TCR Series Engineering Specification

1. Furnish and install a water softener to remove hardness to not more than 0.3 grains per gallon, as determined by an ASTM standard soap test method, when operated in accordance with the operating instructions. Unit shall be Diamond Water Conditioning Model TCR-450-3 or engineer's approved equal. Each unit shall be designed to provide 450,000 grains per tank of capacity between regenerations at a maximum salt dosage of 300 pounds of salt per regeneration. Each unit shall be capable of a continuous service flow of 150 GPM with a pressure drop of 15 PSI and a peak service flow rate of 205 GPM with a pressure drop of 25 PSI.
2. The water softener vessel(s) shall be designed for a working pressure of 150 PSI and a temperature of 120°F. A minimum freeboard volume of 50% shall be provided to assure adequate bed expansion during regeneration. The vessel(s) shall be manufactured of fiberglass-reinforced polyester. A continuous glass filament overwrap of the same color as the vessel(s) shell shall reinforce the exterior side shell. A molded polypropylene structural base shall support the vessel(s). Each vessel shall have the dimensions of 36 inches diameter by 72 inches in height, plus the height of the base.
3. The backwash distributor/soft water collector shall be of either a molded basket or hub/radial design, based upon vessel size and accepted standard engineering practice. No assembly shall be required at installation. A graded gravel under bedding shall be provided as a support bed for the exchange media and to aid in backwashing.
4. The combination salt storage/brine measuring tank shall be provided with a tight fitting cover and be sized to hold 2200 pounds of salt, providing a minimum of four (4) regenerations. The tank shall have the dimensions of 39 inches in diameter by 48 inches in height. The tank shall be constructed of 3/8-inch thick blow molded or rotationally molded, rigid polyethylene. The brine tank shall be equipped with a plastic brine well to house an automatic air eliminator that shall automatically open to educt brine and automatically close to prevent the entrance of air after the brine has been completely drawn out of the tank. The water softener control valve, through an adjustment on the controller timer, shall control brine dosage. The brine system shall be designed to provide the proper brine tank refill, regardless of the salt level in the tank.
    a. Salt Platform and Safety Float Option: An elevated salt grid, to aid in the dilution of salt, shall be installed in the brine tank. A safety float, that includes an automatic air eliminator, shall be installed in the brine well to provide a redundant mechanical shut-off of the refill water, should there be an electrical failure during the refill cycle.

5. The control valve(s) shall have 3 inch inlet and 3 inch outlet connections. The control valve shall be of a mechanically actuated, five (5) position type to accomplish service and the regeneration steps of backwash, brine draw/slow rinse, fast rinse and refill. A fixed orifice injector and pressure compensating backwash flow control shall be an integral part of the control valve(s). Single systems shall be provided with a provision to allow hard water bypass to the service line during the regeneration cycle.

6. The control valve(s) shall be provided with a controller timer, which allows for the adjustment in duration of the various steps of the regeneration cycle, allows for "pushbutton" start and complete manual operation. The frequency of regeneration shall be initiated on demand, providing fully automatic operation.

   a. Volume Meter Option: A water meter, mechanically coupled to the outlet of the control valve(s), shall be used to initiate regeneration. After a preset volume of water has passed through the meter, the controller timer shall initiate regeneration at a field adjustable time of day and then automatically reset the meter to the preset volume. The controller timer allows for the adjustment in duration of the various steps of the regeneration cycle, allows for "pushbutton" start and complete manual operation. The meter shall be attached to the outlet of the control valve(s) and have a pipe size of 2 inches. The meter shall be constructed of Brass.

   b. Electronic Meter/Controller Option: A state of the art, electronic control system shall be used to initiate and control the regeneration process of the water softener. The controller connects to the water meter by means of a low voltage electronic pick-up cable. Using flow meter input, the electronic controller determines the regeneration requirements of the water softener. Step by step programming guides the user to custom tailor the electronic controller to their exact specifications. The electronic controller will have the capability to display Time of Day, Volume Remaining, Instantaneous Flow Rate, Flow Meter Input, Total Treated Volume, Service Status, Regeneration Signal and Low Battery condition.

   c. Twin Alternating Option: An alternator shall be provided to allow only one (1) unit in a twin system to be in service while the other unit is in either regeneration or stand-by, providing a continuous supply of softened water to service. The volume meter provided with this option must be installed in the common soft water line. After a preset volume of water has passed through the meter, an electrical signal is sent to the alternator, which first moves the stand-by unit to service, then initiates an immediate regeneration of the unit just taken out of service and finally, automatically resets to the preset volume. The volume meter shall be remote mounted, be constructed of Brass and have a pipe size of 2 inches.

7. The water softener shall be provided with 15 cubic feet of high-capacity, non-phenolic resin per vessel, having a minimum exchange capacity of 30,000 grains per cubic foot when regenerated with 15 pounds of salt per cubic foot. The media shall be solid, of the proper particle size (not more than 4% through 40 mesh U.S. standard wet screen) and shall contain no plates, shells, agglomerates or other shapes, which might interfere with the normal function of the water softener.

8. The water softener system shall be warranted against failure due to faulty materials, workmanship or corrosion for a period of one (1) year. In addition, the control valve(s), timer(s) and meter(s) shall be warranted for three (3) years, while the fiberglass reinforced water softener vessel(s) shall be warranted against leaking for a period of five (5) years.