PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Replaceable (throwaway) extended area pleated filters.

B. Disposable, extended area pleated filters.

C. Disposable panel filters.

D. Washable permanent panel filters.

E. Filter fames and housings.

F. Filter Gauges

1.02 REFERENCE STANDARDS

A. AHRI 850 – Performance Rating of Commercial and Industrial Air Filter Equipment.

B. ASHRAE Std 52.2 - Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size.

C. IEST Recommended Practice RP-CC034: HEPA and ULPA Filter Leak Tests.

D. ISO Standard 29463: New Test Standard for HEPA Filters.

E. MIL-STD-282 - Filter Units, Protective Clothing, Gas-Mask Components, and Related Products: Performance-Test Methods.

F. NFPA 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems

G. NFPA 90B – Standard for the Installation of Warm Air Heating and Air-Conditioning Systems.

H. UL 586 - High Efficiency, Particulate, Air Filter Units; Current Edition, Including All Revisions.

I. UL 900 - Standard for Air Filter Units; Current Edition, Including All Revisions

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data including, dimensions, weights, required clearances and access, flow capacity including initial and final pressure drop at rated air flow, efficiency and test method, fire classification, and installation instructions.

B. Shop Drawings: Submit manufacturer's assembly-type shop drawings for filter rack assemblies indicating dimensions, materials, and methods of assembly of components.

C. Maintenance Data: Submit maintenance data and spare parts lists for each type of filter and rack required. Include this data, product data, and shop drawings in maintenance manual; in accordance with requirements of Division 1.

1.04 QUALITY ASSURANCE

A. NFPA Compliance: Comply with applicable portions of NFPA 90A and 90B, and NEC pertaining to installation of air filters and associated electric wiring and equipment.

B. UL Compliance:

1. Comply with UL Standards pertaining to safety performance of air filter units.

C. ASHRAE Compliance: Comply with provisions of ASHRAE Standard 52 for method of testing, and for recording and calculating air flow rates.

D. AHRI Compliance: Comply with provisions of AHRI Standard 850 pertaining to test and performance of air filter units.

1.05 SPARE PARTS

A. If HVAC equipment is used during the construction period, Contractor shall provide one set of filters (if system is designed to include pre-filters and after-filters, provide only pre-filters) when the unit is started and replace filters when needed, but not less than every month. On the day of substantial completion, the Contractor shall clean the unit and provide a new set of filters at each location in the unit.

PART 2 - PRODUCTS AND MATERIALS

2.01 REPLACEABLE (THROWAWAY), EXTENDED AREA PLEATED FILTERS

A. Manufacturers:

1. AAF/Flanders.
2. Bioclimatic Air Systems
3. Columbus Industries, Inc..
4. Camfil Farr.
5. Filtration Group
6. Koch Filter Corp.
7. Research Products Corp.

B. Media: UL 900 Class 2, pleated, lofted, non-woven, reinforced cotton and synthetic fabric; supported and bonded to welded wire grid. Wire grid shall be of non-corrosive metal or metal coated with rust inhibitor.

1. Frames: Minimum 20 gauge galvanized steel.
2. Gaskets: Provide gaskets to prevent unfiltered air by-passing between media frames and holding members.
3. Nominal Thickness: 1, 2 or 4 inch as noted on the drawings.

C. Minimum Efficiency Reporting Value (MERV): Provide filters with MERV 6, 8 or 13 rating as scheduled on the drawings. Testing shall be in accordance with ASHRAE Std 52.2.

D. Rating per ASHRAE 52.2:

1. MERV 6 filters: At 500 fpm, maximum initial resistance of 0.3” WG and final resistance of 0.9” WG.
2. MERV 8 filters: At 350 fpm for 1 inch filters and 500 fpm for 2 inch and 4 inch filters, maximum initial resistance of 0.3 inch WG and final resistance of 0.9 inch WG.
3. MERV 13 filters: At 350 fpm for 1 inch filters and 500 fpm for 2 inch and 4 inch filters, maximum initial resistance of 0.41 inch WG and final resistance of 0.9 inch WG.

2.02 DISPOSABLE, EXTENDED AREA PLEATED FILTERS

A. Manufacturers:

1. AAF/Flanders.
2. Bioclimatic Air Systems

3. Columbus Industries, Inc..
4. Camfil Farr.
5. Filtration Group
6. Koch Filter Corp.
7. Research Products Corp.

B. Media: UL 900 Class 2, pleated, synthetic fabric or fine, glass fiber; supported and bonded to welded wire grid. Wire grid shall be of non-corrosive metal or metal coated with rust inhibitor. Provide metal contour stabilizers where required by manufacturer for adequate support.

1. Frames: Minimum 20 gauge galvanized steel.
2. Gaskets: Provide gaskets to prevent unfiltered air by-passing between media frames and holding members.
3. Nominal Thickness: 2, 4, 6 or 12 inch as noted on the drawings.

C. Minimum Efficiency Reporting Value (MERV): Provide filters with MERV 9, 11, 13 or 14 rating as scheduled on the drawings. Testing shall be in accordance with ASHRAE Std 52.2.

D. Rating per ASHRAE 52.2:

1. MERV 9 filters: For 2 inch and 4 inch filters, at 500 fpm, maximum initial resistance of 0.30 inch WG and final resistance of 1.0 inch WG. For 6 inch filters at 300 FPM, maximum initial resistance of 0.2 inch WG and final resistance of 1.5 inch WG. For 12 inch filters at 500 FPM, maximum initial resistance of 0.4 inch WG and final resistance of 1.5 inch WG.
2. MERV 11 filters: For 2 inch and 4 inch filters, at 500 fpm, maximum initial resistance of 0.50 inch WG and final resistance of 1.0 inch WG. For 6 inch filters at 300 FPM, maximum initial resistance of 0.2 inch WG and final resistance of 1.5 inch WG. For 12 inch filters at 500 FPM, maximum initial resistance of 0.35 inch WG and final resistance of 1.5 inch WG.
3. MERV 13 filters: For 2 inch and 4 inch filters, at 500 fpm, maximum initial resistance of 0.50 inch WG and final resistance of 1.0 inch WG. For 6 inch filters at 300 FPM, maximum initial resistance of 0.45 inch WG and final resistance of 1.5 inch WG. For 12 inch filters at 500 FPM, maximum initial resistance of 0.45 inch WG and final resistance of 1.5 inch WG.

2.03 DISPOSABLE PANEL FILTERS

A. Manufacturers:

1. AAF/Flanders.
2. Bioclimatic Air Systems
3. Columbus Industries, Inc..

4. Camfil Farr.
5. Filtration Group
6. Koch Filter Corp.
7. Research Products Corp.

B. Media: UL 900 Class 2, interlaced glass fibers, sprayed with non-flammable, non-drip, non-volatile adhesive.

1. Casing: Carboard frame.
2. Nominal Thickness: 1 or 2 inch as noted on the drawings.

C. Minimum Efficiency Reporting Value (MERV): Provide filters with MERV 4 rating. Testing shall be in accordance with ASHRAE Std 52.2.

D. Rating per ASHRAE 52.2: At 500 FPM, maximum initial resistance of 0.15 inch WG and final resistance of 0.50 inch WG.

E. Holding Frames: 20 gauge, 0.0359 inch minimum galvanized steel frame with expanded metal grid on outlet side and steel rod grid on inlet side, hinged with pull and retaining handles.

1. Gaskets: Provide gaskets to prevent unfiltered air by-passing between media frames and holding members.

2.04 WASHABLE PERMANENT PANEL FILTERS

A. Manufacturers:

1. Air Filters Inc.
2. Columbus Industries, Inc..
3. Camfil Farr.
4. Koch Filter Corp.
5. Research Products Corp.
6. Smith Filter Corporation.

B. Media: Flat panel, cleanable, 14 mesh screen constructed of aluminum or galvanized steel layered of flat and herringbone crimp.

1. Frame: Aluminum or galvanized steel header frame.
2. Thickness: 1 or 2 inch.

C. Minimum Efficiency Reporting Value (MERV): Provide filters with MERV 3 rating. Testing shall be in accordance with ASHRAE Std 52.2.

D. Performance Rating:

1. Initial resistance at 300 FPM face velocity: 0.03 inch WG for 1" thick and 0.05" WG for 2" thick.
2. Recommended Final Resistance at 300 FPM face velocity: 0.50 inch WG.

2.05 FILTER FRAMES AND HOUSING

A. Manufacturers:

1. AAF/Flanders.
2. Columbus Industries, Inc..
3. Camfil Farr.
4. Filtration Group
5. Koch Filter Corp.

B. General: Fabricate filter frames and supporting structures of minimum 16 gauge galvanized steel or extruded aluminum framing members having minimum thickness of 0.09". Design housing system for either upstream (front) or downstream (rear) filter servicing. Provide permanently gasketed framing members to prevent bypass of unfiltered air. If vertical support members are required to prevent deflection of horizontal members, install so as not to interfere with either installation or operation of filters. Incorporate separate track for prefilters, removable from front, or removable from back after removal of after-filters. Provide factory-installed positive sealing device for each row of filters, to ensure seal between gasketed filter elements. Provide hardware necessary for field assembly.

C. Standard Sizes: Provide frame and housing of size and capacity for filter media to meet the maximum velocity as scheduled or noted on drawings.

D. Side Servicing Housings: Flanged for insertion into ductwork constructed of minimum 16 gauge galvanized steel with aluminum tracks or channels for filter banks specified on the drawings. Provide access doors with continuous gasketing on perimeter and positive locking devices. Incorporate positive-sealing gasket material on channels to seal top and bottom of filter cartridge frames to prevent bypass. Arrange so filter cartridge can be loaded from either access door.

2.06 FILTER GAUGES

A. Manufacturers:

1. Dwyer Instruments, inc.
2. H.O. Trerice co.

3. Weiss Instruments
4. Wika USA

B. General: Provide separate gauge for each filter bank or gauge with sufficient range to serve all connected filters.

C. Direct Reading Dial: 3-1/2 inch diameter diaphragm actuated dial in metal case, vent valves, black figures on white background, front recalibration adjustment, range such that final filter pressure drop is near mid-range, 2 percent of full scale accuracy.

D. Accessories: Static pressure tips with integral compression fittings, 1/4 inch aluminum, plastic or copper tubing, 2- or 3-way vent valves, and mounting bracket.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions and comply with installation requirements as specified elsewhere in these specifications pertaining to air filters housing/casings, and associated supporting devices.

B. Install air filters and holding devices of types indicated, and where shown; in accordance with air filter manufacturer's written instructions and with recognized industry practices; to ensure that filters comply with requirements and serve intended purposes.

C. Locate each filter unit accurately in position indicated, in relation to other work. Position unit with sufficient clearance for normal service and maintenance. Anchor filter holding frames securely to substrate.

D. Coordinate with other work including ductwork and air handling unit work, as necessary to interface installation of filters properly with other work.

E. Install filters in proper position to prevent passage of unfiltered air.

F. Install air filter gauge pressure tips upstream and downstream of filters to indicate air pressure drop through air filter. Mount filter gauges on outside of filter housing or filter plenum, in accessible position. Adjust and level inclined gauges if any, for proper readings.

3.02 FIELD QUALITY CONTROL

A. Cleaning:

1. Thoroughly clean any equipment that has been operated during the construction period.
2. Replace filters in any equipment that has operated during the construction period or that got dirty from the construction process.

END OF SECTION