**PERMANENT MEDIA FILTER SYSTEM**

**SECTION \_\_\_\_\_**

# PART I – GENERAL

* 1. **Summary**

Furnish and install a Puroflux PF-20 series media filter a low-pressure open application as specified herein.

**Primary Purpose:** To remove unwanted solids from the cooling tower water by utilizing a permanent media filter. A fully assembled media filter system shall be supplied to prevent the accumulation of troublesome solids in the open condenser system. The influent fluid shall be dispersed evenly over the filter media. The systems suspended solids shall be trapped in the pores formed between the media. The effluent fluid will then pass from the vessel through the under-drain and return to the condenser system.

The differential pressure will increase as the trapped particles load the media. When the differential pressure reaches 16 psid, a backwash cycle shall be required. The control valves shall be repositioned, reversing the flow and the media is backwashed. The reverse flow fluidizes the media causing a scouring action which releases the trapped debris. The trapped debris shall then be pushed up through the over-drain and flushed to an existing drain. On completion of the backwash cycle, the valves are repositioned and the filtration process continues.

The permanent media filter system will: help prevent particle fouling of the cooling system’s components, reduce maintenance and servicing routines, maintain optimum energy efficiency of the heat exchange process, reduce chemical usage, and aid in the control of harmful bacterial growth.

**PART II – PRODUCTS**

* 1. **Design Criteria**

1. Identification – Permanent media filter package is a model PF-20\_\_\_\_\_\_\_\_\_\_ and is manufactured, assembled, and tested by Puroflux Corporation.
   1. Flow rate shall be \_\_\_\_\_\_\_\_\_\_\_(U.S. GPM / m3/hr).
   2. Maximum working pressure: 75 psi (5.18 bar).
   3. **Construction**

**Package** - A complete factory assembled pump package with: non-code 304-SST vessel, filtration media, system specific pump and motor, pre-strainer, skid, schedule 80 PVC face piping, manual/auto air vent assembly, pressure gauges, and valves. (Automatic backwash includes electric actuators and control panel.)

1. Filter Vessel and Vessel Components - The filter vessel shall be fabricated of non-code 304 stainless steel with epoxy coated carbon steel access ways (manway/hand-hole size varies depending on vessel size). The vessel shall have a maximum operating pressure of 75 psi (5.18 bar). Filter vessel shall have properly sized inlet and outlet connections, drain connection, access ports, and vent fittings.
   1. Optional ASME code stamp (available upon request).
   2. Optional higher pressure ratings (available upon request).

Filter unit shall have removable under-drain laterals, which are to be constructed of schedule 80 PVC. Additionally, the filter unit shall have a schedule 80 PVC 3-point distribution over-drain for even flow across media. The filter vessel shall have a drain screen installed at the bottom of the filter vessel in order to retain media during scheduled draining of vessel.

The filter vessel shall include both automatic and manual air relief vents.

1. **Pump** **& Motor** – Cast iron bronze fitted, close coupled end suction centrifugal pump.
   1. Design conditions: \_\_\_\_\_\_\_\_\_\_GPM @ 50’ TDH.
   2. \_\_\_\_\_\_\_\_\_H.P., standard efficiency TEFC motor.
   3. Pre-strainer: cast iron construction with removable stainless steel basket.
2. **Filter Media** - The filter media shall be permanent type. Periodic backwashing at a flow rate of 20 GPM/ft2 for three minutes will be required to eliminate accumulated suspended particulate and to regrade the filter bed. Filter manufacturer shall supply all required 10 micron media. Media shall meet AWWA and NFS standard.
   1. The media will filter 98% (nominal) of 10 micron particulate or larger, and has achievable filtration down to 0.5 micron.
   2. Optional lower micron media
3. **Connections (tower water backwash configuration)** 
   1. (30” and smaller vessel) \_\_\_” 150-lb flange inlet / \_\_\_” fpt outlet / \_\_\_” fpt waste
   2. (36” and larger vessel) \_\_\_” 150-lb flange inlet / \_\_\_” 150-lb flange outlet/waste
4. **Piping** - Schedule 80 PVC
   1. Optional Schedule 40 coated carbon steel (available upon request)
   2. Optional type “L” copper (available upon request)
5. **Valves** – Valves shall be industrial grade 3-way ball type with a brass body and chrome plated brass ball for vessels 30” and smaller. For vessels 36” and larger, valves will be industrial grade cast iron lug style butterfly valves with stainless steel discs.
   1. To eliminate the potential of “water hammer” and out of sequence operation, the control valves shall be mechanically linked.
6. **Actuator (Automatic backwash)** - A motorized type electric actuator shall be utilized to cycle 3-way ball valves/butterfly valves between filter and backwash modes.
7. **Electrical Control** **(Automatic backwash units only)** – UL listed and labeled NEMA type 4X polycarbonate enclosure with door disconnect switch, motor starter with short circuit/overload protection, step-down transformer, automatic backwash controls (pressure differential switch, adjustable solid state timer and 24-hour backwash clock), manual backwash push button, pump remote start-stop Local/Off/Remote switch, and dry contacts for remote monitoring (pump on/tripped). (Power requirement: 208/230/460V, 3-phase, 60Hz)
   1. **Control panel options available upon request**:
      1. Status lights (specify function)
      2. 7- day time clock (in lieu of 24-hour time clock)
      3. Additional dry contacts for remote monitoring (specify function)
      4. Backwash counter (internally mounted)
      5. Backwash lockout (two filter maximum)
8. **Structural Skid** – Shall be constructed of UV resistant fusion bonded polyester coated carbon steel framework for maximum rigidity.
   1. **Manufacturers**

The permanent media filter system shall be manufactured by Puroflux Corporation in Simi Valley, California, USA. Specific model designation is PF-20\_\_\_\_\_\_\_\_\_\_.

# PART III – EXECUTION

* 1. **Installation**

1. Coordinate with the installing contractor to ensure equipment is installed in conformance with manufacturer’s recommendations and those found in the specification.
2. Start up and commissioning shall be performed by factory authorized representatives.