

SECTION 23 34 00
HVAC FANS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Fans for heating, ventilating and air conditioning.
- B. Product Definitions: AMCA Publication 99, Standard 1-66.

1.2 RELATED WORK

- A. Section 01 00 00, GENERAL REQUIREMENTS.
- B. Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- C. Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.
- D. Section 23 05 12, GENERAL MOTOR REQUIREMENTS FOR HVAC AND STEAM GENERATION EQUIPMENT.
- E. Section 23 05 41, NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT.
- F. Section 23 05 93, TESTING, ADJUSTING, AND BALANCING FOR HVAC.
- G. Section 23 08 00 COMMISSION OF HVAC SYSTEMS
- H. Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC.
- I. Section 23 73 00, INDOOR CENTRAL-STATION AIR-HANDLING UNITS.
- J. Section 26 29 11, LOW-VOLTAGE MOTOR STARTERS.

1.3 QUALITY ASSURANCE

- A. Refer to paragraph, QUALITY ASSURANCE, in Section 23 05 11, COMMON WORK RESULTS FOR HVAC AND STEAM GENERATION.
- B. Fans and power ventilators shall be listed in the current edition of AMCA 261, and shall bear the AMCA performance seal.
- C. Operating Limits for Centrifugal Fans: AMCA 99 (Class I, II, and III).
- D. Fans and power ventilators shall comply with the following standards:
 - 1. Testing and Rating: AMCA 210.
 - 2. Sound Rating: AMCA 300.
- E. Vibration Tolerance for Fans and Power Ventilators: Section 23 05 41, NOISE AND VIBRATION CONTROL FOR HVAC PIPING AND EQUIPMENT.
- F. Performance Criteria:
 - 1. The fan schedule shall show the design air volume and static pressure. Select the fan motor HP by increasing the fan BHP by 10 percent to account for the drive losses and field conditions.
 - 2. Select the fan operating point as follows:
 - a. Forward Curve and Axial Flow Fans: Right hand side of peak pressure point
 - b. Air Foil, Backward Inclined, or Tubular: At or near the peak static efficiency

- G. Safety Criteria: Provide manufacturer's standard screen on fan inlet and discharge where exposed to operating and maintenance personnel.
- H. Corrosion Protection:
 - 1. Except for fans in fume hood exhaust service, all steel shall be mill-galvanized, or phosphatized and coated with minimum two coats, corrosion resistant enamel paint. Manufacturers paint and paint system shall meet the minimum specifications of: ASTM D1735 water fog; ASTM B117 salt spray; ASTM D3359 adhesion; and ASTM G152 and G153 for carbon arc light apparatus for exposure of non-metallic material.
 - 2. Fans for general purpose fume hoods, or chemical hoods, and radioisotope hoods shall be constructed of materials compatible with the chemicals being transported in the air through the fan.
- I. Spark resistant construction: If flammable gas, vapor or combustible dust is present in concentrations above 20% of the Lower Explosive Limit (LEL), the fan construction shall be as recommended by AMCA's Classification for Spark Resistant Construction. Drive set shall be comprised of non-static belts for use in an explosive.

1.4 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES.
- B. Manufacturers Literature and Data:
 - 1. Fan sections, motors and drives.
 - 2. Centrifugal fans, motors, drives, accessories and coatings.
 - 3. Air curtain units.
- C. Certified Sound power levels for each fan.
- D. Motor ratings types, electrical characteristics and accessories.
- E. Belt guards.
- F. Maintenance and Operating manuals in accordance with Section 01 00 00, GENERAL REQUIREMENTS.
- G. Certified fan performance curves for each fan showing cubic feet per minute (CFM) versus static pressure, efficiency, and horsepower for design point of operation.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Air Movement and Control Association International, Inc. (AMCA):
99-86.....Standards Handbook

- 210-06.....Laboratory Methods of Testing Fans for
Aerodynamic Performance Rating
- 261-09.....Directory of Products Licensed to bear the AMCA
Certified Ratings Seal - Published Annually
- 300-08.....Reverberant Room Method for Sound Testing of
Fans
- C. American Society for Testing and Materials (ASTM):
 - B117-07a.....Standard Practice for Operating Salt Spray (Fog)
Apparatus
 - D1735-08.....Standard Practice for Testing Water Resistance
of Coatings Using Water Fog Apparatus
 - D3359-08.....Standard Test Methods for Measuring Adhesion by
Tape Test
 - G152-06.....Standard Practice for Operating Open Flame
Carbon Arc Light Apparatus for Exposure of Non-
Metallic Materials
 - G153-04.....Standard Practice for Operating Enclosed Carbon
Arc Light Apparatus for Exposure of Non-Metallic
Materials
- D. National Fire Protection Association (NFPA):
 - NFPA 96-08.....Standard for Ventilation Control and Fire
Protection of Commercial Cooking Operations
- E. National Sanitation Foundation (NSF):
 - 37-07.....Air Curtains for Entrance Ways in Food and Food
Service Establishments
- F. Underwriters Laboratories, Inc. (UL):
 - 181-2005.....Factory Made Air Ducts and Air Connectors

1.6 EXTRA MATERIALS

- A. Provide one additional set of belts for all belt-driven fans.

PART 2 - PRODUCTS

2.1 AIR DOORS

- A. Acceptable Products: Berner Series In-Ceiling Mount ICA Hot Water Heated.
- B. Construction: Provide factory assembled units of sufficient structural strength to be supported from ends without intermediate support.
- C. Cabinet:

1. Dimensions: Not to exceed 15.17 in. (38.53 mm) height by 26.110 in. (66.32 mm) deep.
 2. Material - General: Corrosion resistant, Aluminized Steel all welded construction.
 3. Material - Top: Corrosion resistant mill finish Aluminum.
 4. Material - Bottom: Corrosion resistant [Aluminum with polyester white on white painted finish with powder coated inlet screen] [Stainless Steel] riveted and mechanically fastened construction.
 5. [Fasteners: shall be tamper-resistant type.]
- D. Motors: 1/2 hp, 3-speed, sleeve bearings, permanently lubricated and sealed bearings, double extended shafts, continuous duty, with internal thermal-overload protection.
- E. Fans: Balanced forward curved type, double inlet, mounted in matched fan scrolls with aerodynamically formed air inlet venturis.
1. Wheels and housing constructed of galvanized steel.
- F. Discharge Nozzles:
1. Provide uniform velocity across width of air door.
 2. Aperture: 3 1/2 in. (9 mm) slot by width of air door.
- G. Vanes: constructed of airfoil-shaped aluminum extrusions; air-directional vanes adjustable plus or minus 20 degrees to deflect airflow.
- H. Inlet:
1. Location: Bottom.
 2. Screen: Perforated pattern constructed of powder coated steel.
- I. Filters
1. Air inlet filter re-cleanable polyester fire rated with integral filter bracket.

2.2 HEATING ELEMENTS

- A. Hot Water Coil:
1. Certify per ARI 410.
 2. Construction: 16 gauge galvanized steel casing, 5/8 in. (15.8 mm) outside diameter copper steam/hot water coil with aluminum fins and seamless copper headers.
 3. Leak-test at 350 psig (2415 kPa) dry nitrogen.

4. Factory mount on air door intake, protected by perforated metal screen.

2.3 CONTROLS

- A. Controller: UL listed, pre-wired, with solid state control switch.
- B. Each air curtain shall be provided with a factory mounted/wired Intelliswitch digital programmable controller and shall include the following:
 1. 5 volt DC output for control circuit
 2. Lock and Unlock tamper-proof features
 3. Motor and switching suitable for 3 fan speed settings
 4. Fan start & fan stop time with provisions to program start & stop times for two different operating times per week.
 5. Programmable settings for all user controlled options.
 6. Adjustable time delay from 0 -10 minutes
 7. Five preset and three customizable programs - On, Off, Automatic, Deluxe, Comfort Plus, Program 1, Program 2 and Program 3.
 8. Fan fail lockout
 9. Built-in capillary style thermostat for heated units with temperature settings of 1° C to 32° C or 35° F to 90° F
 10. Emergency stop
 11. Clock with lighted display
- C. Unit mounted display.
 1. Automatic Door Switch: Switch automatically activates unit when door opens and deactivates unit when door closed after 10 Minutes or when thermostat set point is reached.
 2. Reed Switch: Magnetic.
- D. Remote Control: controller for use with Intelliswitch digital programmable controller.

2.4 MOUNTING ACCESSORIES

- A. Provide brackets and other mounting accessories as required permitting installation and functioning of air door to meet project conditions of use.
- B. Mounting accessories shall be painted, aluminized or equal, steel.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that door frame and adjacent construction are installed and ready to receive work of this Section.
- B. Verify that utilities are in correct location and are of correct capacities for specified products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install air doors where shown on Drawings and in accordance with [shop drawings and] manufacturer's instructions.
- B. Securely install air doors plumb, level, and as close as practical to top of opening and face of wall.
- C. Install switches where indicated on drawings.

3.3 CONNECTIONS

- A. Connect air door to utilities as specified in other Division 23 and Division 26 sections.

3.4 FIELD QUALITY CONTROL

- A. Provide a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- B. Test and operate air door to be sure that it performs as intended.

3.5 ADJUSTING

- A. Adjust motor and fan speed to prepare installed products to perform properly.
- B. Adjust discharge nozzles to deflect air outward (unless otherwise required).

3.6 CLEANING

- A. Clean prior to commissioning.

B. Repair or repaint damage to finishes on exposed-to-view surfaces.

3.7 SYSTEM STARTUP

A. Test and operate air door to be sure that it performs as intended. Adjust discharge nozzles to deflect air outward (unless otherwise required).

3.8 DEMONSTRATION

A. Demonstrate for Owner's maintenance personnel how to adjust, operate, and maintain air curtains.

END OF SECTION

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