

SECTION 233423 - HVAC POWER VENTILATORS

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. Ceiling-mounted ventilators.
 - 2. Centrifugal ventilators - roof downblast.
 - 3. Centrifugal ventilators - roof upblast and sidewall.

- B. Reference and Industry Standards

- Enterprise Green Communities Criteria

- 1. Mandatory Requirements: See the current edition of the NYC overlay of the EGC reference standard for full specifications.
 - a. NYC New Construction projects must achieve at least 60 optional points, and Substantial and Moderate Rehab projects must also achieve at least 55 optional points.
 - b. Healthy Living Environment 7.7 Ventilation.

Comply with relevant HPD design guidelines section or appendix.

Comply with the current edition of the New York City Mechanical code.

- C. <https://www.nyc.gov/site/hpd/services-and-information/sustainability.page>

- D. <https://www.nyc.gov/site/hpd/services-and-information/blds.page>

ACTION SUBMITTALS

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

1.3 INFORMATIONAL SUBMITTALS

- A. Reports indicating exhaust system in compliance with ASHRAE 62.1 & 62.2 requirements

- B. Provide documentation showing that exhaust fans meet ENERGY STAR efficiencies.
- C. Reports indicating compliance with EGC ventilation requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- B. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of unit components.
- C. ASHRAE 62.1 Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
- D. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

2.2 CEILING-MOUNTED VENTILATORS

- A.
- B. Housing: Steel, lined with acoustical insulation.
- C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel removable for service.
- D. Back-draft damper: Integral.
- E. Grille: Plastic Stainless steel Aluminum Painted aluminum, louvered grille with flange on intake and thumbscrew or spring retainer attachment to fan housing.
- F. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.
- G. Accessories:
 - 1. Manual Starter Switch: Single-pole rocker switch assembly with cover and pilot light.
 - 2. Filter: Washable aluminum to fit between fan and grille.
 - 3. Isolation: Rubber-in-shear vibration isolators.

2.3 CENTRIFUGAL VENTILATORS - ROOF DOWNBLAST

- A. Housing: Downblast; removable spun-aluminum dome top and outlet baffle or extruded-aluminum rectangular top or galvanized-steel, mushroom-domed top or spun aluminum; square, one-piece aluminum base with venturi inlet cone.
- B. Fan Wheels: Aluminum hub and wheel with backward-inclined blades; spark-resistant construction classified in accordance with AMCA 99, Section 8,.
- C. Belt Drives:
 - 1. Resiliently mounted to housing.
 - 2. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
 - 3. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
 - 4. Fan Pulleys: Cast iron or cast steel with split, tapered bushing; dynamically balanced at factory.
 - 5. Motor Pulleys: Adjustable pitch for use with motors through 5 hp. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions. Provide fixed pitch for use with motors larger than 5 hp.
 - 6. Fan and motor isolated from exhaust airstream.
- D. Accessories:
 - 1. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted outside fan housing, factory wired through an internal aluminum conduit.
 - 2. Bird Screens: Removable, 1/2-inch (13-mm) mesh, aluminum or brass wire.
 - 3. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.
 - 4. Motorized Dampers(Where applicable as per NYCECC): Parallel-blade dampers mounted in curb base with electric actuator; wired to close when fan stops.
 - 5. Overall Height: 12 inches (300 mm).
 - 6. Sound Curb: Curb with sound-absorbing insulation.
 - 7. Pitch Mounting: Manufacture curb for roof slope.
 - 8. Metal Liner: Galvanized steel.
 - 9. Mounting Pedestal: Galvanized steel with removable access panel.

2.4 CENTRIFUGAL VENTILATORS - ROOF UPBLAST OR SIDEWALL

- A. Configuration: Centrifugal roof upblast sidewall ventilator.
- B. Housing: Removable spun-aluminum dome top and outlet baffle extruded-aluminum rectangular top galvanized-steel, mushroom-domed top spun aluminum; square, one-piece aluminum base with venturi inlet cone.
 - 1. Upblast Units: Provide spun-aluminum discharge baffle to direct discharge air upward, with rain and snow drains.
- C. Fan Wheels: Aluminum hub and wheel with backward-inclined blades; spark-resistant construction classified in accordance with AMCA 99, Section 8
- D. Belt Drives:

1. Resiliently mounted to housing.
 2. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
 3. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings; minimum ABMA9, L(10) of 100,000 hours <Insert life>.
 4. Fan Pulleys: Cast iron or cast steel with split, tapered bushing; dynamically balanced at factory.
 5. Motor Pulleys: Adjustable pitch for use with motors through 5 hp. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions. Provide fixed pitch for use with motors larger than 5 hp.
 6. Fan and motor isolated from exhaust airstream.
- E. Accessories:
1. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted outside fan housing, factory wired through an internal aluminum conduit.
 2. Bird Screens: Removable, 1/2-inch (13-mm) mesh, aluminum or brass wire.
 3. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.
 4. Motorized Dampers:(Where applicable as per NYCECC) Parallel-blade dampers mounted in curb base with electric actuator; wired to close when fan stops.
 5. Spark-resistant, all-aluminum wheel construction.
 6. Overall Height: 12 inches (300 mm).
 7. Sound Curb: Curb with sound-absorbing insulation[and galvanized metal liner].
 8. Pitch Mounting: Manufacture curb for roof slope.
 9. Metal Liner: Galvanized steel.
 10. Mounting Pedestal: Galvanized steel with removable access panel.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Install power ventilators level and plumb.
- B. Install units with clearances for service and maintenance.
- C. Label units according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

3.2 DUCTWORK CONNECTIONS

- A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."

3.3 ELECTRICAL CONNECTIONS

- A. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

- B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.
 - 1. Nameplate shall be laminated acrylic or melamine plastic signs, as specified in Section 260553 "Identification for Electrical Systems."
 - 2. Nameplate shall be laminated acrylic or melamine plastic signs with a black background and engraved white letters at least 1/2 inch (13 mm) high.

3.4 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect control wiring according to Section 260523 "Control-Voltage Electrical Power Cables."

3.5 STARTUP SERVICE:

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Complete installation and startup checks in accordance with manufacturer's written instructions.
 - 2. Verify that shipping, blocking, and bracing are removed.
 - 3. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
 - 4. Verify that cleaning and adjusting are complete.
 - 5. For direct-drive fans, verify proper motor rotation direction and verify fan wheel free rotation and smooth bearing operation.
 - 6. For belt-drive fans, disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
 - 7. Adjust belt tension.
 - 8. Adjust damper linkages for proper damper operation.
 - 9. Verify lubrication for bearings and other moving parts.
 - 10. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
 - 11. Disable automatic temperature-control operators, energize motor and confirm proper motor rotation and unit operation, adjust fan to indicated rpm, and measure and record motor voltage and amperage.
 - 12. Shut unit down and reconnect automatic temperature-control operators.
 - 13. Remove and replace malfunctioning units and retest as specified above.

3.6 ADJUSTING

- A. Adjust damper linkages for proper damper operation.

- B. Adjust belt tension.
- C. Lubricate bearings.
- D. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.7 CLEANING

- A. After completing system installation and testing, adjusting, and balancing and after completing startup service, clean fans internally to remove foreign material and construction dirt and dust.

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor will engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections with the assistance of a factory-authorized service representative.
 - 1. Fan Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
 - 2. Test and adjust controls and safeties.
 - 3. Fans and components will be considered defective if they do not pass tests and inspections.
 - 4. Prepare test and inspection reports.

3.9 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain centrifugal fans.

END OF SECTION 233423