SECTION 23 34 00

EXHAUST AND SUPPLY AIR FANS

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

A. Comply with Division 1 - General Requirements and referenced documents.

B. Comply with all other Division 23 Sections, as applicable. Refer to other Divisions for coordination of work with other portions of work.

1.2 SYSTEM DESCRIPTION

A. Provide exhaust fans of the type, rotational speed, and arrangement indicated.

B. Each fan shall be rated to deliver the capacity indicated in the tabulation on the Schedule against the external resistance of the system in which it operates.

C. Provide high efficiency motors as specified in Section 23 05 13 for motors one (1) horsepower and larger.

1.3 QUALITY ASSURANCE

A. All equipment and materials shall be new and of the best quality.

B. All equipment and materials shall be installed by experienced mechanics and as recommended by the fan manufacturer.

C. All fans shall bear the AMCA and U.L. Labels. Capacity ratings shall be based on tests performed in accordance with the latest version of AMCA Standard 210 and Publication 211.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's descriptive literature and installation instructions together with fan curves.

B. Shop Drawings: Submit in accordance with Section 23 05 00.

C. When equipment, other than specified, is proposed, the Contractor shall be completely responsible for electrical revisions necessitated. Submit listing of electrical feeder and conduit sizes, breaker sizes, and motor starter sizes for each item of equipment where motor sizes are required to be larger than specified to meet scheduled capacities.

1.5 PRODUCT HANDLING

A. Cover and protect fans in transit and at site. Fans not properly protected and stored and which are damaged or defaced during construction shall be rejected. Cover all openings to prevent entrance of dirt and debris until final connections are made.

B. Storage and protection of materials shall be in accordance with Section 23 0500.

PART 2 - PRODUCTS

2.1 FANS – POWER ROOF VENTILATORS (UPBLAST AND DOME TYPE)

A. Fans shall be direct or belt-drive, down blast or up blast type, units as indicated, positively ventilated, permanently lubricated, have sealed motors and fan shafts with ball bearings. Belt drive units shall be complete with cast iron adjustable sheaves.

B. Provide centrifugal all aluminum fans with static and dynamic balance and with capacities as scheduled on drawings, all tested, approved, rated and bearing the AMCA Seal of Approval.

C. Provide all aluminum weatherproof housing, venturi throat inlet, bird screen and disconnect. Provide for concealed wiring such that power wiring does not penetrate roof but runs within curb.

D. New Curbs shall be minimum eighteen inches (18”) high, made of galvanized steel and be insulated with minimum 1-1/2”, 1-1/2 PCF density insulation, have continuous perimeter treated wood nailer and be furnished with a neoprene isolation strip to be placed on the top of the nailer. Provide sloped bottom of curbs to match roof pitch to allow for fans to be installed level. Custom adapter curbs shall be minimum height required to have no greater than a 45 degree offset to existing curb and be constructed of minimum 18 gauge G-90 galvanized steel. Custom adapter curbs shall be fully welded with no seams and fully sloped so that there are no flat portions of the curb in the horizontal (Refer to Drawings for curb type). Curbs shall be fully gasketed between the curb top and unit bottom with the curb providing full perimeter support, cross structure support and air seal for the unit. Curbs shall provide for the full support for the exhaust duct. For custom adapter curbs provide shop fabricated curb sized for existing curb dimensions. Provide for a separate thru utility vertical entry point within the footprint of the inside of the curb; no penetrations allowed in the side (vertical portions) of curbs. Curbs shall be fully perimeter insulated with minimum one inch (1") thick neoprene coated rigid fiberglass insulation, minimum 1.5 pcf density, either factory or field insulated.

E. Furnish automatic backdraft dampers for all fans, unless indicated otherwise. Only up blast grease exhaust models will not have backdraft dampers.

F. Provide grease container, hinged curb-base for inspection and cleaning of duct, and minimum 16" high vented curb extension to sit on top of base curb on all up blast grease hood exhaust fans. Minimum distance required from top of finished roof to grease exhaust discharge elevation shall be 40”. Where the 16” extension does not achieve this elevation requirement increase the base curb height as required, in two inch (2”) increments, to achieve this requirement.

G. Use up-blast type fans for dishwasher and light duty science laboratory fume hoods, middle or High School level, and provide an epoxy coating on all materials of construction exposed to the air stream.

H. For kiln exhaust systems the exhaust fan and drive assembly shall be rated for a minimum of 300 Deg. F.

I. Provide SCR fan speed controller on direct drive motors with minimum stop for motor protection to be factory mounted on unit to be used for final air balance purposes.

J. Acceptable manufacturers:

1. Loren Cook.
2. Greenheck.
3. ACME.
4. Penn.
5. Flo-Aire.
6. Twin City Fans and Blowers.

2.2 CEILING CABINET EXHAUST FAN

A. Provide in-line type ceiling cabinet exhaust fans with the capacities and characteristics scheduled.

B. Fans shall be AMCA certified and bear the label thereof.

C. Casing shall be made of galvanized steel and acoustically insulated for quiet operation. Housing shall be installed to provide for accessibility and removal of motor and blower without removing housing from the system.

D. Motors shall be permanently lubricated and have accessible internal wiring. Provide permanent split capacitor (PSC) motors. Provide external toggle disconnect switch with each fan.

E. Provide noiseless backdraft damper integral with unit.

F. Provide SCR fan speed controller with minimum stop for motor protection to be factory mounted on unit to be used for final air balance purposes.

G. Provide flat roof caps of the sizes indicated for each fan. Each cap shall be a minimum of eight inches (8") in diameter and shall be the curb mounted type to ensure proper

flashing. New curbs shall be minimum 18" high and curb extensions shall be a minimum of 12” high, made of galvanized steel and be insulated with minimum 1-1/2", 1-1/2 PCF density insulation, have continuous perimeter treated wood nailer and be furnished with a neoprene isolation strip to be placed on the top of the nailer. Provide sloped bottom of curbs to match roof pitch to allow for roof caps to be installed level.

H. Acceptable manufacturers:

1. Loren Cook Gemini.
2. ACME Masterette.
3. Greenheck SP/CSP.
4. Penn Zephyr.
5. Flo-Aire.
6. Twin City Fans and Blowers, T or TL series.

2.3 AIR SUPPLY PACKAGED FANS

A. Furnish and install air supply packaged fans of capacities and sizes as indicated on the Drawings.

B. Fan housing shall be a heavy gauge G-90, galvanized steel material, be of low silhouette design, shall have all corners mitered, be completely weatherproof, and have a removable cover. Insulated cover shall be held in place with four (4) secure type latches for quick and easy access.

C. Housing shall be equipped with, permanent, one inch (1") thick aluminum type washable filters, and shall be easily removed for cleaning.

D. Fans shall be roof mounted on minimum eight inch (8") high factory fabricated, acoustically insulated, two inch (2") thick, galvanized steel roof curbs. Provide two inch (2") wide continuous strip of 3/8" thick neoprene rubber along curb top rail to limit mechanical vibration and noise. Provide sloped base curbs to allow fan to be set level on the roof, as applicable.

E. Fan drives shall be the belt drive type. Belts shall be the non-static oil resistant type. Motor and drive assembly shall be accessible from the roof. Motor speed shall be 1750 RPM. Motor drives shall be machine cast iron and variable pitch up through 5 horsepower and fixed pitch over 5 horsepower. Shafts shall be solid steel, ground and polished. Motor and blower bearings shall be permanently lubricated with sealed ball bearings.

F. Fan wheels shall be double width double inlet (DWDI) forward curved centrifugal blowers. Fan assembly capacities shall be rated in accordance with AMCA standards with air filters in place, and bear the seal thereof. Furnish duct connection adaptor.

G. Unit blower assembly shall be mounted on vibration isolators.

H. Provide bird screens if not inherently protected through design.

I. Furnish 120 Volt, single phase, motorized backdraft dampers.

J. Furnish disconnect switch within blower housing for fan servicing.

K. Acceptable manufacturers:

1. Loren Cook, ASP.
2. Greenheck.
3. ACME.
4. Brundage.
5. Penn Ventilator.
6. FloAire.
7. Twin City Fans and Blowers.

PART 3 - EXECUTION

3.1 DELIVERY AND PROTECTION

A. Contractor to perform installation and start-up to include installation of all accessories as required to make a complete and operating system.

B. All equipment shall be handled carefully to avoid damage and be protected from exposure to the weather and dirt. All equipment shall be examined upon delivery to the site and evidence of abuse, damage, or exposure to weather and dirt shall be grounds for refusal to accept individual pieces of equipment. Rejected items shall be replaced promptly at no cost to the Owner.

3.2 FANS – INSTALLATION

A. Install fans suspended from structure, or as indicated, and provide vibration isolation internally or externally as required, as specified herein, or as specified in other sections of these specifications.

B. Suspended fans shall be set level with all thread rod from structure above.

C. Field install motor and other accessories not factory installed.

D. Verify operation of automatic motorized and backdraft dampers.

E. Adjust fan drives and replace sheaves as required to obtain scheduled capacities as directed by the Test and Balance firm.

3.3 ROOF MOUNT CURBED EXHAUST FANS

A. Install all roof mounted exhaust fans on the factory fabricated and insulated roof curbs.

B. Flash and counterflash to prevent leakage.

C. Mount fan base on neoprene strips on curb tops.

D. Secure fans base to curb with non-ferrous fasteners.

E. Field install motor and other accessories not factory installed.

F. Verify operation of backdraft and motorized dampers.

G. Adjust fan drives or replace sheaves as directed by the Test and Balance Firm to obtain scheduled capacities to and as required to meet field conditions.

3.4 CLEAN-UP

A. Clean all fans and components after installation is complete.

B. Vacuum clean all debris from inside scrolls, on fan wheels and at drives.

END OF SECTION