

## SECTION 234100 - PARTICULATE AIR FILTRATION

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Pleated panel filters.
2. Rigid cell box filters.
3. V-bank cell filters.
4. Side-access filter housings.
5. Filter gauges.

B. Related Requirements:

1. Section 234133 "High-Efficiency Particulate Air Filtration" for HEPA filters used in combination with particulate air filters.

#### 1.2 DEFINITIONS

- A. HIPS: High-impact polystyrene.

#### 1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. 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.

#### 1.4 INFORMATIONAL SUBMITTALS

- A. Seismic Qualification Data: Certificates, for filters, accessories, and components from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- B. Product Test Reports: For each filter, for tests performed by a qualified testing agency.
- C. Field quality-control reports.

#### 1.5 CLOSEOUT SUBMITTALS

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

#### 1.6 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. Provide one complete set(s) of filters for each filter bank. If system includes prefilters, provide only prefilters.
  2. Provide one container(s) of red oil for inclined manometer filter gauge.

#### 1.7 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An NRTL.

#### 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in a clean, dry place.
- B. Comply with manufacturer's written rigging and installation instructions for unloading and moving to final installed location.
- C. Handle products carefully to prevent damage, breaking, denting, and scoring. Do not install damaged products.
- D. Protect products from weather, dirt, dust, water, construction debris, and physical damage.
1. Retain factory-applied coverings on equipment to protect finishes during construction and remove just prior to operating unit.
  2. Cover unit openings before installation to prevent dirt and dust from entering inside of units. If required to remove coverings during unit installation, reapply coverings over openings after unit installation and remove just prior to operating unit.
  3. Replace installed products damaged during construction.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Filters shall withstand the effects of earthquake motions determined according to ASCE/SEI 7
  - 1. The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
  - 2. Component Importance Factor: 1.5
- B. Comply with NFPA 90A and NFPA 90B.
- C. Comply with UL 900.
- D. 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

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

- A. Source Limitations: Obtain from single source from single manufacturer.
- B. Capacities and Characteristics: See Mechanical Schedules
- C. Media: Interlaced glass or Cotton and synthetic fibers coated with nonflammable adhesive
  - 1. Separators shall be bonded to the media to maintain pleat configuration.
  - 2. Welded-wire grid shall be on downstream side to maintain pleat.
  - 3. Media shall be bonded to frame to prevent air bypass.
  - 4. Support members on upstream and downstream sides to maintain pleat spacing.
- D. Filter-Media Frame: Galvanized steel sealed or bonded to the media.

### 2.3 RIGID CELL BOX FILTERS

- A. Description: Factory-fabricated, adhesive-coated, disposable, packaged air filters with media perpendicular to airflow, and with holding frames.
- B. Source Limitations: Obtain from single source from single manufacturer.
- C. Capacities and Characteristics: See Mechanical Schedules
- D. Media: Fibrous material constructed so individual pleats are maintained in tapered form under rated-airflow conditions by flexible internal supports.

- E. Filter-Media Frames: Galvanized steel

## 2.4 V-BANK CELL FILTERS

- A. Description: Factory-fabricated, adhesive-coated, disposable, packaged air filters with media angled to airflow, and with holding frames.
- B. Source Limitations: Obtain from single source from single manufacturer.
- C. Capacities and Characteristics: See Mechanical Schedules.
- D. Media: Fibrous material constructed so individual mini-pleats are maintained in tapered form under rated-airflow conditions by flexible internal supports.
- E. Filter-Media Frames: HIPS

## 2.5 SIDE-ACCESS FILTER HOUSINGS

- A. Description: Factory-assembled, side-service housings, constructed of galvanized steel, with flanges to connect to duct or casing system.
- B. Source Limitations: Obtain from single source from single manufacturer.
- C. Prefilters: Integral tracks to accommodate scheduled filters on mechanical schedules sheet.
- 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.

## 2.6 FILTER GAUGES

- A. Diaphragm-type gauge with dial and pointer in metal case, vent valves, black figures on white background, and front recalibration adjustment.
- B. Source Limitations: Obtain from single source from single manufacturer.
- C. Diameter: 2 inches
- D. Scale Range for Filter Media Having a Recommended Final Resistance of 0.5-Inch wg (125 Pa) or Less: 0- to 0.5-inch wg.
- E. Scale Range for Filter Media Having a Recommended Final Resistance of 0.5- to 1.0-Inch wg (125 to 250 Pa) or Less: 0- to 1.0-inch wg.
- F. Scale Range for Filter Media Having a Recommended Final Resistance of 1.0- to 2.0-Inch wg (250 to 500 Pa) or Less: 0- to 2.0-inch wg.

- G. Scale Range for Filter Media Having a Recommended Final Resistance of 2.0- to 3.0-Inch wg (500 to 750 Pa) or Less: 0- to 3.0-inch wg.
- H. Scale Range for Filter Media Having a Recommended Final Resistance of 3.0- to 4.0-Inch wg (750 to 1000 Pa) or Less: 0- to 4.0-inch wg.
- I. Manometer-Type Filter Gauge: Molded plastic, with epoxy-coated aluminum scale and logarithmic-curve tube gage with integral leveling gage, graduated to read from 0- to 3.0-inch wg, and accurate within 3 percent of the full-scale range.
- J. Accessories: Static-pressure tips, tubing, gauge connections, and mounting bracket.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine ducts, air-handling units, and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION OF FILTERS

- 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 gauge 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. Coordinate filter installations with duct and air-handling-unit installations.

### 3.3 INSTALLATION OF FILTER GAUGES

- A. Install filter gauge for each filter bank.
- B. Install filter-gauge, static-pressure tips upstream and downstream from filters. Install filter gauges on filter banks with separate static-pressure taps upstream and downstream from filters. Mount filter gauges on outside of filter housing or filter plenum in an accessible position. Adjust and level inclined gauges.

### 3.4 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.

- B. Connect control wiring between pressure sensors and DDC system
- C. Connect control wiring between controlled devices.
- D. Connect control wiring according to Section 260523 "Control-Voltage Electrical Power Cables."

### 3.5 FIELD QUALITY CONTROL

- A. Testing Agency:
  - 1. Engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
  - 1. Test for leakage of unfiltered air while system is operating.
- C. Air filter will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

### 3.6 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