

SECTION 15887
HVAC AIR FILTERS AND COMPONENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions apply to this Section.

1.2 SECTION INCLUDES:

- A. Requirements for air filters and filter components specifically used only for HVAC systems:
 - 1. Disposable panel Filters.
 - 2. Extended-Surface Disposable Panel Filters.
 - 3. Automatic Roll Filters.
 - 4. Activated Carbon Filters.
 - 5. High Efficiency Particulate Air (HEPA) Filters.
 - 6. Filter Frames (both Front & Rear access types).
 - 7. Side-Service Housings.
 - 8. Filter Gauges.
- B. Process related (HEPA) filters for the Target Building is specified under Section 15885.

1.3 REFERENCES

- A. American Society of Heating, Refrigeration and Air Conditioning engineers (ASHRAE).
 - 1. ASHRAE compliances: comply with provisions of ASHRAE 52.1-92, Standard for Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning and Devices Used for General Ventilation in Removing Particulate Matter.
- B. National Fire Protection Association (NFPA).
 - 1. NFPA 90A, Standard for Installation of Air Conditioning and Ventilating Systems.
 - 2. NFPA 90B, Standard for Installation of warm Air heating and Air Conditioning Systems.
- C. Underwriters Laboratories (UL).
 - 1. UL 486A, Standard for Safety Wire Connectors and Soldering Lugs for Use with Copper Conductors.
 - 2. UL 486B, Standard for Safety Wire Connectors for Use with Aluminum Conductors.
 - 3. UL 900-87, Standard for Safety Test Performance of Air Filter Units.

1.4 SUBMITTALS

- A. Submit the following for approval:
 - 1. Product Data: Include dimensions; shipping, installed, and operating weights; required clearances and access; rated flow capacity, including initial and final pressure drop at rated airflow; efficiency and test method; fire classification; furnished specialties; and accessories for each model indicated.
 - 2. Shop Drawings: Include plans, elevations, sections, and details to illustrate component assemblies and attachments.
 - a. Show filter rack assembly, dimensions, materials, and methods of assembly of components.
 - b. Include setting drawings, templates, and requirements for installing anchor bolts and anchorages.

3. Maintenance Data: For each type of filter and rack to include in maintenance manuals specified in General and Supplementary Conditions.
4. Documentation of compliance with UL 900 classifications (Class I or II with UL-registered manufacturer control number).
5. Documentation of atmospheric dust spot efficiency test report in accordance with ASHRAE 52.1.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide air filters, frames, housing, gauges, retainers, and clips as indicated on drawings. Filters specified as part of an air handling unit assembly shall be identified by size, capacity and efficiency, and supplied as part of the air handler.

2.2 SOURCE QUALITY CONTROL

- A. Loose filters shipped in container are to be marked by the manufacturer with the following information contained on a label. (Label size to be minimum 3 in. X 6 in. with minimum text size 1/4 in. high.)
 1. Manufacturer's identification of type, size, efficiency and class by catalog number (each shipping container to contain only items with same Manufacturer's catalog number).
 2. UL 900 classification (Class I or Class II) with UL-registered manufacturer's control number.
 3. Manufacturer and point of shipment.
 4. ASHRAE atmospheric dust spot efficiency. (Filter with less than 20% dust spot efficiency to be marked with "N/A" for this category.)
 5. Air filter dimensions.
- B. Filter element to have UL 900 Classification (UL Class I or II) marked on each element.

2.3 DISPOSABLE PANEL FILTERS

- A. Description: Factory-fabricated, viscous-coated, flat-panel type, disposable air filters with holding frames.
- B. Media: Interlaced glass fibers sprayed with nonflammable adhesive.
- C. Frame: Galvanized steel with metal grid on outlet side, steel rod grid on inlet side, hinged, and with pull and retaining handles.
- D. Duct-Mounting Frames: Welded, galvanized steel with gaskets and fasteners and suitable for bolting together into built-up filter banks.

2.4 EXTENDED-SURFACE, DISPOSABLE PANEL FILTERS

- A. Description: Factory-fabricated, dry, extended-surface filters with holding frames.
- B. Media: Fibrous material formed into deep-V-shaped pleats and held by self-supporting wire grid.
- C. Media and Media-Grid Frame: Galvanized steel.
- D. Duct-Mounting Frames: Welded, galvanized steel with gaskets and fasteners, and suitable for bolting together into built-up filter banks.

2.5 AUTOMATIC ROLL FILTERS

- A. Description: Factory-fabricated, automatic, motor-driven, roll-type filter with holding casing.
 - 1. Arrangement: Vertical.
- B. Media: Compressed and rolled, viscous-coated, fibrous-glass material.
- C. Holding Frame: Galvanized steel with enclosed, clean media roll arranged to allow upstream replacement of filter media.
 - 1. Auxiliary Frame: Locate on downstream side of unit with downstream access.
 - 2. Final Filter: Extended-surface, retained-media filters.
- D. Control and Drive: Electric, gear-reducer, motor-driven, feed-control mechanism equipped with manual media advance and run out switches for stopping media movement of filter bank and operating remote warning signal lights.
 - 1. Manual Control: Manual switch to advance media and wired to override automatic controls.
 - 2. Automatic Control: Pre-wired control package to advance media after pre-selected operating time.

2.6 ACTIVATED-CARBON FILTERS

- A. Description: Factory-fabricated unit with activated-carbon trays in deep-V- arrangement with disposable panel prefilter.
- B. Media: Activated carbon, mounted in removable carbon-cell trays of epoxy-coated steel.
 - 1. Activated-Carbon Capacity: 12 lb. (5.4 kg) of activated carbon per 500 cfm (236 L/s) of airflow.
 - 2. Activated-Carbon Capacity: 8.8 lb (4.9 kg) of activated carbon per 2,000 cfm (944 L/s) of airflow.
- C. Housing: 0.064-in- (1.6-mm) thick, galvanized steel, for side servicing through gasketed access doors on both sides. Equip housings with metal slide channel tracks to hold activated-carbon trays.

2.7 HIGH-EFFICIENCY PARTICULATE AIR (HEPA) FILTERS

- A. Description: Factory-fabricated HEPA filters with holding casing.
- B. Media: UL 586, fibrous glass, constructed of continuous sheets with closely spaced pleats with vinyl-coated aluminum separators.
- C. Frame Material: Galvanized steel.
- D. Media to Frame Side Bond: Neoprene adhesive.
- E. Face Gasket: Neoprene expanded rubber.
- F. Duct-Mounting Frames: Construct downstream corners of holding device with cushion pads to protect media. Provide bolted filter-sealing mechanism to mount and continuously seal each individual filter.

2.8 FILTER FRAMES, FRONT-AND REAR-ACCESS

- A. Framing System: Aluminum framing members with access for either upstream (front) filter servicing, cut to size and pre-punched for assembly into modules. Vertically support filters prevent deflection of horizontal members without interfering with either filter installation or operation.
- B. Prefilters: Incorporate a separate track, removable from front or back.
- C. Sealing: Factory-installed, positive-sealing device for each row of filters to ensure seal between gasketed filter elements to prevent bypass of unfiltered air.

2.9 SIDE-SERVICE HOUSINGS

- A. Description: Factory-assembled, side-service housings, constructed of galvanized steel, with flanges to connect to duct system.
- B. Prefilters: Integral tracks to accommodate 2-inch (50-mm) disposable or washable filters.
- C. Access Doors: Continuous gaskets on perimeter and positive-locking devices. Arrange so filter cartridges can be loaded from either access door.
- D. Sealing: Incorporate positive-sealing gasket material on channels to seal top and bottom of filter cartridge frames to prevent bypass of unfiltered air.

2.10 FILTER GAGES

- A. Description: Diaphragm type with dial and pointer in metal case, vent valves, black figures on white background, and front recalibration adjustment.
 - 1. Diameter: 4-1/2 inches (115 mm).
 - 2. Prefilter Range: 0- to 0.5 inch WG (0 to 125 Pa.).
 - 3. Medium Efficiency Filter Range: 0-to 1.0-inch WG (0 to 250 Pa.).
 - 4. HEPA Filter Range: 0- to 3.0-inch WG (0 to 750 Pa.).
- B. Manometer-Type Filter Gage: Molded plastic with epoxy-coated aluminum scale, logarithmic-curve tube gage with integral leveling gage, graduated to read from 0- to 3.0-inch WG (0 to 750 Pa), and accurate within 3 percent of full scale range.
- C. Accessories: Static pressure tips, tubing gage connections, and mounting bracket.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install filter frames according to manufacturer's written instructions.
- B. Position each filter unit with clearance for normal service and maintenance. Anchor filter-holding frames to substrate.
- C. Install filters in position to prevent passage of unfiltered air.
- D. Install a filter gage for each filter bank.

- E. Install filter gage static pressure tips upstream and downstream from filters to measure pressure drop through filter. Mount filter gages on outside of filter housing or filter plenum in an accessible position. Adjust and level inclined gages.
- F. Coordinate filter installations with duct and air-handling unit installations.
- G. Electrical wiring and connections are specified in Division 16 Sections.
- H. Ground equipment.
 - 1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.2 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components, filter and filter-frame installation, and electrical wiring. Report results in writing.
- B. Operate automatic roll filters to demonstrate compliance with requirements. Test for leakage of unfiltered air while system is operating. Correct malfunctioning units, and then retest to demonstrate compliance. Remove and replace units that cannot be corrected with new units and retest.
- C. HEPA Filters: Pressurize housing to a minimum of **3.0-inch WG (750 Pa)** or to designed operating pressure, whichever is higher; and test housing joints, door seals, and sealing edges of filter with soapy water to check for air leaks.

3.3 CLEANING

- A. After completing system installation and testing, adjusting, and balancing air handling and air-distribution systems, clean filter housings and install new filter media.

END OF SECTION 15887