SECTION 23 3416 - CENTRIFUGAL HVAC FANS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Backward inclined centrifugal fans.

B. Forward curved centrifugal fans.

C. Airfoil centrifugal fans.

D. Motors and drives.

E. Fan accessories.

1.02 RELATED SECTIONS

A. Drawings and General Provisions of the Contract apply to this section.

1.03 REFERENCES

A. ABMA STD 9 - Load Ratings and Fatigue Life for Ball Bearings; American Bearing Manufacturers Association, Inc.

B. ABMA STD 11 - Load Ratings and Fatigue Life for Roller Bearings; American Bearing Manufacturers Association, Inc.

C. AMCA 99 - Standards Handbook; Air Movement and Control Association International, Inc.

D. AMCA 210 - Laboratory Methods of Testing Fans for Aerodynamic Performance Rating; Air Movement and Control Association International, Inc.; (ANSI/AMCA 210, same as ANSI/ASHRAE 51).

E. AMCA (DIR) - [Directory of] Products Licensed Under AMCA International Certified Ratings Program; Air Movement and Control Association International, Inc.; http://www.amca.org/licenses/search.aspx.

F. AMCA 300 - Reverberant Room Method for Sound Testing of Fans; Air Movement and Control Association International, Inc.

G. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data; Air Movement and Control Association International, Inc.

H. NEMA MG 1 - Motors and Generators; National Electrical Manufacturers Association.

I. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association.

1.04 PERFORMANCE REQUIREMENTS

A. Performance Ratings: Determined in accordance with AMCA 210 and bearing the AMCA Certified Rating Seal.

B. Sound Ratings: AMCA 301, tested to AMCA 300, and bear AMCA Certified Sound Rating Seal.

C. Fabrication: Conform to AMCA 99.

D. Performance Base: Sea level conditions.

E. Temperature Limit: Maximum 300 degrees F.

F. Static and Dynamic Balance: Eliminate vibration or noise transmission to occupied areas.

G. Air Flow: As scheduled on the drawings.

H. Static Pressure: As scheduled on the drawings.

I. Motor: As scheduled on the drawings.

1.05 SUBMITTALS

A. Product Data: Provide data on centrifugal fans and accessories including fan curves with specified operating point clearly plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.

B. Shop Drawings: Indicate assembly of centrifugal fans and accessories including fan curves with specified operating point clearly plotted, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.

C. Manufacturer's Instructions: Include complete installation instructions.

D. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Protect motors, shafts, and bearings from weather and construction dust.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Do not operate fans for any purpose until ductwork is clean, filters are in place, bearings have been lubricated, and fan has been test run under observation.

1.09 EXTRA MATERIALS

A. Supply two sets of belts for each fan.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. ACME Engineering and Manufacturing Corporation

B. Loren Cook Company

C. PennBarry

D. Greenheck Fan Corporation

2.02 WHEEL AND INLET

A. Backward Inclined: Steel or aluminum construction with smooth curved inlet flange, heavy back plate, backwardly curved blades welded or riveted to flange and back plate; cast iron or cast steel hub riveted to back plate and keyed to shaft with set screws.

B. Forward Curved: Galvanized steel construction with inlet flange, back plate, shallow blades with inlet and tip curved forward in direction of airflow, mechanically secured to flange and back plate; steel hub swaged to back plate and keyed to shaft with set screw.

C. Airfoil Wheel: Steel construction with smooth curved inlet flange, heavy back plate die formed hollow airfoil shaped blades continuously welded at tip flange, and back plate; cast iron or cast steel hub riveted to back plate and keyed to shaft with set screws.

D. Radial: Steel construction with heavy back plate, plate blades welded or riveted to back plate, cast iron or cast steel hub riveted to back plate and keyed to shaft with set screws.

2.03 HOUSING

A. Heavy gage steel, spot welded for AMCA 99 Class I and II fans, and continuously welded for Class III, adequately braced, designed to minimize turbulence with spun inlet bell and shaped cutoff.

B. Factory finish before assembly to manufacturer's standard. For fans handling air downstream of humidifiers, fabricate of galvanized steel.

C. Provide bolted construction with horizontal flanged split housing, where indicated.

D. Fabricate plug fans without volute housing, in lined steel cabinet.

E. Provide flanged inlet and outlet where scheduled.

2.04 BEARINGS AND DRIVES

A. Bearings: Heavy duty pillow block type, selfgreasing ball bearings, with ABMA 9 life at 50,000 hours or roller bearings, or ABMA 11, life at 120,000 hours.

B. Shafts: Hot rolled steel, ground and polished, with keyway, protectively coated with lubricating oil, and shaft guard.

C. Drive: Cast iron or steel sheaves, dynamically balanced, keyed. Variable and adjustable pitch sheaves for motors 15 hp (11.2 kW) and under, selected so required rpm is obtained with sheaves set at mid Fixed sheave for 20 hp (15 kW) and over, matched belts, and drive rated as recommended by manufacturer or minimum 1.5 times nameplate rating of the motor.

D. Belt Guard: Fabricate to SMACNA Duct Construction Standards - Metal and Flexible; 0.106 inch thick, 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.

2.05 ACCESSORIES

A. Fixed Inlet Vanes: Steel construction with fixed cantilevered inlet guide vanes welded to inlet bell.

B. Adjustable Inlet Vanes: Steel construction with blades supported at both ends with two permanently lubricated bearings, variable mechanism terminating in single control lever with control shaft for double width fans.

C. Discharge Dampers: Parallel blade heavy duty steel damper assembly with blades constructed of two plates formed around and welded to shaft, channel frame, sealed ball bearings, with blades linked out of air stream to single control lever.

D. Inlet/Outlet Screens: Galvanized steel welded grid.

E. Access Doors: Shaped to conform to scroll, with quick opening latches and gaskets.

F. Scroll Drain: 1/2 inch steel pipe coupling welded to low point of fan scroll.

G. Flanged Inlet and Outlet: As scheduled on the drawings.

H. Vibration Isolators

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install fans with resilient mountings and flexible electrical leads.

C. Install flexible connections between fan inlet and discharge ductwork; refer to Section 23 3300. Ensure metal bands of connectors are parallel with minimum 1 inch flex between ductwork and fan while running.

D. Install fan restraining snubbers. Adjust snubbers to prevent tension in flexible connectors when fan is operating.

E. Provide fixed sheaves required for final air balance.

F. Provide safety screen where inlet or outlet is exposed.

G. Pipe scroll drains to nearest floor drain.

H. Provide backdraft dampers on discharge of exhaust fans and as indicated.

END OF SECTION 23 3416