Division 23 Heating, Ventilation and Air Conditioning (HVAC)
SECTION 23 39 00
FANS AND ACCESSORIES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. The Contractor is referred to the Instructions to Bidders and General Conditions, NYCHA Contracts; the Special Notice to Contractors; the Form of Proposal; the Form of Bid Bond; Division 01 - General Requirements of the Contract Specifications; the Contract Drawings and all Amendments and Addenda thereto; all of which govern the Work of this Section.

1.2 WORK INCLUDED

A. Furnish and install all fans of the various types, arrangement and sizes specified herein and as scheduled on the drawings.

B. Fans shall include all motors, drives, curbs, flashing, special coatings and accessories.

C. Furnish and install motorized dampers with all fans.

D. Furnish and install all roof curbs.

1.3 RELATED SECTIONS

A. Examine all drawings and criteria sheets and all other Sections of the Specifications for requirements which affect work under this Section whether or not such work is specifically mentioned in this Section.

1.4 REFERENCES

A. Applicable provisions of the following Codes and Trade Standard Publications shall apply to the work of this Section, and are hereby incorporated into, and made a part of the Contract Documents.

B. Material standards shall be as specified or detailed hereinafter and as following:

1. AMCA 99 – Standards Handbook; 1986.
2. AMCA 210 – Laboratory Methods of Testing Fans for Rating Purposes; 1985.
3. AMCA 261 – Directory of Products Licensed to Bear the AMCA Certified Ratings Seal; 1995.
4. AMCA 300 – Test Code for Sound Rating Air Moving Devices; 1994.
5. AMCA 301 – Method of Publishing Sound Rating Air Moving Devices; 1994.
6. NEMA MG 1 – Motors and Generators; 1993 (and Revision 1).
7. UL 705 – Power Ventilators; 1994.

1.5 SUBMITTALS

A. See Section 23 05 00 and General Conditions for additional requirements.

B. Submit certified curves showing fan performance with system operating points plotted on curves.

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C. Submit motor data sheets including motor efficiency and power factor at various loadings of nameplate horsepower. Motor efficiency and power factor shall be shown for 100%, 75% and 50% of nameplate horsepower. Submit data on efficiency and power factor required for motors 1 HP and above only. Motors shall have premium efficiency motors with minimum efficiency on motors listed in specification.

D. Submit sound power levels for each size and type of fan. Sound levels shall be in all (8) octave bands for discharge of fan, inlet to fan, and radiated noise through casing.

E. Submit certified shop drawings indicating all dimensional data and operating and maintenance clearances.

1.6 QUALITY ASSURANCE

A. Fans shall conform to most recent AMCA Bulletins regarding construction and testing. Fans shall be tested and rated per AMCA and shall be selected in proper operating range without motor overloading and fan surge.

B. Manufacturers must prove experience in the production of similar products of this type for at least ten (10) years prior.

C. Fans shall be air and sound certified in accordance with AMCA 210 and 300 and shall bear the AMCA seal.

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

1.7 ENVIRONMENTAL REQUIREMENTS

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

PART 2 - PRODUCTS

2.1 GENERAL

A. Manufacturers acceptable contingent upon product's compliance with the specifications are as follows:

1. Roof Mounted Centrifugal Fans
    a. Greenheck Fan Corp.
    b. Loren Cook Co.
    c. ACME Fan Co.
    d. Twin City Fan.
    e. Or equal.

B. Selection and Balancing

1. Provide and install items as listed in equipment schedules, as shown on drawings, and as specified, complete in all respects to the functions intended.
2. Provide fans capable of accommodating static pressure variations of ±10%.

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3. Provide balanced variable sheaves for motors 15 HP and under.
4. Statically and dynamically balance fans in the field to eliminate vibration or noise transmission to occupied areas of the building. Provide certificate of compliance from manufacturer.
5. Provide OSHA and ANSI approved belt guards on interior mounted belt driven fans. Provide weatherproof ventilated housing for exterior mounted fans.
6. Provide safety, bird or insect screen where inlet or outlet is exposed.
7. All fans shall be manufactured in accordance with this specification even where techniques are required which are not considered standard by that manufacturer.
8. Verify fan arrangement with the Contractor including motor location for servicing and discharge arrangements for proper airflow.
9. Where fixed speed sheaves are specified for a particular fan, provide (2) additional sheaves (one motor and one drive) as necessary for final air balancing.

C. Painting

1. Each fan component shall be thoroughly cleaned, degreased and deburred before the application of a rust preventive primer.
2. Two (2) coats of a rust preventive primer shall be applied under a topcoat of air-dried epoxy or enamel. Minimum coating thickness shall be 5 to 6 mils. The final coat shall be applied after final assembly to all surfaces.
3. Special coatings shall be provided for corrosive exhaust systems as specified under the fan specification.

D. Additional Corrosion Protection

1. Fans serving laboratory fume hoods, or as scheduled on the drawings, shall have all components in contact with the airstream provided with a minimum of (2) coats of 5 mil thick air-dried Heresite VR500 (or equal) coating.

2.2 ROOF MOUNTED CENTRIFUGAL FANS

A. Provide belt driven centrifugal type roof mounted fans with capacities as indicated in the equipment schedules on the mechanical drawings. Fans complete with curb cap suitable for curb mounting. Roof curbs shall be provided by the HVAC Contractor.

B. Fans housing shall be heavy gauge spun aluminum with gauges as listed in the following schedule, mounted to a rigid support network constructed of galvanized or epoxy coated steel. Fan housing shall have a rigid wire bird screen mounted to the unit discharge.

C. Drive frame, bearing support, and motor support shall be heavy gauge galvanized steel.

D. Fan inlet cone shall have a die spun hyperbolic shape, matched to the wheel cone to ensure full loading of fan blades to maximize efficiency.

E. Fan wheel shall have single thickness backward inclined blades or true hollow airfoil shaped blades. Wheel characteristics shall be non-overloading.

F. Fan inlet cone, wheel cone, blades and backplate shall be constructed of heavy gauge aluminum.

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G. Blades shall be welded, riveted or bolted to wheel cone and backplate.

H. Wheel shall be statically and dynamically balanced.

I. Drive shaft shall be ground and polished high grade steel supported by permanently lubricated sealed ball bearings housed in a cast iron flanged mounted housing.

J. Bearings shall be sized for a minimum L-10 life of 100,000 hours at maximum fan operating conditions including belt pull. Bearings shall be selected in accordance with standards set forth by the Anti-Friction Bearing Mfrs. Assn.

K. Drives shall be sized for a minimum of 1.65 times the fan motor horsepower. Sheaves shall be adjustable and have a tapered split and keyed hub. Belts shall be oil resistant 24,000-hour non-static type.

L. Motor and drive assembly shall be mounted on neoprene vibration isolators.

M. Motor, drive, and bearings shall be out of the exhaust airstream and housed to facilitate ease of maintenance. Motor cooling shall be through the fan drive and motor housings.

N. Motor shall be wired to a factory installed disconnect switch. All wiring and electrical components shall comply with the National Electric Code and be UL listed.

O. Motors shall be TEFC in accordance with the Motor Section of the Special Conditions.

P. Provide automatic damper. Damper to open when fan is energized and close when fan is de-energized. See Sheet Metal Section for damper specification.

Q. Damper to be field installed in duct at fan inlet.

R. All fasteners shall be stainless steel.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fans shall be installed in accordance with manufacturer recommendations, Contract Drawings and reviewed submittals.

B. Fans shall be installed so as to ensure easy accessibility for service or removal or replacement of all components such as, but not limited to, fans, motors, belts, drives, bearings, dampers, actuators, isolators, and field connections.

C. Provide fixed sheaves as necessary for final air balancing. The Contractor shall install the fixed sheave after balancing with the Contractor to adjust the fans.

D. Set roof mounted fans on sound absorbing insulated curbs. Coordinate installation with General Contractor. Curbs shall be provided by the HVAC Contractor. The HVAC Contractor shall provide all counter flashing.

E. Make all penetrations through roof or vertical walls watertight. Submit methods of sealing to Architect/Engineer for review and approval.

F. All fans shall have flexible inlet and outlet couplings to prevent vibration transmission to ductwork.

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G. Field adjustment including belt alignment, wheel balancing, belt tension, greasing of bearings, installation of belt guards, and other loose parts shall be provided by the HVAC Contractor.

3.2 COORDINATION

A. The Contractor shall coordinate the fan arrangement with the coordinated ductwork layout prior to ordering the fan. The Contractor shall provide all labor and materials necessary to change fan arrangement in the field when fan arrangement does not match ductwork.

B. The inlet and discharge ductwork shall have a minimum straight run of (2) fan diameters upstream and downstream of the fan. The Contractor shall notify the Engineer in writing if these conditions cannot be achieved. Installation of improper inlet/discharge conditions without the review of the Engineer shall be corrected in the field at no cost to the Owner.

C. The discharge duct arrangement shall comply with AMCA recommended layouts for elbows after fans.

D. The Contractor shall receive and inspect all fans and motors to make sure that all fans are received without defect. All defective or damaged fans shall be returned to the manufacturer by the Contractor for replacement.

E. The Contractor shall properly protect all equipment to prevent damage from water, dirt, etc. Protection shall include temporary plastic wrap to keep equipment in original factory condition. Fans used for temporary ventilation during construction shall be totally cleaned and refurbished prior to turnover to the Owner.

F. The HVAC Contractor shall mount, and vibration balance all fans. The Electrical Contractor shall furnish and install power wiring to the fan motor and verify proper fan rotation. The HVAC and Electrical Contractors shall coordinate the starter requirements to ensure that the proper starter is installed for non-standard motors. The ATC Contractor shall wire all interlocking wiring to the fan.

G. The HVAC Contractor shall mount all automatic control dampers on the fan either shipped loose or provided by the ATC Contractor.

H. The HVAC Contractor shall mount all field mounted flow measuring devices on the inlet or discharge of the fan prior to fan installation.

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END OF SECTION