

## **SECTION 23 34 23 - HVAC POWER VENTILATORS**

### **PART 1 - GENERAL**

#### **1.1 SUMMARY**

A. This Section includes the following:

1. Centrifugal roof ventilators.
2. Ceiling-mounting ventilators.
3. In-line centrifugal fans.

#### **1.2 SUBMITTALS**

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated and include the following:
- 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.
- C. Field quality-control test reports.
- D. Operation and maintenance data.

#### **1.3 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. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.
- C. UL Standard: Power ventilators shall comply with UL 705.

### **PART 2 - PRODUCTS**

#### **2.1 CENTRIFUGAL ROOF VENTILATORS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:
1. Acme Engineering & Mfg. Corp.
  2. Aerovent; a Twin City Fan Company.
  3. Ammerman; General Resource Corp.

4. Carnes Company HVAC.
  5. Greenheck.
  6. JencoFan; Div. of Breidert Air Products.
  7. Loren Cook Company.
  8. Penn Ventilation.
- B. Description: Direct or belt driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base, and accessories.
- C. Housing: Removable, spun-aluminum, dome top and outlet baffle; square, one-piece, aluminum base with venturi inlet cone.
1. Hinged Subbase: Galvanized steel hinged arrangement permitting service and maintenance.
- D. Fan Wheels: Aluminum hub and wheel with backward inclined blades.
- E. Belt-Driven Drive Assembly: Resiliently mounted to housing, with the following features:
1. Fan Shaft: Turned, ground, and polished steel; keyed to wheel hub.
  2. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
  3. Pulleys: Cast-iron, adjustable pitch motor pulley.
  4. Fan and motor isolated from exhaust airstream.
- F. 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 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: Parallel blade dampers mounted in curb base with electric actuator; wired to close when fan stops.
- G. Roof Curbs: Galvanized steel; mitered and welded corners; 1-1/2 inch thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2 inch wood nailer. Size as required to suit roof opening and fan base.
1. Configuration: Built-in cant and mounting flange.
  2. Overall Height: **[8 inches] [9-1/2 inches] [12 inches] [16 inches] [18 inches]**.
  3. Sound Curb: Curb with sound absorbing insulation matrix.
  4. Pitch Mounting: Manufacture curb for roof slope.
  5. Metal Liner: Galvanized steel.

## 2.2 CEILING-MOUNTING VENTILATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:
  - 1. Ammerman; General Resource Corp.
  - 2. Broan Mfg. Co., Inc.
  - 3. Carnes Company HVAC.
  - 4. Greenheck.
  - 5. Loren Cook Company.
  - 6. NuTone Inc.
  - 7. Penn Ventilation.
- B. Description: Centrifugal fans designed for installing in ceiling or for concealed in-line applications.
- C. Housing: Steel, lined with acoustical insulation.
- D. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.
- E. Grille: **[Plastic]** **[Stainless steel]** **[Aluminum]** **[Painted aluminum]**, louvered grille with flange on intake and thumbscrew 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. Time-Delay Switch: Assembly with single-pole rocker switch, timer, and cover plate.
  - 3. Isolation: Rubber-in-shear vibration isolators.
  - 4. Manufacturer's standard roof jack and transition fittings.

## 2.3 IN-LINE CENTRIFUGAL FANS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equal:
  - 1. Acme Engineering & Mfg. Corp.
  - 2. Ammerman; General Resource Corp.
  - 3. Bayley Fans; a division of Lau Industries, Inc.
  - 4. Carnes Company HVAC.
  - 5. Greenheck.
  - 6. Hartzell Fan, Inc.
  - 7. Loren Cook Company.
  - 8. Penn Ventilation.

- B. Description: In-line, [**direct**] [**belt**] driven centrifugal fans consisting of housing, wheel, outlet guide vanes, fan shaft, bearings, motor and disconnect switch, drive assembly, mounting brackets, and accessories.
- C. Housing: Split, spun aluminum with aluminum straightening vanes, inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting.
- D. Direct Driven Units: Motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing[; **with wheel, inlet cone, and motor on swing-out service door**].
- E. Belt Driven Units: Motor mounted on adjustable base, with adjustable sheaves, enclosure around belts within fan housing, and lubricating tubes from fan bearings extended to outside of fan housing.
- F. Fan Wheels: Aluminum, airfoil blades welded to aluminum hub.
- G. Accessories:
  - 1. Companion Flanges: For inlet and outlet duct connections.
  - 2. Fan Guards: 1/2 by 1 inch mesh of galvanized steel in removable frame. Provide guard for inlet or outlet for units not connected to ductwork.
  - 3. Motor and Drive Cover (Belt Guard): Epoxy-coated steel.

## 2.4 MOTORS

- A. Comply with requirements in Division 23 Section "Electrical Motors for Mechanical Equipment."
- B. Enclosure Type: Totally enclosed, fan cooled.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install power ventilators level and plumb.
- B. Support units using restrained spring isolators having a static deflection of 1 inch. Vibration- and seismic-control devices are specified in Division 23 Section "Vibration and Seismic Controls for Mechanical Piping and Equipment."
  - 1. Secure vibration and seismic controls to concrete bases using anchor bolts cast in concrete base.
- C. Install floor mounting units on concrete bases. Concrete, reinforcement, and formwork requirements are specified in Division 03 Section "Cast-in-Place Concrete."

- D. Secure roof mounting fans to roof curbs with cadmium plated hardware. Install roof curb on roof structure, according to NRCA's "Low-Slope Membrane Roofing Construction Details Manual," Illustration "Raised Curb Detail for Rooftop Air Handling Units and Ducts." Coordinate roof penetrations and flashing with roof construction.
- E. Ceiling Units: Suspend units from structure; use steel wire or metal straps.
- F. Support suspended units from structure using threaded steel rods and spring hangers having a static deflection of 1 inch. Vibration-control devices are specified in Division 23 Section "Vibration and Seismic Controls for Mechanical Piping and Equipment."
- G. Install units with clearances for service and maintenance.
- H. Label units according to requirements specified in Division 23 Section "Identification for Mechanical Piping and Equipment."
- I. Duct installation and connection requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Division 23 Section "Air Duct Accessories."
- J. Install ducts adjacent to power ventilators to allow service and maintenance.
- K. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."
- L. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.2 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 fire, smoke and combination fire/smoke 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.

**END OF SECTION 23 34 23**