SECTION 234300 - ELECTRONIC AIR CLEANERS

TIPS:

To view non-printing **Editor's Notes** that provide guidance for editing, click on Masterworks/Single-File Formatting/Toggle/Editor's Notes.

To read **detailed research, technical information about products and materials, and coordination checklists**, click on Masterworks/Supporting Information.

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. Electronic air cleaners.
2. Side-service housings.
3. Front- and rear-access filter frames.
4. 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. LEED Submittals:

1. Product Data for Prerequisite IEQ 1: Documentation indicating that units comply with ASHRAE 62.1, Section 5 - "Systems and Equipment."

C. Shop Drawings: For each electronic air cleaner. Include plans, elevations, sections, details, and attachments to other work.

1. Show filter assembly, dimensions, materials, and methods of assembly of components.
2. Include setting drawings, templates, and requirements for installing anchor bolts and anchorages.
3. Wiring Diagrams: For power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each type of filter and housing 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**] <**Insert number**> complete set(s) of prefilters for each filter bank.
2. Provide detergent for [**one**] [**two**] <**Insert number**> refill(s).
3. Provide [**one**] <**Insert number**> container(s) of red oil for inclined manometer filter gage.

1.7 QUALITY ASSURANCE

A. 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.

B. 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 52.1 for arrestance and with ASHRAE 52.2 for MERV for methods of testing and rating air-filter units.

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

D. Comply with ARI 850.

E. Comply with UL 867.

PART 2 - PRODUCTS

2.1 ELECTRONIC AIR CLEANERS

A. Description: Factory-fabricated electronic air cleaner operating by electrostatic precipitation principles.

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>

B. Prefilter Media: [**Four**] [**Six**] alternate layers of [**galvanized-steel**] [**aluminum**] [**stainless-steel**], flat and herringbone-crimp screen.

C. Prefilter: Comply with requirements in Section 234100 "Particulate Air Filtration" for [**flat**] [**pleated**] [**ring**] panel. Size and airflow capacity shall match those of electronic air cleaners.

1. Depth: [**1 inch (25 mm)**] [**2 inches (50 mm)**] [**4 inches (100 mm)**] <**Insert dimension**>.
2. Filter Unit Class: UL 900, [**Class 1**] [**Class 2**].
3. Arrestance: [**85**] <**Insert number**> percent when tested according to ASHRAE 52.1.
4. MERV: [**8**] <**Insert value**> when tested according to ASHRAE 52.2.

D. Final Filter: Comply with requirements in Section 234100 "Particulate Air Filtration" for [**supported bag**] [**unsupported bag**] [**rigid-cell box**] [**V-bank cell**] [**self-supported pocket**]. Size and airflow capacity shall match those of gas-phase filters.

1. Depth: [**12 inches (300 mm)**] [**18 inches (450 mm)**] [**24 inches (600 mm)**] <**Insert dimension**>.
2. Filter Unit Class: UL 900, [**Class 1**] [**Class 2**].
3. Arrestance: [**85**] <**Insert number**> percent when tested according to ASHRAE 52.1.
4. MERV: [**13**] <**Insert value**> when tested according to ASHRAE 52.2.

E. Collection Cells: Aluminum, independently supported and nested.

1. Ionizing Section: Alternately spaced grounded struts and charged ionizing wires.
2. Collecting Section: Alternately grounded and charged plates, with insulators located out of airstream.

F. Power Pack: Self-contained, prewired rectifying unit to convert [**120**] [**208/240**] [**480**]-V ac, single-phase, 60-Hz power to approximately 12,000-V dc for ionizer and 6000-V dc for collector; include overload protection, on-off switch, pilot light showing operating status, and access door interlock.

G. Safety Accessories: Manual-reset safety switches and warning lights for filter plenum access doors, signal lights and safety switching upstream and downstream from unit within duct, and enameled high-voltage warning signs.

H. Collection Section Cleaning System:

1. Detergent Reservoir Tank: [**30 gal. (110 L)**] [**55 gal. (200 L)**] with pump, motor, solenoid valve, level sensor, backflow preventer, wye-strainer, and ball valve.
2. Detergent.
3. Dispensing System: Motor-driven oscillating copper manifolds with brass spray nozzles on each side of the collector.

I. Mist Eliminators: [**Upstream**][**and downstream**] [**Downstream**].

J. Controls: Programmable logic controller in remotely mounted NEMA 250, Type 12 enclosure; with integral time clock and manual override.

1. Contacts for enable-disable control by building automation system.

K. Finish of Interior Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

2.2 FAN SECTION

A. Fan: Forward curved, belt driven.

B. Motor:

1. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
2. Type: [**Permanent-split capacitor with SCR for speed adjustment**] [**Electronically commutated motor**].
3. Fan-Motor Assembly Isolation: Rubber isolators.
4. Enclosure: Totally enclosed, fan cooled, and [**explosion proof**] [**dust-ignition proof**].
5. Enclosure Materials: [**Cast iron**] [**Cast aluminum**] [**Rolled steel**].
6. Motor Bearings: Sealed ball, <**Insert special requirements**>.
7. Unusual Service Conditions:

    a. Ambient Temperature: <**Insert deg F (deg C)**>.
    b. Altitude: <**Insert feet (m)**> above sea level.
    c. High humidity.
    d. <**Insert conditions**>.

8. Efficiency: Premium efficient.
9. NEMA Design: <**Insert designation**>.
10. Service Factor: <**Insert value**>.
11. Motor Speed: [**Single speed**] [**Multispeed**].

    a. Speed Control: Infinitely adjustable with pneumatic-electric and electronic controls.

2.3 CABINET

A. Description: 16-gage galvanized steel with epoxy powder finish for suspended, wall, frame, or duct mounting.

2.4 SIDE-SERVICE HOUSINGS

A. Description: Factory-assembled, side-service housings, [**with bottom drain,**]constructed of [**galvanized steel**] [**aluminum**] and configured for stacking, with flanges to connect to duct or casing system.

B. Access Doors: [**Hinged with continuous**] [**Continuous**] gaskets on perimeter and positive-locking devices.

C. Sealing: Incorporate positive-sealing gasket material on channels to seal top and bottom of filter cartridge frames to prevent bypass of unfiltered air.

D. Finish of Interior Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

2.5 FRONT- AND REAR-ACCESS FILTER FRAMES

A. Framing System: [**Galvanized-steel**] [**Aluminum**] framing members with access for either upstream (front) or downstream (rear) filter servicing, cut to size and prepunched for assembly into modules[**with bottom drain**], and configured for stacking. Vertically support filters to prevent deflection of horizontal members without interfering with either filter installation or operation.

B. Prefilters: Incorporate a separate track[**with spring clips**], removable from front[**or back**].

C. Final Filters: Integral tracks to accommodate [**particulate**] [**gas-phase**] disposable filters.

D. Sealing: Factory-installed, positive-sealing device for each row of filters to ensure seal between gasketed filter elements to prevent bypass of unfiltered air.

E. Finish of Interior Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

2.6 FILTER GAGES

A. Diaphragm type, with dial and pointer in metal case, vent valves, black figures on white background, and front recalibration adjustment.

1. <Double click here to find, evaluate, and insert list of manufacturers and products.>
2. Diameter: [**4-1/2 inches (115 mm)**] [**2 inches (50 mm)**].
3. 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 (0 to 125 Pa).
4. Scale Range for Filter Media Having a Recommended Final Resistance of 0.5- to 1-Inch wg (125 to 250 Pa) or Less: 0- to 1.0-inch wg (0 to 250 Pa).
5. 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 (0 to 500 Pa).
6. 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 (0 to 750 Pa).
7. 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 (0 to 1000 Pa).

B. Manometer-Type Filter Gage: Molded plastic, with epoxy-coated aluminum scale, logarithmic-curve tube gage, with integral leveling indicator, 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.

2.7 CAPACITIES AND CHARACTERISTICS

A. Unit Face Dimensions: [**72 by 72 inches (1828 by 1828 mm)**] <**Insert dimensions**> nominal.

B. Number of Cleaner Units: <**Insert number**>.

C. Unit Depth: [**33 inches (825 mm)**] [**45 inches (1125 mm)**] <**Insert dimension**> nominal.

D. Holding Frame Size: <**Insert inches (mm)**>.

E. Frame Access Location: [**Front**] [**back**] [**or**] [**side**].

F. System Airflow: <**Insert cfm (L/s)**>.

G. Maximum or Rated Face Velocity: [**500 fpm (2.5 m/s)**] <**Insert value**>.

H. Power Pack:

1. Volts: [**120**] [**208**] [**230**] [**460**] <**Insert value**> V.
2. Phase: [**Single**] [**Three**].
3. Hertz: 60.
4. Full-Load Amperes: <**Insert value**>.
5. Minimum Circuit Ampacity: <**Insert value**>.
6. Maximum Overcurrent Protection Device: <**Insert amperage**>.

I. Efficiency: 90 percent on particles 20 micrometers and larger at 500 fpm (2.5 m/s).

J. Efficiency: [**85**] [**90**] [**95**] percent as tested according to ASHRAE 52.1.

K. Initial Resistance: [**0.25-inch wg (63 Pa)**] <**Insert value**>.

L. Prefilter Type: Integral tracks to accommodate 2-inch- (50-mm-) thick disposable[**or washable**] filters.

M. Final Filter Type: Integral tracks to accommodate [**particulate**] [**gas-phase**] disposable filters.

N. Fan Motor Electrical Characteristics:

1. Horsepower: <**Insert value**>.
2. Volts: [**120**] [**208**] [**230**] [**460**] <**Insert value**> V.
3. Phase: [**Single**] [**3**].
4. Hertz: 60.
5. Full-Load Amperes: <**Insert value**>.
6. Minimum Circuit Ampacity: <**Insert value**>.
7. Maximum Overcurrent Protection Device: <**Insert amperage**>.

O. Cleaning System: [**Manual**] [**or**] [**automatic**].

P. Reservoir Tank: [**30 gal. (114 L)**] [**50 gal. (190 L)**].

Q. Connections:

1. Water Supply: <**Insert NPS (DN)**>.
2. Drain: <**Insert NPS (DN)**>.

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. 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.

D. Operate electronic air cleaners for 24 hours as part of startup before filters are put into operation.

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. Install and connect water-supply and drainage piping.

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

3.2 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installation, including connections.

B. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections: Test for leakage of unfiltered air while system is operating.

D. Air filter will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

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 prefilter and final-filter media.

END OF SECTION 234300