

SPECIAL SPECIFICATION

SECTION 15832S

AXIAL FANS

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Fans.
- B. Motors and drives.
- C. Inlet vanes.
- D. Belt guards.
- E. Inlet/outlet screens.

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 15810S – **Solvent and General Exhaust Ducts**
- F. **Section 15891S - Ductwork.**
- G. Section 15950S - Testing, Adjusting and Balancing.

1.03 REFERENCES

- A. AMCA 99 - Standards Handbook.
- B. AMCA 210 - Laboratory Methods of Testing 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. Include performance data for adjustable axial fan blades for at least five blade settings.
- D. Provide operation and maintenance manual.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Chicago.
- B. Joy.
- C. Penn.

2.02 GENERAL

- A. Provide fans which do not decrease 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. Statically and dynamically balance fans to eliminate vibration or noise transmission to occupied areas.
- C. Base performance on 5,300 ft. elevation.**

2.03 HUB AND IMPELLER

- A. Airfoil Impeller Blades: Adjustable die cast aluminum alloy.
- B. Hub: Die cast aluminum alloy or cast iron hub, bored and keyed to shaft; to facilitate indexing of blade angle with manual adjustment stops.
- C. Controllable Pitch Assemblies: Incorporate ball bearing counterbalanced blade and variable pitch assembly into hub with mechanical link to casing exterior mounted actuator, or pneumatic or electric actuator incorporated within hub.
- D. Cast Components: X-ray components after fabrication, and statically and dynamically balance assembly before attachment to motor or shaft.

2.04 CASING

- A. Fabricate casing of 1/4-inch steel for fans 40 inch in diameter and smaller, and 3/8-inch steel for larger fans.
- B. Continuously weld, with inlet and outlet flange connections, and motor or shaft supports. Incorporate flow straightening guide vanes for fans specified for static pressure greater than 1 inch wg.
- C. Finish with three coats of Heresite applied to interior and exterior.

2.05 MOTORS AND DRIVES

- A. Motors: As indicated.

- 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 100,000 hours, pillow block type, self-aligning, grease lubricated roller bearings.
- C. Shafts: Hot rolled steel, ground and polished, with keyway; protectively coated with lubricating oil.
- 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 minimum 1.5 times nameplate rating of the motor.
- 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. Lubrication: Extend lubrication fittings to outside of casing.

2.06 ACCESSORIES

- A. Guide Vanes: Welded steel construction with airfoil vanes and casing flanges, finished to match casing.
- B. Adjustable Inlet Vanes: Steel construction with blades supported at both ends with two permanently lubricated bearings, variable mechanism out of air stream terminating in single control lever with control shaft for double width fans and locking quadrant.
- C. Inlet Bell: Bell mouth inlet fabricated of steel with flange.
- D. Outlet Cones: Fabricated of steel with flanges, outlet area/inlet area ratio of 1.5/1.0, with center pod as recommended by manufacturer.
- E. Inlet Screens: Galvanized steel welded grid to fit inlet bell.
- F. Dampers: Welded steel construction consisting of two semi-circular vanes pivoted on oil retaining bearings in short casing section, finished by hot dip galvanizing. Provide motor actuation.

- G. Access Doors: Shaped to conform to casing with quick opening latches and gaskets.

2.07 PROPELLER FAN

- A. Impeller: Shaped steel or steel reinforced aluminum blade with heavy hubs, statically and dynamically balanced, keyed and locked to shaft, directly connected to motor or provided with v-belt drive.
- B. Motor: Self-aligning pre-lubricated ball or sleeve bearings affixed to mounting plate permitting belt tensioning, neoprene vibration isolation between fan assembly and mounting plate.
- C. Frame: One-piece square steel, with die formed venturi orifice, mounting flanges and supports with baked enamel finish.
- D. Safety Screens: 1 inch galvanized wire over inlet, motor and drive, and backdraft damper for separate mounting on outlet.

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 fans have been test run under observation.
- B. Install axial fans as indicated. Install with resilient mountings and with flexible electrical leads.
- C. Install flexible connections between axial fan inlet and discharge ductwork. Ensure metal bands of connectors are parallel with minimum 1 inch flex between ductwork and axial fan while running.
- D. Install axial fan restraining snubbers as required. Install flexible connectors so that they are not in tension while running.
- E. Provide fixed sheaves required for final air balance.
- F. Provide safety screen where inlet or outlet is exposed.

Axial Fans

- G. Provide backdraft dampers on discharge of exhaust axial fans and as indicated.
- H. Provide access to adjustable blade axial fan wheels for varying blade angle setting. Adjust blades for varying range of volume and pressure.
- I. Provide floor mounted axial fans with reinforced legs. Provide ceiling suspended units with support brackets bolted to casing flange.

3.02 PAINING

- 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 to be provided with Heresite coating, have Heresite coating applied to units at the factory with required number of coats prior to shipping to the job site.

END OF SECTION