

SPECIAL SPECIFICATION

SECTION 15834S

CENTRIFUGAL FANS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Centrifugal fans for mechanical systems and associated (**except for acid and solvent exhaust system**) items normally found with fan installation; including:
 - 1. Backward inclined centrifugal fans.
 - 2. Airfoil centrifugal fans.
 - 3. Inline centrifugal fans.
 - 4. Utility/vent sets.
 - 5. Motors and drives.
 - 6. Belt guards.
 - 7. Inlet/outlet screens.
 - 8. Access doors.
 - 9. Scroll drains.

1.02 RELATED SECTIONS

- A. **Section 13085S – Seismic Protection**
- B. **Section 15060S - Hangers and Supports.**
- C. **Section 15070S- Vibration Limits and Control**
- D. **Section 15170S - Motors**
- E. **Section 15720S - Air Handling Units.**
- F. **Section 15810S – Solvent and General Exhaust Ductwork..**

G. Section 15891 - Ductwork

1.03 REFERENCES

- A. AMCA 99 - Standards Handbook.
- B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
- C. AMCA 300 - Test Code for Sound Rating Air Moving Devices.
- D. AMCA 301 - Method of Calculating Fan Sound Ratings from Laboratory Test Data.
- E. AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
- F. AFBMA 11 - Load Ratings and Fatigue Life for Roller Bearings.
- G. SMACNA 1035 - HVAC Duct Construction Standard - Metal and Flexible.

1.04 SUBMITTALS

- A. Include fan curves with specified operating point clearly plotted.
- B. Include sound power levels for both fan inlet and outlet at rated capacity.
- C. Indicate special coating when required.
- D. Provide operation and maintenance manual.

1.05 QUALITY ASSURANCE

- A. Performance Ratings: Conform to AMCA 210 and bear the AMCA Certified Rating Seal.
- B. Sound Ratings: AMCA 301, tested to AMCA 300.
- C. Fabrication: Conform to AMCA 99.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acme.

- B. **Hartzell**
- C. Cook.
- D. Duall (PVC or fiberglass).
- E. Greenheck.
- F. Trane.

2.02 GENERAL

- A. Select fans such that they do not increase motor size, increase noise level, or increase tip speed by more than 10 percent, or increase inlet air velocity by more than 20 percent, from specified criteria. Provide fans capable of accommodating static pressure variations of plus or minus 10 percent.
- B. Base performance on **5,300 ft. elevation.**
- C. Statically and dynamically balance fans to eliminate vibration or noise transmission to occupied areas.
- D. Coat all parts of fan housing, blades, etc., exposed to corrosive air stream with specified material.

2.03 WHEEL AND INLET

- A. Backward Inclined: Steel or aluminum construction with smooth curved inlet flange, heavy backplate, backwardly curved blades welded or riveted to flange and backplate; cast-iron or cast steel hub riveted to backplate and keyed to shaft with set screws and key.
- B. Airfoil Wheel: Steel construction with smooth curved inlet flange, heavy backplate die formed hollow airfoil shaped blades continuously welded at tip flange, and backplate; cast-iron or cast steel hub riveted to backplate and keyed to shaft with set screws and key.
- C. Fume Hood Fan Wheels: Monel, forward curved.
- D. Corrosion Resistant Fan Wheels: PVC or fiberglass.

2.04 HOUSING

- A. Heavy gage steel, spot welded for AMCA 99 designated Classes I and II fans, and continuously welded for Class III, adequately braced, designed to minimize turbulence with spun inlet bell and shaped cut-off.
- B. Factory finish before assembly with enamel or prime coat. For fans handling air downstream of humidifiers, fabricate of galvanized steel. Prime coating on aluminum parts is not required.
- C. Provide bolted construction with horizontal flanged split housing.
- D. Fume Hood Fan Housing: Cast iron with three coats of air dried Heresite. Apply Heresite to all parts of the fan housing both internal and external.
- E. Corrosive Resistant Housing: PVC or fiberglass.

2.05 MOTORS AND DRIVES

- A. Motors: As indicated, in compliance with section on motors, this division.
- B. Bearings: AFBMA 9, L-50 life at 100,000 hours heavy duty pillow block type, self-aligning, grease-lubricated ball bearings, or AFBMA 11 L-50 life at 400,000 hours pillow block type, self-aligning, grease-lubricated roller bearings.
- C. Shafts: Hot rolled steel, ground and polished, with key-way, protectively coated with lubricating oil. Provide 316 stainless steel shafts for corrosive applications.
- D. V-Belt Drive: Cast iron or steel sheaves, dynamically balanced, keyed. Variable and adjustable pitch sheaves for motors 15 horsepower and under, selected so required rotations per minute is obtained with sheaves set at mid-position. Fixed sheave for 20 horsepower and over, matched belts, and drive rated as recommended by manufacturer or 120 percent of the motor nameplate rating. Include an additional set of drives for each fan to be used for final adjustments. After correct speed has been determined with variable sheave, provide fixed sheaves for units that require more than two belts.
- E. Belt Guard: Fabricate to SMACNA 1035; of 12 gage 3/4-inch diamond mesh wire screen welded to steel angle frame or equivalent, prime coated. Secure to fan or fan supports without short circuiting vibration isolation, with provision for adjustment of belt tension, lubrication, and use of tachometer with guard in place.
- F. **Direct Drive: Copy 15832, 2.05, A, B, C, F with VFC's as indicated on drawings.**

2.06 ACCESSORIES

- A. Inlet/Outlet Screens: Galvanized steel welded grid.

- B. Access Doors: Shaped to conform to scroll with quick opening latches and gaskets.
- C. Cover: Provide weatherproof cover for motor and drive where fans are exposed to the weather.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Do not operate fans for any purpose until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.
- B. Install fans as indicated or specified with resilient mountings and flexible electrical leads.
- C. Install flexible connections specified in section on ductwork accessories between fan inlet and discharge ductwork. Ensure metal bands of connectors are parallel with minimum 1 inch flex between ductwork and fan while running.
- D. Install fan restraining snubbers as required. Install flexible connectors so that they are not in tension while running.
- E. Provide sheaves required for final air balance.
- F. Provide safety screen where inlet or outlet is exposed.
- G. Provide backdraft dampers on discharge of exhaust fans and as indicated.
- H. Install roof mounted fans on factory curbs.

3.02 PAINTING

- A. Provide fans with factory finish in accordance with the manufacturer's standard. Touch up scratches and marks from handling and placement of equipment with masking enamel to match manufacturer's color.
- B. Where exhaust fans are required to have Heresite coating, have units factory finished with required number of coats prior to shipping to the job site.

END OF SECTION