SECTION 234100 - AIR FILTER ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-01 Specification sections, apply to work of this section.

1.2 SCOPE

A. Furnish and install complete air filter assemblies of the types, sizes and capacities indicated.

1.3 RELATION TO OTHER WORK

A. Refer to the section, "General Mechanical Provisions", for related requirements. Refer to other sections of Division 23 and to all other applicable portions of the Drawings and Specifications.

1.4 SHOP DRAWINGS

A. Include complete performance data at the scheduled operating conditions; dimensions; weights; performance curves; airside pressure losses; quantities; descriptions; and any other necessary information.

PART 2 - PRODUCTS

2.1 GENERAL

A. Filters shall pass applicable air quantities at velocities and pressure drops which are within manufacturer's recommended operating ranges and as specified and scheduled.

B. Filter Manufacturers: Continental; American Air Filter; Cambridge; Farr; Flanders; Purafil; or equivalent.

C. Filter Housing Apparatus Manufacturers: Same manufacturer as the applicable filters or same manufacturer as the air handling unit in which installed, whichever manufacturer is applicable.

D. Air Handling Unit Filter Sections: Shall be of adequate size to accept specified filters. Air handling unit filter sections shall be factory made by air handling unit manufacturer or by filter manufacturer to be specifically compatible with applicable air handling unit.

E. Fan Coil Unit and Fan Powered Terminal Unit Filter Box: Integral part of fan coil unit or terminal unit assembly.

1. Access: Filter sections shall be designed for side service access unless otherwise indicated.

2.2 REPLACEABLE THROWAWAY FILTERS, 1-INCH THICK

A. Dacron or fibrous glass multi-ply fiber with 3 graduated density plies. Equal to Continental Conoply Type LD 3 ply, AAF 5700. Galvanized steel or aluminum or fiberboard frame suitable for mounting in applicable filter box. Minimum efficiency: 25% NBS atmospheric dust spot efficiency. Applicable uses: fan coil units; fan powered terminal units at heating coils contained therein.

2.3 INITIAL PREFILTERS FOR AIR HANDLING UNITS

A. Filter Housing: Integral part of air handling unit assembly. (If not part of AHU assembly, provide external filter housing.)

B. Filters: Extended surface, pleated panel type; disposable; double-wall chipboard frame with diagonal support members; 2-inches thick; average efficiency no less than 25-30% based on ASHRAE 52.2-99 test method; operate at an initial resistance of not more than 0.25-inches w.g.s.p. at 500 fpm face velocity. Design base: Farr 30/30.

2.4 FINAL PREFILTERS FOR AIR HANDLING UNITS

A. Filter Housing: Integral part of air handling unit assembly. (If not part of AHU assembly, provide external filter housing.)

B. Filters: Air filters shall be high performance, extended area, deep pleated, disposable type. They shall consist of a filter element, media retainer holding frame and sealer frame. The filter element shall be of the high performance, pre-formed, deep pleated, disposable type. The media shall be microfine glass fiber which is reinforced by a laminated synthetic backing. The filter shall have an average efficiency of 80-85% on ASHRAE Test Standard 52.2-99. It shall have an average arrestance of no less than 98%. The filter shall be listed by Underwriters' Laboratories as Class 1.

C. Media retainer: shall be of welded steel construction and shall be designed in such a manner that it supports the multiple pleats of the filter element against the direction of airflow. The media retainer shall be PVC coated and designed to totally eliminate the possibility of oscillation and/or sagging. Holding Frames shall be factory fabricated of 16 gauge galvanized steel and shall be equipped with gaskets and four spring type positive sealing fasteners. Fasteners shall be capable of being attached or removed without the use of tools. Sealer frames shall be fabricated of 20 gauge galvanized steel and shall be equipped with gasketing material on the rear flange of the sealer frame.

D. Design Base: Farr HP-100.

2.5 EXTERNAL FILTER HOUSING FOR AIR HANDLING UNIT FILTERS

A. Filter Housing: Holding frame of galvanized steel reinforced with bracing and gussets; constructed to provide positive air seal and retainage of filter elements; doors equipped with heavy duty latches and resilient gasketing; designed for side access. Housing shall accept both initial and final prefilters. Applicable uses: where filter housing is not an integral part of air handling unit assembly. Design base: Farr Model 3P Universal Glide/Pack.

2.6 ACTIVATED CARBON FILTERS

A. Activated carbon filters shall be the full flow high velocity type. Each filter shall contain 90 pounds of activated carbon per 2000 CFM. Filters shall be of size and quantity as indicated on the plans. The casing shall be constructed of galvanized steel: The activated carbon in each filter shall be contained in removable panels constructed of high heat, medium impact polystyrene plastic, to withstand corrosion, and so installed as to preclude the possibility of air bypass. The panels shall contain internal separators to minimize the settling of the carbon and shall be capable of being refilled by the owner. The activated carbon shall have an activity rating of at least 50 minutes by the Standard Government Accelerated Chloropicrin Test. Design base: Farr CF-4.

2.7 HEPA FILTERS

A. Each module shall consist of an all metal corrosion resistant steel casing, steel center divider, filter pack, adjustable flow control, spun steel inlet collar, face screen and integral provisions for attachment of seismic restraints. Module shall be provided for use in lay-in type ceiling and shall be custom manufactured in size as required to fit the lay-in ceiling furnished.

B. The filter pack shall be made with pleated all-glass filter media and safe-edge corrugated aluminum separators. The filter media, separators, and casing components shall be encapsulated in a high stability compound to eliminate any possibility of leaks around the filter media or through the casing joints.

C. The flow control system shall provide each module with the capability of being adjusted to a specified discharge velocity between 25 and 110 fpm with a supply air static pressure between 0.5" and 2.0" w.g. The discharge velocity shall be uniform across the projected face of the module within a tolerance of + 20 fpm.

D. Flow control adjustments and measurements shall be made from the discharge face of the module. A single port of volumetric flow and filter resistance measurements and adjustments and measurement of upstream test aerosol concentration shall be provided in the face of the unit.

E. The module shall be protected by a diamond perforated anodized aluminum screen sealed to the face of the unit. The module shall provide a minimum of 5/8" of bearing and sealing surface when installed on a 1-1/2" T-Bar system.

F. The complete module shall be manufactured, tested and supplied by filter manufacturer. The completed unit shall be tested for efficiency and leaks and certified to have a minimum efficiency of 99.99% on 0.3 micron thermally generated particles and be leak-free per Federal Standard 209B.

G. After test and cleaning, the module face and inlet collar shall be sealed with removable shields to prevent further contamination and protect against damage.

H. Design Base: Cambridge model CAM-1.

PART 3 - EXECUTION

3.1 GENERAL

A. Arrangement and Access: Arrange, install and make provisions for easy access to and removal and replacement of filters. Provide access doors and/or panels as necessary.

B. Coordination and Matching: Coordinate assembly components and properly match sizes and quantities of filters with related air moving systems (e.g., air handling units, fan coil units, filter banks) so that filter assemblies will operate in accord with operating conditions, sizes and capacities as listed in this section or as otherwise indicated.

3.2 MANOMETER

A. Provide a filter manometer for each separate filter bank type (e.g., initial prefilter bank, final prefilter bank) of each air handling unit filter assembly. Do not provide for fan coil units or terminal units. Units shall be complete with pressure fittings, tubing, vent valves, lags, fluid, and the like as required for a complete installation. Acceptable: Dwyer Series 250-AF with pressure range as applicable for filter bank. Not required for fan coil units. Manometers shall be installed in strict accordance with the manufacturer's instructions and in a manner which will not compromise filter access. Provide mounting brackets as required for proper installation. Set red and green signal flags for proper indication of status of the filters involved.

3.3 MISCELLANEOUS SUPPORT STEEL AND HARDWARE

A. Provide as required to provide for adequate support and structural integrity of each filter bank. In no case shall supplementary supports be less than those indicated or recommended by the filter manufacturer in his standard installation instructions.

3.4 FILTER ASSEMBLY LOCATIONS

A. Where scheduled and shown on the drawings.

3.5 ORIGINAL AND SPARE FILTER SETS

A. Provide an original filter set and two (2) spare filter sets for each unit having an air handling equipment filter assembly specified above. Upon initial start-up, each filter assembly shall be provided with a complete original filter set. Prior to or at the time of final test and balance, this original filter set shall be replaced with a complete new spare filter set. However, if at the time of final test and balance there is still useful operating life remaining in the initial filter set (i.e. the filters are still operating within their recommended pressure drop limits for the particular application), then the Contractor (if he is given written approval by the final test and balance agency) may give the spare filter sets to the Owner (at a place of the Owner's selection on the site) in lieu of replacing the original filters with the spare filters.

END OF SECTION 234100