

SECTION 23 34 10 – FANS AND GRAVITY VENTILATORS

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. The Work of this Section shall consist of the labor, materials and equipment required for installation of fans and gravity ventilators.

1.2 RELATED SECTIONS

- A. Section 23 05 05, HVAC Basic Materials: Motors
- B. Section 23 05 35, HVAC Sound and Vibration Control: Vibration isolators and bases.

1.3 SUBMITTALS

- A. Submit for approval in accordance with specified submittal procedures:
 - 1. Fans
 - 2. B. Product Data: Submit manufacturer's technical product data for fans, including:
 - 3. Selection characteristics and rated capacities.
 - 4. Fan performance curves with system operating conditions indicated.
 - 5. Sound power ratings, with an 8 octave band analysis for large, central system fans.
 - 6. General specifications: Fan type description, material of construction, thicknesses and finishes.
 - 7. Motor type, ratings and electrical characteristics
 - 8. Accessories furnished
- B. Shop Drawings: Include the following:
 - 1. Plans, elevations, sections, and attachment details.
 - 2. Details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 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. Wiring Diagrams: Submit manufacturer's electrical requirements for power supply wiring to fan units. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field-installed.
- D. Coordination Drawings: As required to meet project complexity, show fan room layout and relationships between components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate and certify field measurements.

- E. Maintenance Data: Submit operation and maintenance instructions, including lubrication instructions, motor and drive replacement, and spare parts lists. Include this data, product data, shop drawings, and wiring diagrams in maintenance manuals.
- F. Field quality-control reports.
- G. Manufacturer's published fan curve data shall be included with shop drawing submittal data for fans. Fan curve information shall include operating point, RPM curve for operating point, minimum and maximum RPM curves for fan, system curve and brake horsepower curves. Tabular fan performance charts are not an acceptable substitute for fan curve data. Shop drawing submittals for air handling equipment will be returned without Architect's review if the fan curve data is not included with the submittal.

1.4 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. Fan rating shall be AMCA certified.

1.5 SOURCE QUALITY CONTROL

- A. Fan Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Fans shall bear AMCA-certified sound ratings seal.
- B. Fan Performance Rating: Factory test fan performance for airflow, pressure, power, air density, rotation speed, and efficiency. Rate performance according to AMCA 210, "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating."

1.6 EXTRA MATERIALS

- A. Furnish one set of extra fan belt(s) for each fan. Identify unit designation on packaging sleeves.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Fan ratings shall be AMCA certified and statically and dynamically balanced and run tested at the factory.
- B. Bearings: Fans, except power roof ventilators, shall be provided with lubricating type bearings with extended fittings as required. Extend grease fittings to safe, accessible locations.
- C. Motors: Refer to Section 23 05 05 for motor requirements.
- D. Accessories:

1. Belt guards: Where required, guards shall be fabricated to comply with OSHA and SMACNA requirements, constructed of expanded metal mesh to allow for quick visual inspection of belts and pulleys without removal. Guards shall be attached to equipment with hinges and/or quick release fasteners that can be turned without tools to allow for ease of maintenance. Secure to fan or fan supports without short circuiting vibration isolation.
2. Access for Inspection, Cleaning, and Maintenance: Comply with requirements in ASHRAE 62.1.
3. Roof Exhaust Fan Roof Curbs: Provide manufacturers roof curb with outer finish to match fan. Provide hinging kit to allow easy access to damper. Curb shall be insulated with 2 inch thick sound and thermal insulation.

2.2 CABINET INLINE FAN, TYPE CFD

- A. Acceptable Manufacturer: Greenheck Fan Corp., or Loren Cook Company, Broan, Carnes, PennBarry, Solar & Palau.
- B. Blower: Backward inclined centrifugal, aluminum wheel, direct drive.
- C. Housing
 1. Galvanized steel with integral duct flanges.
 2. Integral terminal box.
 3. Access panels.
 4. Removable fan motor and wheel assembly from housing.
- D. Accessories
 1. Electronic speed Controller.
 2. Gravity Backdraft damper
 3. Integral disconnect switch.
 4. Duct inlet connection.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install fans and gravity ventilators in accordance with equipment manufacturer's recommendations. Submit manufacturer's printed installation instructions with operating and maintenance data at completion of Work.
- B. Install fans level and plumb to prohibit excessive vibration and insure longer life.
- C. Protect belts, sheaves, bearings, motors and other fan parts during installation.
- D. Access: Provide adequate access and service clearance space around and over fans as indicated, but in no case less than that recommended by manufacturer. Allow adequate and safe pathway for components and unit replacement.
- E. Isolation: Comply with requirements for vibration isolation devices specified in Section 23 05 35

F. Duct Connections:

1. Minimize Fan System Effects: Avoid poor fan inlet and outlet conditions. Comply with manufacturer's installation guidelines.
2. Make final duct connections with flexible connectors.
3. Install ducts adjacent to fans to allow service and maintenance.
4. Provide access door in duct below power roof ventilators to service damper.

G. Secure roof-mounted fans to roof curbs with cadmium-plated hardware.

H. Electrical Connections: Ground equipment and connect control wiring according to Division 26.

3.2 FIELD QUALITY CONTROL

A. Upon completion of installation of fans, and after motor has been energized with normal power source, perform the following tests and inspections with the assistance of a factory-authorized service representative to demonstrate compliance with requirements:

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, make final alignments of pulleys and belt tension, and install belt guards.
5. Adjust damper linkages for proper damper operation.
6. Verify lubrication for bearings and other moving parts.
7. Verify that manual and automatic volume control and fire dampers in connected ductwork systems are in fully open position.
8. Test and adjust controls and safeties. Controls and equipment will be considered defective if they do not pass tests and inspections.
9. Prepare test and inspection reports.

B. Remove and replace malfunctioning units that cannot be satisfactorily corrected and retest as specified above.

END OF SECTION