

SECTION 233423 - HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 WORK INCLUDES

- A. Base Bid:
 - 1. Contractor Provide:
 - a. Inline Ventilators.

1.2 PERFORMANCE REQUIREMENTS

- A. Project Altitude: Base fan-performance ratings on actual Project site elevations.
- B. Operating Limits: Classify according to AMCA 99.

1.3 SUBMITTALS

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated and include the following:
 - 1. Certified fan performance curves with system operating conditions indicated.
 - 2. Certified fan sound-power ratings.
 - 3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
 - 4. Material thickness and finishes, including color charts.
 - 5. Dampers, including housings, linkages, and operators.
 - 6. Fan speed controllers.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Wiring Diagrams: Power, signal, and control wiring.
 - 2. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
 - 3. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, and base weights.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. AMCA Compliance: Products shall comply with performance requirements and shall be licensed to use the AMCA-Certified Ratings Seal. Laboratory Fume Hood Exhaust System shall be certified in accordance with AMCA 260-07.
- C. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.
- D. UL Standard: Power ventilators shall comply with UL 705.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver fans as factory-assembled unit, to the extent allowable by shipping limitations, with protective crating and covering.
- B. Disassemble and reassemble units, as required for moving to final location, according to manufacturer's written instructions.
- C. Lift and support units with manufacturer's designated lifting or supporting points.

1.6 COORDINATION

- A. Coordinate size and location of structural-steel support members.

PART 2 - PRODUCTS

2.1 INLINE VENTILATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Carnes Company HVAC.
 - 2. Greenheck.
 - 3. JencoFan; Div. of Breidert Air Products.
 - 4. Loren Cook Company.
 - 5. Penn Ventilation.
 - 6. ACME.
- B. Description: Fan shall be a backward inclined centrifugal inline fan.
 - 1. Base fan performance at standard conditions (density 0.075 Lb/ft³).
 - 2. Normal operating temperature up to 130 Fahrenheit (54.4 Celsius).
 - 3. Each fan shall bear a permanently affixed manufacture's engraved metal nameplate containing the model number and individual serial number.

- C. Wheel:
 - 1. Non-overloading, backward inclined centrifugal wheel
 - 2. Constructed of aluminum
 - 3. Statically and dynamically balanced in accordance to AMCA Standard 204-05
 - 4. The wheel cone and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency
 - 5. Single thickness blades are securely riveted or welded to a heavy gauge back plate and wheel cone.

- D. Motor:
 - 1. AC Induction Motor
 - a. Motor enclosures: Open drip-proof.
 - b. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase.

- E. Housing/Cabinet Construction:
 - 1. Construction material: Galvanized.
 - 2. Square design constructed of heavy gauge galvanized steel and shall include square duct mounting collars
 - 3. Housing and bearing supports shall be constructed of heavy gauge bolted and welded steel construction to prevent vibration and to rigidly support the shaft and bearing assembly.

- F. Housing Supports and Drive Frame:
 - 1. Housing supports are constructed of structural steel with formed flanges
 - 2. Drive frame is welded steel which supports the motor

- G. Disconnect Switch:
 - 1. NEMA rated: 1.
 - 2. Positive electrical shut-off
 - 3. Wired from fan motor to junction box

- H. Duct Collars:
 - 1. Square design to provide a large discharge area
 - 2. Inlet and discharge collars provide easy duct connection

- I. Access Panel:
 - 1. Two sided access panels, permit easy access to all internal components
 - 2. Located perpendicular to the motor mounting panel

- J. Accessories:
 - 1. Refer to schedule on drawings.

- K. Capacities and Characteristics:
 - 1. Refer to schedule on drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

- 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 CONNECTIONS

- A. Duct installation and connection requirements are specified in 233113 – Metal Ducts. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 23 33 00 - Air Duct Accessories.
- B. Install ducts adjacent to power ventilators to allow service and maintenance.
- C. Ground equipment according to Section 260526 - Grounding and Bonding for Electrical Systems.
- D. Connect wiring according to Section 260519 - Building Wire & Cable.

3.3 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Verify that shipping, blocking, and bracing are removed.
 - 2. 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.
 - 3. Verify that cleaning and adjusting are complete.
 - 4. 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.
 - 5. Adjust belt tension.
 - 6. Adjust damper linkages for proper damper operation.
 - 7. Verify lubrication for bearings and other moving parts.
 - 8. Verify that manual and automatic volume control and fire dampers in connected ductwork systems are in fully open position.
 - 9. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
 - 10. Shut unit down and reconnect automatic temperature-control operators.
 - 11. Remove and replace malfunctioning units and retest as specified above.
- B. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

- A. Adjust damper linkages for proper damper operation.
- B. Adjust speed controller.
- C. Refer to Section 230593 - Testing, Adjusting, and Balancing for HVAC for testing, adjusting, and balancing procedures.
- D. Replace fan and motor pulleys as required to achieve design airflow.
- E. Lubricate bearings.

END OF SECTION 233423