# Water Softener Engineering Specifications

## Excalibur Water Systems Model EWS SC1255180 Fiveplex Progressive Water Softener Electronic Metered Initiated Service Operation

Supply one (1), only Excalibur Water Systems Model EWS SC1255180 Sodium Fiveplex Progressive Water Softener. The system shall be designed to operate under pressure from 40 psig (minimum) to 110 psig (maximum).

**Mineral Tank**
Supply five (5), only 18" diameter x 65" high 4" top opening with bushing 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 five (5), only 1.32" high impact FDA approved ABS hub & 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.

**Brine Tank**
Supply five (5), only 24" diameter x 50" high density capacity polyethylene combination salt storage/brine storage tank complete with salt grid platform for dry salt storage. The brine tank will be of dry salt design capable of holding 900lbs of salt.

**Brine Float**
Supply five (5), only series 474 brine float to eliminate brine tank overflowing. Safety float / brine valve delivers water demand for high flow brine draws and refill eliminating pre-checking during brine refill when air in the brine line could cause excessive flow rates. The brine float is to be enclosed inside of a brine well with cap and secured utilizing a two-piece overflow set.

**Control System**
Supply five (5), main operating 1.25" control valves shall be made of Noryl™. The inlet/outlet connections need to allow for either a quick connect bypass valve or quick connect inlet/ outlet fitting kit that utilize a union style nut that only needs to be hand tightened to mount to the control valve. The drain ports consist of a ¾" Male NPT quick disconnect elbow that can swivel 180 degrees for easy orientation. The brine ports utilize a quick disconnect 3/8" compression elbow that swivels 270 degrees for easy orientation. The distributor pilot for the control valve is 1.32" OD pipe. Control valves will have a single main piston, patent 1-piece compressible seal/ spacer stack assembly and have an internal brine regenerant piston. Valve must be a top-mount design with a 15-volt electronic microprocessor controller. Control valves shall have fully adjustable regeneration cycle duration times for backwash, downflow brine/slow rinse, 2nd backwash, fast rinse, soft water brine refill, and return to service. Control valves shall be made of non-corrosive materials, including all wetted parts.

**System Controller:** Supply one (1) Polycarbonate wall mount enclosure with an easy access hinged smoke gray transparent cover and quick release latch. The System Controller will be provided with an 110V power cord for installation. The solid-state microprocessor has a user-friendly front panel design for programming and multi-colored LED status indicators for On-line, Standby, and Regeneration mode. All connecting units need to be wired into the System Controller. Progressive Flow system utilizes no hard water bypass valves, alternating between units, and opening or closing water flow based on flow rate demand. The System Controller will have an on-board USB port for software program updates and/ or extracting diagnostic data history. Two fused single pole double throw (SPDT) relay outputs and a single demand-based meter output are provided. A coin cell lithium battery backup for time of day shall be on board as well. The controller has multi-color backlit LCD which displays current time of day & day of the week, days until next regeneration, current system flow rate, and total system volume used (totalizer).

**Progressive Flow:** Progressive Flow systems utilize motorized no hard water bypass valves on the outlet of each softener control and opening or closing water flow based on flow rate demand. The valves allow multiple control valves to always become a multi-tank progressive flow system with one unit online and the remaining units in stand-by or in regeneration. 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 90% of the set point for greater than 1 minute the stand-by unit(s) that were driven on-line will return to stand-by mode. This system configuration determines the need to regenerate based on a unit reaching zero capacity or day override.

**No Hard Water Bypass Valve:**
Supply five (5), only 1.25" full ported 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 soft water with the control valves and system controller 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.

**Turbine & Volumetric Meter**
Supply five (5), internal magnetic pulse Hall Effect turbine meter accuracy must be +/- 5% with a flow rate range of 0.25 – 34.0 GPM. External flow meters are not acceptable.

**Bypass Isolation Valve**
Supply five (5), Injection molded bypass Isolation valve full 1.25" porting plastic Noryl to be connected threaded connections adapter to the control valve for proper isolation. Isolation bypass valve operating pressures 20-125 psi, temperature range 40-110 F. Bypass isolation valve to offer normal operation, bypass operation, diagnostic mode, and shut off mode.

**Ion-Exchange Resin**
Each vessel shall be supplied with Aldex C-800 resin bead-form with a minimum 8% cross link gel type sodium form high-capacity polystyrene ion-exchange resin with performance capacity of 30,000 (27,000) [20,000] grains per cubic foot when regenerated with 15lbs (10lbs) [6lbs] of salt per cubic foot. The resin shall be solid, of the proper particle size and contain no plates, shells, agglomerates or other shapes which might interfere with the normal functions of the water softener. Tested & certified WQA according to NSF/ANSI 44, 61, 372 and WQA Gold Seal.

**Performance**
Each unit shall provide 180,000 (162,000) [120,000] grains capacity between regenerations utilizing 90lbs (60lbs) [36lbs] of salt. Max System capacity 900,000 (810,000) [600,000] utilizing 450lbs (300lbs) [180lbs] of salt per regeneration.

**Flow Rate**
Minimum flow rate 3.5gpm (0.22 l/s), Critical flow rate of softened water 70.0gpm (4.42 l/s) Service flow rate 105.0gpm (6.62 l/s), 15psi ΔP 130.0gpm (8.20 l/s), 25psi ΔP 170.0gpm (10.73 l/s)

**Drain Flow Rate**
Water shall be discharged during the regeneration process at a flow rate of 9.0 GPM (0.57 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 softener column, system operation, and product water testing for each column and training of personnel. Set system for medium salting/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
- Brine Salt Storage Tank – TEN (10) YEARS
- Cation Exchange Resin – FIVE (5) YEARS
- Control Valves & Electronics – FIVE (5) YEARS
- All other components – ONE (1) YEAR