

SECTION 15830
FANS

PART 1 - GENERAL

1.01 PROVISIONS INCLUDED

- A. The general provisions of the Contract, including General and Supplementary Conditions, and Division 1 General Requirements, apply to work specified in this Section.
- B. Requirements of Section 15050, "Basic Mechanical Materials and Methods" apply to work specified in this Section.

1.02 SUMMARY

- A. This Section includes the following types of power ventilators:
 - 1. Centrifugal roof ventilators.
- B. Related Work Specified in Other Sections:
 - 1. 15 Section 15070, "Vibration Control & Seismic Restraints" for vibration hangers and supports.
 - 2. Section 15920, "Control Systems", for control devices.
 - 3. Division 16 for motor starters.

1.03 SUBMITTALS

- A. Product data for selected models, including specialties, accessories, and 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 fan accessories.
 - 4. Material gages and finishes, including color charts.
 - 5. Dampers, including housings, linkages, and operators.
- B. Shop drawings from manufacturer detailing equipment assemblies and indicating dimensions, weights, required clearances, components, and location and size of field connections.
- C. Wiring diagrams that detail power, signal, and control wiring. Differentiate between manufacturer-installed wiring and field-installed wiring.
- D. Maintenance data for fans, for inclusion in Operating and Maintenance Manual specified in Division 1 and Division 15 Section "Basic Mechanical Requirements."

1.04 QUALITY ASSURANCE

- A. UL Compliance: Fans shall be designed, manufactured, and tested in accordance with UL 705 "Power Ventilators."

- B. UL Compliance: Fans and components shall be UL listed and labeled.
- C. Listing and Labeling: Provide electrically operated fixtures specified in this Section that are listed and labeled.
 - 1. The Terms "listed" and "Labeled": As defined in the National Electrical Code, Article 100.
- D. AMCA Compliance: Provide products that meet performance requirements and are licensed to use the AMC Seal.
- E. NEMA Compliance: Provide motors and electrical accessories that comply with NEMA standards.
- F. Electrical Component Standard: Components and installation shall comply with NFPA 70 "National Electrical Code."
- G. Comply with USM IDAT requirements.

1.05 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements. Verify clearances.
- B. Do not operate fans until ductwork is clean, filters are in place, bearings are lubricated, and fans have been commissioned.

1.06 COORDINATION AND SCHEDULING

- A. Lift and support units with the manufacturer's designated lifting or supporting points.
- B. Deliver fan units as a factory-assembled unit to the extent allowable by shipping limitations, with protective crating and covering.

1.07 SEQUENCING AND SCHEDULING

- A. Coordinate the installation of roof curbs, equipment supports, and roof penetrations.
- B. Coordinate the size and location of structural steel support members.

1.08 EXTRA MATERIALS

- A. Furnish one additional complete set of belts.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide fans by one of the following:
 - 1. Acme Co.
 - 2. Greenheck Fan Corp.

3. Twin City Fans Co.

2.02 SOURCE QUALITY CONTROL

- A. Testing Requirements: The following factory tests are required:
 1. Sound Power Level Ratings: Comply with AMCA Standard 301 "Method for Calculating Fan Sound Ratings From Laboratory Test Data." Test fans in accordance with AMCA Standard 300 "Test Code for Sound Rating." Fans shall be licensed to bear the AMCA Certified Sound Ratings Seal.
 2. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings in accordance with AMCA Standard 210/ASHRAE Standard 51 - Laboratory Methods of Testing Fans for Rating.

2.03 ROOF INTAKE AND RELIEF HOODS

- A. General:
 1. Designed to withstand stresses developed by winds up to 100 miles per hour without external bracing and with no bracing in air passage.
 2. Guaranteed by manufacturer to be rain, snow and storm proof. Base catalog ratings upon tests conducted in an industry approved testing laboratory.
 3. Provide:
 - a. Aluminum bird screen.
 - b. Opposed blade damper.
 - c. Roof Curbs: Prefabricated, heavy-gage, aluminum; mitered and welded corners; 2-inch-thick, rigid, fiberglass insulation adhered to inside walls; built-in cant and mounting flange for flat or sloped roof as required; and 2-inch wood nailer. Size as required to suit roof opening and fan base.
 1. Overall Height: 12 inches.
 2. Provide neoprene strip between fan and curb for vibration isolation.
 4. Decorative coating. Entire exterior exposed surfaces to be factory applied baked on enamel finish. Field applied coatings are not acceptable. Provide finished color as selected by architect.
- B. Housing of heavy gauge aluminum with hinged hood, designed for intake and relief as scheduled. All vertical seams continuously welded with lock formed seams on hood ends. Hood stressed and sloped for drainage.

2.04 MOTORS

- A. Torque Characteristics: Sufficient to accelerate the driven loads satisfactorily.
- B. Motor Sizes: Minimum sizes and characteristics as indicated. If not indicated, large enough so that the driven load will not require the motor to operate in the service factor range.
- C. Temperature Rating: 50°C maximum temperature rise at 40°C ambient for continuous duty at full load (Class A Insulation).

- D. Service Factor: 1.15 for polyphase motors and 1.35 for single-phase motors. Provide permanent-split capacitor classification motors for shaft-mounted fans and capacitor start classification for belted fans.
- E. Motor Construction: NEMA Standard MG 1, general purpose, continuous duty, Design B.
 - 1. Bases: Adjustable.
 - 2. Bearings: The following features are required:
 - a. Ball or roller bearings with inner and outer shaft seals.
 - b. Grease lubricated.
 - c. Designed to resist thrust loading where belt drives or other drives produce lateral or axial thrust in motor.
 - 3. Enclosure Type: Open drip-proof motors where satisfactorily housed or remotely located during operation.
 - 4. Overload protection: Built-in, automatic reset, thermal overload protection.
 - 5. Noise rating: Quiet.
 - 6. Efficiency: Premium efficiency.
 - 7. Nameplate: Indicate the full identification of manufacturer, ratings, characteristics, construction, and special features.
- F. Starters, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 16.

2.05 FACTORY FINISHES

- A. Sheet Metal Parts: Prime coat before final assembly.
- B. Exterior Surfaces: Baked-enamel finish coat after assembly.
- C. Aluminum Parts: No finish required.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances, roof curbs, equipment supports, and other conditions affecting performance of fans.
- B. Do not proceed until unsatisfactory conditions have been corrected.

3.02 INSTALLATION:

- A. Install roof curbs and securely fasten to roof construction.
- B. Install fans level and plumb, in accordance with manufacturer's written instructions. Support units as described below, using the vibration control devices indicated. Vibration control devices are specified in Division 15 Section "Vibration Control and Seismic Restraints."
 - 1. Secure roof-mounted fans to roof curbs with cadmium-plated hardware.

- C. Arrange installation of units to provide access space around fans for service and maintenance.

3.03 CONNECTIONS

- A. Duct installations and connections are specified in other Division 15 sections. Make final duct connections with flexible connections.
- B. Electrical Connections: The following requirements apply:
 - 1. Electrical power wiring is specified in Division 16.
 - 2. Grounding: Connect unit components to ground in accordance with the National Electrical Code.

3.04 ADJUSTING, CLEANING, AND PROTECTING

- A. Adjust damper linkages for proper damper operation.
- B. Adjust belt tension.
- C. Lubricate bearings.
- D. After completing installation, inspect exposed finish. Remove burrs, dirt, and construction debris, and repair damaged finishes including chips, scratches, and abrasions.
- E. Clean unit interiors to remove foreign material and construction dirt and dust. Vacuum clean fan wheel and housing.

3.05 START-UP

- A. Final Checks Before Start-Up: Perform the following operations and checks before start-up:
 - 1. Remove shipping blocking and bracing.
 - 2. Verify unit is secure on mountings and supporting devices and that connections for ductwork, and electrical are complete. Verify proper thermal overload protection is installed in motors, starters, and disconnects.
 - 3. Cleaning and adjusting.
 - 4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operations. Reconnect fan drive system, align belts, and install belt guards.
 - 5. Lubricate bearings, pulleys, belts, and other moving parts with factory-recommended lubricants.
 - 6. Verify that manual and automatic volume control and fire dampers in connected ductwork systems are in the full open position.
 - 7. Disable automatic temperature control operators.

- B. Starting procedures for fans:
 - 1. Energize motor; verify proper operation of motor, drive system, and fan wheel. Adjust fan to indicated RPM.
 - a. Replace fan and motor pulleys as required to achieve design conditions.
 - 2. Measure and record motor electrical values for voltage and amperage.
- C. Shut unit down and reconnect automatic temperature control operators.
- D. Refer to Division 15 Section "Testing, Adjusting, and Balancing" for procedures for fan-system testing, adjusting, and balancing.

3.06 DEMONSTRATION

- A. Demonstration Services: Arrange and pay for a factory-authorized service representative to train Owner's maintenance personnel on the following:
 - 1. Procedures and schedules related to start-up and shutdown, troubleshooting, servicing, preventative maintenance, and how to obtain replacement parts.
 - 2. Familiarization with contents of Operating and Maintenance Manuals specified in Division 1 Section "Project Closeout" and Division 15 Section "Basic Mechanical Materials and Methods."
- B. Schedule training with at least 7 days advance notice.

END OF SECTION 15830