



IMF High Efficiency Granular Media Filter

Part 1 – GENERAL

DESCRIPTION

- A.** Furnish and install high efficiency filtration system as specified herein. The filter shall operate continuously to remove suspended particles from the water until a backwash is initiated by either a pre-determined pressure differential across the filter media, or 24 hours.
- B.** The filter manufacturer shall provide a complete filtration system including the filter vessel and media, pump, valves, actuator(s) and control panel.
- C.** Filtration flow rate shall be at least 3% of the system flow rate and the filter vessel shall be sized so as not to exceed 20 gpm/ft² of filter surface area.

1.01 SUBMITTALS

- A.** Submit six copies of submittal data including filter system assembly drawing which identifies all major system components, design flow rate, materials of construction, design working pressure, and dimensions. The electrical wiring diagram shall include pump motor horsepower, full load amperage and any other electrical requirements. All electrical components shall be identified and shall include numbered terminal locations. Submit manufacturer's installation instructions and four copies of operating and maintenance manuals. This information may be submitted on CD ROM.

1.02 WARRANTY

- A.** Full parts warranty for one year from start-up or 18 months from shipment, whichever occurs first.
- B.** The filter vessel and all internals shall be warranted to be free from defects in materials and workmanship for 15 years from shipment date.

1.03 SHIPMENT

- A.** Ship FOB factory

Part 2 – PRODUCTS

2.01 – PERFORMANCE

- A.** Filter system shall operate continuously to remove airborne contaminants and other suspended particulate from the cooling water until either a 16 psig pressure drop across the filter is reached or 24 hours has elapsed. Upon either event, the filter shall automatically backwash and return to the filtration mode. A complete filtration system shall be provided and shall include the filter vessel, system matched pump, automatic valves and media. The filter shall be capable



of removing suspended particulate down to 0.5 micron at flow rates up to 20 gallons per square foot of filter media surface area. The filter shall remove greater than 50% of all particles from 0.5 to 1 micron and over 85% of all particles greater than 1 micron within four weeks of start-up.

2.02 – CONSTRUCTION

- A. All filter system components shall be skid mounted. The skid shall be constructed of carbon steel I-beam and all surfaces shall be epoxy coated.
- B. The filter vessel shall be constructed to meet ASME Class VIII, Division I standards. The vessel shall be constructed of grade 304 stainless steel and rated for 150 psig (maximum) continuous operating pressure. The filter vessel shall be equipped with a flanged inlet and outlet, automatic and manual air vent, 2.5" diameter liquid filled inlet and outlet pressure gauges, inlet and outlet sample taps, and top and bottom access ports. The top access port shall be 6" x 8" (on 24" diameter vessels) and 11" x 15" (on 30" and 36" diameter vessels). The bottom access port shall be 4" diameter.
- C. To induce solids separation before reaching the media bed, unfiltered water shall enter the vessel via a tangential inlet. The filter vessel inlet shall be tangential to the vessel cylindrical sidewall to induce rotation of unfiltered water and centrifugally separate and send larger solids to the vessel perimeter before reaching the media bed.
- D. To eliminate stagnant water below the under-drain, the filter vessel shall be cylindrical with a conical bottom and shall have an annular ring under-drain that is installed flush with the cone bottom. To assure complete removal of filtered solids during backwash with minimal backwash water, the filter vessel shall be equipped with a minimum of eight radial arm media bed fluidizers. The annular ring under-drain and radial fluidizers shall be constructed of grade 304 stainless steel.
- E. To accommodate varying site requirements, modular universal face piping will be utilized to allow for easy field conversion to either city water or tower/system water backwash.

The optional "**Dual Source**" pipe module will allow for three modes of operation.

- 1) **Manual Mode** – Allows selecting between tower/system water and city water at the flip of a switch.
- 2) **Remote Mode** – Allows backwash source selection via remote input from building monitoring system (BMS).
- 3) **Water/Chemical Conservation Mode** – Allows a conductivity meter to determine backwash water source. If system conductivity is low, city water is utilized. If conductivity is high, instead of bleeding system water to drain, it is used to backwash the filter.



- F. Filter Media: Filter media shall be included with the filtration system. To assure thorough removal of trapped particulate and minimize bacterial growth on the media bed, the filter shall backwash at not less than 15 gallons per minute per square foot of filter surface area. There shall be no loss of filter media during the backwash cycle. Filter media shall be AWWA or NSF approved.
- G. Filter pump shall be closed coupled, centrifugal type with a cast iron housing and bronze impeller, 460/3/60. The pump shall incorporate a mechanical seal. The pump shall be rated to flow the design flow rate at 50 feet of total dynamic head. The pump motor housing shall be TEFC. The filter system shall be furnished with automatic controls for filtering and backwash operation. Backwash operation shall be controlled by a differential pressure switch with 24-hour time override, adjustable backwash duration timer and push button switch for manual override. Controls shall also include motor and circuit overload protection, six digit resettable backwash cycle counter and door mounted electrical disconnect. The cycle counter shall be readable without having to open the control enclosure. The control panel shall be neatly wired and meet NEC requirements and shall be fabricated in a UL approved shop. The control enclosure shall be NEMA 4X with lock provision.
- H. Total system to be skid mounted for ease of installation. Sweeper jet basin piping will be installed to follow the natural flow of the tower system. Isolation valves (provided by others) shall be provided to permit maintenance of both tower and filter system. Drain lines should be sized based on full flow for backwash. A check valve should be installed in the suction piping to insure the pump will maintain its prime.
- I. The filter manufacturer shall furnish sweeper jet nozzles in an appropriate size and sufficient quantity to sweep settled solids in the tower basin toward the filter intake header. Sweeper jets shall have an elliptical nozzle for a wide and flat flow pattern. Spacing shall not be greater than 10" between sweeper jet centers and total sweeper jet flow rate shall be 1 gallon per minute per square foot of flat basin area.
- J. The filter manufacturer shall provide sweeper jet nozzles to direct solids toward the filter inlet piping. The filter pump shall be sized for 1 gpm/ft² of basin area. An appropriate flow control device shall be furnished with the filter. Sweeper jets shall be rated at 5, 8 or 13 gpm (each) at 15 psig and shall be installed no greater than ten inches between centerlines.

2.03 - MANUFACTURER

- A. Acceptable Manufacturers: PEP Filters or approved equal.



Part 3 – EXECUTION

3.01 INSTALLATION

- A.** Coordinate with installing contractor to ensure equipment is installed in conformance with manufacturer's recommendations and these specifications.
- B.** Provide factory trained service personnel for start up services and equipment checkout. Any deficiencies noted by the field service representative shall be corrected at no additional cost to the Owner.
- C.** Install the filter skid on a firm and level surface and secure with anchor bolts as necessary.

Field Wiring: Connect electrical power to the filter system UL control panel per the detailed wiring diagram provided by the manufacturer. Wiring diagram shall include details of all field wiring required by size and terminal block number. Field wiring shall be in accordance with applicable electrical codes.