**VN Series Specifications**

Valve nest on steel tanks

1. Scope. The softener shall consist of mineral tank(s) and internals containing resin and brine tank(s) complete with brine valve(s). Each mineral tank shall have face piping and a valve nest consisting of six pneumatically actuated diaphragm valves with Sentry Softener controller. Furnish a Water King Model VN Water Softener.
2. Mineral Tank. The non-code vessel shall be A36 carbon steel or better rated at 100 psi working pressure designed to a factor of safety of 3.0. The inlet and outlet shall be 3000 psi NPT full couplings. The inlet shall be in the side wall and the outlet shall be in the center of the tank bottom shell. Each tank shall have a top center fitting. Tanks 36” Ø and larger shall have lifting lugs. Tanks 20, 24, and 30” Ø inch diameter shall have a 4” x 6” handhole in the side shell and in the top head. Tanks 36” Ø and larger shall have a 4” x 6” handhole in the top dome and an 11” x 16” or larger manway in the side shell. ASME code vessels are optional.
3. Internals. The bottom distributor shall be a multipoint system using 2½” Ø single point molded S distributor heads with 2½” of slotted length and a 1½-inch NPT male threaded connection. The slots shall be .012" - .016" wide to retain mineral and the total slot area shall be equal to or larger than the unit pipe size. A top dome splash distributor with an opening equal to or larger than the unit pipe size shall be installed in the mineral tank. The internal distributor piping shall be SCH 80 PVC.
4. Face Piping. The softener(s) shall ship with face piping mounted on the vessels. Face piping shall be schedule 40 galvanized carbon steel with NPT fittings for 1 ½” and 2” piping. Piping for super flow or service flow bypass shall be schedule 40 grooved galvanized pipe and fittings. (Schedule 80 PVC and Stainless steel face pipe are available options.
5. Media. The resin shall be sodium form polystyrene 8% divinyl benzene cross linked resin with clear spherical beads. Resin beads shall be 16-50 US Standard Mesh with a particle size range of 0.3 to 1.2 mm. The resin shall be clean and packaged in sealed plastic bags weighing 55 lbs or less. Nominal exchange capacity shall be 30,000 grains per cubic foot when regenerated at 15 lbs of salt per cubic foot of resin. The bottom of this mineral tank shall be filled above the distributor with flint gravel sieved between 1/8” and 1/16” (# 20).
6. Brine System. The brine system shall be of the Accumatic™ high grid plate design. The brine tank shall be blow molded or rotationally molded HDPE, including a cover. The system shall include a SCH 80 PVC float operated brine valve to control refill shut-off and refill flow rate. Brine volume is to be repeatedly accurate within 10% and not dependent on salt bed void space for brine volume. Brine draw is to be volumetrically controlled, not timed. The brine valve shall have a low level air check valve. An external venturi type brine eductor of schedule 80 PVC shall draw the brine into the softener. The brine line shall have a ball valve, check valve and diaphragm valve. The diaphragm valve shall be cast iron with a 125 psi maximum pressure.
7. Control Valves. The valve nest shall be composed of the brine valve (see above) and five Water King DMB Series cast iron body valves with grooved connections. The valves can be operated by air or water. The diaphragm shall be pre-formed, nylon fabric reinforced natural rubber. Internal parts shall be stainless steel and brass. Working pressure on the valve is 230 psi with maximum temperature of 175⁰F. Other diaphragm valve types are available. The five valves are for inlet, outlet, backwash inlet, backwash drain, and service to waste. A sixth valve, the brine valve, is noted above.
8. Controller. The softening process shall be regulated by the Water King Sentry controller. This controller includes an Electronic Regeneration Controller (ERC), a programmable logic controller, and a bank of solenoids. The ERC has an operator interface, initiates regeneration, and serves as the timer for the cycles of regeneration. The PLC directs signals from the ERC to the solenoid bank causing the diaphragm valves to open and close. Regeneration initiation can be based on time of day (ERCt), or demand (measured by a totalizing flow meter) (ERCd). Each VN softener vessel is equipped with a Sentry controller. The PLC on the Sentry can be connected to the building management system (BMS).
9. Skid Mounting. (Optional – must be specified at time of order.) The softener mineral tanks shall be mounted on an epoxy coated carbon steel skid. The brine tank shall be shipped loose. Interconnecting piping, drains and a three valve bypass shall be installed on the skid. Pipes shall be secured by Unistrut supports. Drain piping shall be schedule 80 PVC.
10. Other items. A standard soft water soap test kit shall be provided. A complete set of instructions, including installation, loading, start-up, adjustments, servicing, and a parts list shall be provided with the equipment.
11. Warranty. Water King, Inc. warrants to the original purchaser (“Purchaser”) that the Industrial and Commercial Water Conditioning Equipment (“Products”) are free from defects in materials and workmanship for twelve (12) months from the date of shipment. Water King will repair or replace with a rebuilt unit, at its sole option and discretion, products proven to be defective within the warranty period. In addition, the fiberglass reinforced pressure vessel(s) shall be warranted for a period of five (5) years by the vessel manufacturer. (Additional terms and conditions apply.)