

# VN 150 TO 1200 SOFTENERS



## STANDARD FEATURES

DMB SERIES 230 PSI CAST IRON  
 POLYETHYLENE LINED DIAPHRAGM VALVES IN  
 VALVE NEST CONFIGURATION  
 99-DAY ERCT ELECTRONIC TIMER  
 MPV1 125 PSI BRASS STAGER  
 100 PSI EPOXY LINED AND COATED CARBON  
 STEEL MINERAL TANKS  
 EE SERIES – PVC EXTERNAL BRINE EJECTOR  
 FIXED RATE EXTERNAL BACKWASH RATE OF  
 FLOW CONTROLLERS.  
 ACCUMATIC™ BRINE SYSTEM.  
 RESIN POLYSTYRENE 8% DVB CL  
 MULTIPLE POINT ABS DISTRIBUTOR  
 110V, 60Hz, 1Ø

## OPTIONS

ASME CODE TANKS  
 DEMAND INITIATION WITH ERCD ELECTRONIC  
 CONTROLLER AND WATER KING'S PW SERIES  
 FLOW METERS  
 MULTIPLE TANK CONFIGURATION WITH STAGERS  
 AND ERC CONTROLLERS  
 TWIN ALTERNATING WITH EDRd, PW SERIES  
 METER, AND MPV3 STAGER  
 PRESSURE GAUGE AND TEST TAP KIT  
 SKID MOUNTING  
 220V, 50Hz, 1Ø

## OPERATING CONDITIONS

25 to 100 psi ♦ 100°F

## CAT250.2

Model Nº	150	180	240	300	450	600	750	900	1200
Dia.x Side Shell (in.)	20x54	20x54	24x54	30x60	30x60	36x60	36x72	42x72	48x72
Capacity (Kilograins)	153	196	245	293	432	594	731	837	1,170
Salt Applied (lbs)	66	66	91	91	145	244	244	274	388
2" Pipe –Cont Flow Rate <sup>1</sup> (gpm)	50	60	80	94	92	94	98	101	-
2" Pipe - Peak Flow Rate <sup>2</sup> (gpm)	75	90	120	124	124	124	130	132	-
3" Pipe –Cont Flow Rate <sup>1</sup> (gpm)	-	-	-	100	150	200	209	222	225
3" Pipe - Peak Flow Rate <sup>2</sup> (gpm)	-	-	-	150	225	287	280	293	310
4" Pipe –Cont Flow Rate <sup>1</sup> (gpm)	-	-	-	-	-	-	-	300	381
4" Pipe - Peak Flow Rate <sup>2</sup> (gpm)	-	-	-	-	-	-	-	450	509
Backwash <sup>3</sup> (gpm)	10	10	15	25	25	35	35	50	65
Resin (ft <sup>3</sup> )	5	6	8	10	15	20	25	30	40
Gravel (lbs)	100	100	150	250	250	350	350	500	1,100
Brine Tank-Dia. x Side Shell (in.)	24x40	24x40	24x50	24x50	30x50	39x60	39x60	42x60	50x60
Salt Storage (lbs)	500	500	580	580	900	2,040	2,040	2,370	3,360
Brine Valve Size (in.)	3/8"	3/8"	3/8"	3/8"	1/2"	1/2"	1/2"	1"	1 ½
Brine Line Size (in.)	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1/2"	1"	1 ½
BW, Drain, Rinse Pipe Size (in.)	2"	2"	2"	2"	2"	2"	2"	2"	2"

NOTE: SPECIFICATIONS LISTED ARE NOT SKID MOUNTED SYSTEMS. SKID DIMENSIONS ARE GIVEN UPON REQUEST.

### NOTES FOR VN SERIES 150 TO 1200 SIZING INSTRUCTION

1. Allowable continuous flow is flow at **15 psi** max head loss of **10 gpm/ft<sup>3</sup>** which ever is less.
2. Allowable peak flow is flow at **25 psi** max head loss or **15 gpm/ft<sup>3</sup>** which ever is less
3. Backwash flow rates is 5 gpm/ft<sup>2</sup> which provides 50 to 75% resin bed expansion.
4. Brining efficiency at 0.26 Kgr/lb of salt applied. Assumes 90% utilization of capacity.
5. Brining efficiency at 0.47 Kgr/lb of salt applied. Assumes 90% utilization of capacity.

## VN SERIES 150 TO 1200 SPECIFICATIONS

**Mineral Tank (Standard Non Code Vessels).** 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.

**Mineral Tank (Optional Code Vessels).** ASME code stamped tanks shall be available. Tank shall be clearly specified as code or non-code with a specified working pressure. Tanks "built to ASME code but not stamped" shall not be acceptable as ASME code. An ASME U1 form shall be provided with each ASME code tank.

**Coating and lining.** Tanks shall be prepared for internal and external coating with a SPCC 11 near white sand blast. Internal and external coating shall be two 3 - 4 mill coats of white Series 20 Tnemic Epoxy. Paint shall be applied according to manufacturer's recommendations.

**Internals.** The bottom distributor shall be a multipoint system using 2½" Ø single point molded distributor heads with 2½" of slotted length and a 1½ inch NPT female 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.

**Face Piping.** The piping connecting the tank to the tank adaptor and valve shall be SCH 40 galvanized steel pipe with NPT or Gruvlok fittings.

**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. Underbedding shall be #20 graded washed flint gravel sieved between 1/8" and 1/16".

**Valves.** The valves shall be Water King DMB Series cast iron body valves with grooved connections. The valve can be operated by air or water. The diaphragm shall be preformed, 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 175°F.

**Stager.** Diaphragm valves shall be operated by a rotary pilot valve (stager) with multiple ports through which control fluid is directed, thereby operating the diaphragm valves installed in a process system. Standard units shall use stagers constructed of durable, non-corroding, self-lubricating material for long, maintenance free life. The stager shall function by opening and closing its ports, singly or in combination, in a sequence that accomplishes the five cycles of softening. The stager shall use either water or air for the operating fluid. Process fluid, if pressurized, and not damaging to the internal parts of the stager or diaphragm valve, may be drawn from the main line to the inlet of the stager. Otherwise, an independent source of control fluid is required. The pressure of the control fluid must be equal to or greater than the line pressure of the system. The stager enclosure shall be a 10" x 8" x 6" NEMA 4 fiberglass control box which houses both the stager and the timer. Maximum pressure shall be 100 psi with a maximum temperature rating of 150°F. Ports are 1/8" NPT. Power shall be either 120 VAC/60 Hz or 230 VAC/50 Hz. Flexible tubing (¼" O.D.) shall connect stager ports to diaphragm valves.

**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 volumetrically controlled, not timed.

**Operating Conditions.** Maximum temperature shall be 100°F. Pressure shall be 25 to 100 psi.

**External Ejectors.** Brine shall be drawn directly into inlet of the mineral tank using an EE series external ejector. This venturi type device shall be SCH 80 PVC with ¾", or 1" FNPT connections. The venturi shall be chemically bonded to the housing. The venturi shall be precision machined.

## CAT250.4

Maximum temperature shall be 140°F. The external injector shall provide both brine flow and brine dilution.

**Simplex.** Simplex systems shall consist of one mineral tank with attached valve nest and one brine tank. Simplex systems shall be controlled using the ERCt 99-day electronic timer and an MPV1 stager both housed in a single NEMA 4 enclosure. Regeneration shall be initiated at present times of the day. Manual regeneration shall be available at the stager.

**Twin.** Twin systems shall consist of two mineral tanks with attached valve nest and one brine tank with a brine director. Twin systems shall be controlled using the ERCt 99-day electronic timer and two MPV1 staggers all housed in a single NEMA 4 enclosure. Regeneration shall be initiated at present times of the day. Softeners run in parallel and are out of service only during regeneration. Simultaneous regeneration is prevented by setting different regeneration times for each unit. Manual regeneration shall be available at the stager.

**Twin Alternating Demand Initiation.** Twin alternating systems shall consist of two mineral tanks with attached valve nest and one brine tank with a brine director. Twin alternating systems shall be controlling using the ERCd electronic controller and an MPV3 stager housed in a single NEMA 4 enclosure. One softener is in service and one in regeneration or standby. Manual regeneration shall be available at the stager. Twin alternating systems provide a continuous flow of softened water with no bypassing of unsoftened water during regeneration.

**Multiple Tank Demand Initiation.** Regeneration shall be initiated based on the total quantity of water treated by the softener. For pipe sizes 3" and below, the VN Series uses PW series flow meters with the ERCd controller, and MPV 1 or MPV 3 stager. For 4" and 6" and larger piping the VN series uses the PW 400S and 600S saddle mounted flow meters with the WK520-84 controller, staggers and ARC cycle timers. Twin alternating systems provide a continuous flow of softened water with no bypassing of unsoftened water during regeneration.

**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.

**Flow Meters.** For pipe sizes 3" and below, the VN Series uses PW series flow meters with the ERCd controller. For 4" and 6" piping the VN series uses the PAW 400S and 600S saddle mounted flow meters with the ERCd controller.

**Qualifications.** A company that has continuously fabricated water softeners for at least 10 years shall construct the equipment.

**Pressure gauge and test tap kit.** A kit containing two liquid filled, stainless steel pressure gauges with 2 ½" Ø face, two brass ball valve sample taps with hose barb connections and associated brass connection fittings shall be provided for mounting in the 1/4" FNPT predrilled and tapped ports in the inlet and outlet diaphragm valves.