 are not invoked, the data shall be delivered in accordance with the contract 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 one filter unit. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, test, and approval of the first article.

MILITARY INTERESTS:

Custodians

Navy - YD
Air Force - 99

Review Activity

DLA - CS

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS

PREPARING ACTIVITY:

Navy - YD

DOD project 4460-0035

NOTICE
OF VALIDATION

INCH-POUND

F-F-320B
NOTICE 1
15 FEBRUARY 1991

FEDERAL SPECIFICATION

FILTERS, ELECTRONIC AIR CLEANING, IONIZING PLATE TYPE

F-F-320B, dated 23 June 1985, has been reviewed and determined to be valid for use in acquisition.

MILITARY INTERESTS:

Custodians

Navy - YD
Air Force - 99

Review Activity

DLA - CS

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS

PREPARING ACTIVITY:

Navy - YD