

## SECTION 234100 - PARTICULATE AIR FILTRATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  1. Pleated panel filters.
  2. Rigid cell box filters.
  3. Front- and rear-access filter frames.
  4. Side-service housings.
  5. Filter gages.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include dimensions; operating characteristics; 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.
- B. Shop Drawings: For air filters. Include plans, elevations, sections, details, and attachments to other work.
  1. Show filter rack assembly, dimensions, materials, and methods of assembly of components.
  2. Include setting drawings, templates, and requirements for installing anchor bolts and anchorages.
  3. Include diagram for power, signal, and control wiring.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of filter and rack to include in emergency, operation, and maintenance manuals.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  1. Filters: For each filter bank, provide:
    - a. One complete set of filters at the start of testing, adjusting and balancing (TAB).

- b. One complete set of filters for final turnover to owner.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

#### A. ASHRAE Compliance:

1. Comply with applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality"; Section 5 - "Systems and Equipment"; and Section 7 - "Construction and Startup."
2. Comply with ASHRAE 52.2 for MERV for methods of testing and rating air-filter units.
3. Finish of Interior Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

#### B. Comply with NFPA 90A and NFPA 90B.

#### C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

### 2.2 PLEATED PANEL FILTERS (TYPE A)

#### A. Basis-of-Design Product: Subject to compliance with requirements, provide Camfil Farr 30/30 or comparable product by one of the following:

1. 3M
2. AAF International
3. Airguard
4. Camfil Farr
5. Flanders Corporation
6. Koch Filter Corporation
7. Purafil, Inc.

#### B. Description: Factory-fabricated, self-supported, extended-surface, pleated, panel-type, disposable air filters with holding frames.

#### C. Filter Unit Class: UL 900, Class 2.

#### D. Media: Cotton and synthetic fibers coated with nonflammable adhesive.

1. Media shall be coated with an antimicrobial agent.
2. Separators shall be bonded to the media to maintain pleat configuration.
3. Welded-wire grid shall be on downstream side to maintain pleat.
4. Media shall be bonded to frame to prevent air bypass.
5. Support members on upstream and downstream sides to maintain pleat spacing.

#### E. Filter-Media Frame: Cardboard frame with perforated metal retainer sealed or bonded to the media.

- F. Mounting Frames: Welded galvanized steel, with gaskets and fasteners; suitable for bolting together into built-up filter banks.
- G. Capacities and Characteristics:
  - 1. Capacities, efficiencies, and size of filter units shall be as scheduled on the drawings.
  - 2. Maximum or Rated Face Velocity: 450 fpm.
  - 3. Efficiency: 90 percent on particles 20 micrometers and larger at 500 fpm.
  - 4. MERV Rating: 8 when tested according to ASHRAE 52.2.
  - 5. Recommended Final Resistance: 1.0" inches wg at 500 fpm.

## 2.3 RIGID CELL BOX FILTERS (TYPE B)

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Camfil Farr Riga-Flo or comparable product by one of the following:
  - 1. 3M
  - 2. AAF International
  - 3. Airguard
  - 4. Camfil Farr
  - 5. Flanders Corporation
  - 6. Koch Filter Corporation
  - 7. Purafil, Inc.
- B. Description: Factory-fabricated, self-supported, extended-surface, high efficiency media box filter with media perpendicular to airflow, and with holding frames.
- C. Filter Unit Class: UL 900, Class 2.
- D. Media: Microfine glass media in a uniform high loft blanket.
  - 1. Adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 2. Media shall be coated with an antimicrobial agent.
  - 3. The media blanket shall be formed into uniform tapered radial pleats and bonded to a stiffened backing that is bonded to the downstream side of the media to preclude media oscillation.
  - 4. The media shall be mechanically and chemically bonded within the frame to prevent air bypass.
- E. Filter-Media Frame: Corrosion resistant galvanized steel sealed or bonded to the media.
- F. Mounting Frames: Welded galvanized steel, with gaskets and fasteners; suitable for bolting together into built-up filter banks.
- G. Capacities and Characteristics:
  - 1. Capacities, efficiencies, and size of filter units shall be as scheduled on the drawings.
  - 2. Maximum or Rated Face Velocity: 450 fpm.
  - 3. MERV Rating: 13 when tested according to ASHRAE 52.2.
  - 4. Recommended Final Resistance: 1.5" inches wg at 500 fpm.

## 2.4 FRONT- AND REAR-ACCESS FILTER FRAMES

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Camfil Farr Type 8 or comparable product by one of the following:
  - 1. 3M
  - 2. AAF International
  - 3. Airguard
  - 4. Camfil Farr
  - 5. Flanders Corporation
  - 6. Koch Filter Corporation
  - 7. Purafil, Inc.
- B. Framing System: Galvanized-steel framing members with access for either upstream (front) or downstream (rear) filter servicing, cut to size and prepunched for assembly into modules. Vertically support filters to prevent deflection of horizontal members without interfering with either filter installation or operation.
- C. Prefilters: Incorporate a separate track with spring clips, removable from front.
- D. Sealing: Factory-installed, positive-sealing device for each row of filters, to ensure seal between gasketed filter elements and to prevent bypass of unfiltered air.
- E. The frame shall include filter-centering dimples on each frame wall to facilitate ease of filter installation and assure filter centering against filter sealing flange.

## 2.5 SIDE-SERVICE HOUSINGS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Camfil Farr Type 3P Glide/Pack or comparable product by one of the following:
  - 1. 3M
  - 2. AAF International
  - 3. Airguard
  - 4. Camfil Farr
  - 5. Flanders Corporation
  - 6. Koch Filter Corporation
  - 7. Purafil, Inc.
- B. Description: Factory-assembled, side-service housings, constructed of galvanized steel, with flanges to connect to duct or casing system.
- C. Prefilters: Where indicated to be installed with prefilters, frame shall incorporate the capability of two stages of filtration with integral tracks to accommodate 2-inch- deep, disposable prefilters.
- D. Access Doors: Hinged, with continuous gaskets on perimeter and positive-locking devices, and arranged so filter cartridges can be loaded from either access door.
- E. Sealing: Incorporate positive-sealing gasket material on channels to seal top and bottom of filter cartridge frames and to prevent bypass of unfiltered air.

- F. The frame shall include filter-centering dimples on each frame wall to facilitate ease of filter installation and assure filter centering against filter sealing flange.
- G. Accessories:
  - 1. Filter removal rod.

## 2.6 FILTER GAGES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AirGuard; Clarcor Air Filtration Products, Inc.
  - 2. Dwyer Instruments, Inc.
- B. Magnehelic diaphragm-type gage with dial and pointer in metal case, vent valves, black figures on white background, and front recalibration adjustment.
  - 1. Diameter: 4-1/2 inches.
  - 2. Scale Range for Filter Media Having a Recommended Final Resistance of 0.5-Inch wg or Less: 0- to 0.5-inch wg.
  - 3. Scale Range for Filter Media Having a Recommended Final Resistance of 0.5- to 1.0-Inch wg or Less: 0- to 1.0-inch wg.
  - 4. Scale Range for Filter Media Having a Recommended Final Resistance of 1.0- to 2.0-Inch wg or Less: 0- to 2.0-inch wg.
  - 5. Scale Range for Filter Media Having a Recommended Final Resistance of 2.0- to 3.0-Inch wg or Less: 0- to 3.0-inch wg.
  - 6. Scale Range for Filter Media Having a Recommended Final Resistance of 3.0- to 4.0-Inch wg or Less: 0- to 4.0-inch wg.
- C. Accessories: Two 1/8" NPT plugs for duplicate pressure taps, tubing, gage connections, and mounting bracket.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Position each filter unit with clearance for normal service and maintenance. Anchor filter holding frames to substrate.
- B. Install filters in position to prevent passage of unfiltered air.
- C. Install filter gage for each filter bank.
- D. Do not operate fan system until filters (temporary or permanent) are in place. Replace temporary filters used during construction and testing with new, clean filters.
- E. Install filter-gage, static-pressure taps upstream and downstream from filters. Install filter gages on filter banks with separate static-pressure taps upstream and downstream from filters. 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.

### 3.2 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  - 1. Test for leakage of unfiltered air while system is operating.
- B. Air filter will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

### 3.3 CLEANING

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

END OF SECTION 234100