

# Turbidity Filter Engineering Specifications

## Excalibur Water Systems Model EWS FD2HAG5 Duplex Progressive Turbidity Filter Electronic Metered Initiated Service Operation

Supply one (1), only Excalibur Water Systems Model EWS FD2HAG5 Duplex Progressive Turbidity Filter. The system shall be designed to operate under pressure from 40 psig (minimum) to 110 psig (maximum).

**Mineral Tank:** Supply two (2), only 18" diameter x 65" high 4.0" top opening premium quality PE liner with FRP filament winding mineral tank. Maximum operating pressure up to 150 psig with a maximum operating temperature of 120°F. Mineral tank must be NSF/ANSI Standard 44 as well as PED certified.

**Collection & Distribution:** Supply two (2), only 2.0" high impact FDA approved ABS hub and lateral high flow distributor at bottom and upper basket at top shall be utilized to evenly collect and distribute the flow of water over the entire bed.

**Control System:** Supply two (2), main operating control valve will have 2" Female NPT Inlet, Outlet, and Drain connections. The control valve must have an internal flow meter. The valve is top-mount design with a 20-volt electronic microprocessor controller. The control valve must have ¼" inlet/outlet sample tap ports with 316 stainless steel plugs installed if sample taps are not used. The control valve must have a quick connect style base with hinged clamp to allow for quick connect or disconnect to the 316 Stainless Steel 4" base adapter. The quick connect feature allows valve to swivel 360° once it is mounted which provides easy plumbing alignment. The distributor pilot for the control valve must be 2.0" NPS pipe. Control valve will have a single main piston, patented 1-piece compressible seal/spacer stack assembly. The control valves internal wetted parts shall be made of non-corrosive materials. Control valve shall have a lead free brass valve body with a non-corrosive NSF / FDA Approved Food Grade Electro-Deposited black Epoxy Coating. Control valves that do not meet these specifications are not acceptable.

**Microprocessor Controller:** The 20-volt solid state microprocessor shall have a removal POD to allow for easy access and remote mounting. The system shall be capable of operating a single and twin design systems in an alternating system, parallel with both units online at one time or as a progressive flow system. The display shall be able to show time of day, current flow rate, total gallons used and volume remaining/days until regeneration, it shall be capable of initiating regeneration by meter delayed, meter immediate, time clock delayed or pressure differential. All cycles shall be fully adjustable in any order providing up to nine maximum cycle sequences including multiple cycles for each of the following: backwash and fast rinse. All cycles will be fully adjustable cycle time durations. Controller will be capable of operating on an optional clock basis with either a 7-day calendar or 28-day calendar, along with an optional 1 – 28 days' calendar override and have up to (four time periods) for regeneration to occur for either time clock or metered demand regeneration. Optional programming shall allow for pre-programming an alternate regeneration sequence in which the microprocessor can be set to an alternate capacity level automatically every so many regenerations or just change the order of the regeneration cycle arrangement to meet a specific need. The microprocessor must be able to control up to four units and be able to add a second, third or fourth unit at a later date if needed to adjust to increased water usage demand after plugging the system board into the first/master unit. The diagnostics shall be capable of providing data days since last regeneration, gallons or gallons x 1000 since last regeneration, reserve history for the current day and previous 6 days, total volume processed for the current day and the previous 63 days by daily total and hourly, the peak flow rate for each of the last 28 days of operation along with the time of day for each day that the peak flow rate occurred, peak flows may also be viewed by the hour along with total volume processed through.

**Progressive Flow:** Progressive Flow systems utilize motorized no hard water bypass valves on the outlet of each filter control valve and opening or closing water flow based on flow rate demand. The valves allow multiple control valves to become a multi-tank progressive flow system with one unit on line at all times and the remaining units in stand-by or in regeneration. Note: only one unit is in

regeneration at a time. The progressive flow systems use a predetermined flow rate set point to bring on-line additional units to meet peak flow rate requirements. Once the flow rate set point is reached for greater than 30 seconds the unit(s) in stand-by will be driven on-line or immediately if the flow exceeds 120% of the predetermined set point to meet peak flow rate demands. Once the peak flow rate demand decreases by 95% of the set point for greater than 1 minute the stand-by unit(s) that were driven on-line will return back to stand-by mode. This system configuration determines the need to regenerate based on a unit reaching differential pressure, zero capacity or day override.

**No Hard Water Bypass:** Supply two (2), only 2" full ported 316 stainless steel no hard water bypass valve which prevents the raw water bypass during the regeneration cycle at a time while the other unit is in service. This system shall provide a continuous supply of filtered water with the control valves indicating which unit is on-line and in stand-by operation. Its internal non-corrosive single piston & patented 1-piece compressible seal/ spacer stack assembly allow it to be hydraulically balanced. The no hard water bypass has a sight glass that allows you to view the position of the valve to know whether the unit is on-line or on stand-by without removing any covers. Tested and certified to NSF 61.

**Interconnect Cable:** Supply one (1), only interconnect cable to make connection between units must be pre-wired and electrically tested by the water filtering system manufacturer at the factory prior to shipment.

**Turbine & Volumetric Meter:** Supply two (2), only internal magnetic pulse Hall Effect turbine remote meter accuracy must be +/- 5% with a flow rate range of 1.5 – 125.0 GPM. External meters will not be accepted.

**Power Supply:** Supply two (2), only North American plug in type power transformer with electrical specifications output voltage of 20 VAC with the output current not exceeding 750 mA.

**Media:** Excalibur Turbidity media shall be a natural zeolite with high sediment removal capacity. The media shall have a mesh size of 14x30 with effective size of 0.55mm. Hardness must be 4-5 at Mohs Scale and must provide wide pH range to the maximum temperature of 140°F. The media shall be NSF 61 certified.

**Performance:** The unit shall be able to provide the 5-micron filtration of suspended solids at the flow rate of 10gpm/ft<sup>2</sup> and 1-micron filtration of suspended solids at the flow rate of 4gpm/ft<sup>2</sup>. The peak flow rate shall be 12.5gpm/ft<sup>2</sup>.

**Flow Rate:** The minimum flow rate shall be 3.5 GPM (0.22 l/s) and the progressive critical flow rate shall be 35.4 GPM (2.23 l/s) for 5-micron suspended solid filtration and 14.1 GPM (0.89 l/s) for 1-micron suspended solids filtration. The progressive peak flow rate for system shall be 44.2 GPM (2.79 l/s). During regeneration cycle the flow rates shall be halves of progressive flow rates.

**Drain Flow Rate:** Water shall be discharged during the regeneration process at a flow rate of 25.0 GPM (1.58 l/s) for proper regeneration bed expansion process.

**Start-Up:** Successful equipment provider shall follow the manufactures printed instructions to start up the system after plumbing and electrical requirements are completed. This includes raw water testing, programming, individual start-up for each filter column, system operation, and product water testing for each column and training of personnel. Set system for capacity levels with fixed reserve and immediate regeneration. If needed, the successful bidder shall contract an approved authorization service agent from the manufacture to assist with these procedures.

**Warranty:** Equipment and /or parts shall be covered by manufacturer's replacement warranty as follows:

- Fiberglass Mineral Tanks – TEN (10) YEARS
- Media – TEN (10) YEARS
- Control Valves & Electronics – FIVE (5) YEARS
- All other components – ONE (1) YEAR