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## DETAILED EQUIPMENT SPECIFICATION - MGT WATER SOFTENERS

1. Furnish and install a Marlo Model MGT-\_\_\_\_\_ (*single*) (*twin*) (*triple*) water softener to provide a zero soft water effluent as determined by an ASTM standard soap test method, when operated in accordance with operating instructions. Each unit shall be designed to provide \_\_\_\_\_ grains per tank maximum capacity of hardness reduction between regenerations at a maximum salt dosage of \_\_\_\_\_ lbs. salt. Each unit shall be capable of a continuous flow rate of \_\_\_\_\_ GPM with a pressure drop of 15 psi and a peak flow rate of \_\_\_\_\_ GPM with a pressure drop of 25 psi.
2. The 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 backwash. Vessel(s) shall be manufactured of fiberglass reinforced polyester (FRP). The exterior side shall be reinforced by a continuous roving glass filament overwrap of the same color as the vessel(s) shell. The vessel(s) shall be supported by a molded polypropylene structural base. Each vessel(s) shall have the dimensions of \_\_\_\_\_ diameter x \_\_\_\_\_ height plus the height of the base.
  - 2a. *ASME Tank Option* – The softener vessel(s) shall be fabricated in accord with the ASME code, certified, and so stamped (available in 24" diameter vessels and larger).
3. The backwash distributor and soft water collector shall be of the hub-radial design and shall require only assembly of the riser pipe upon installation. The radials shall be designed with a higher density of slots at the outer ends to provide adequate distribution and collection of water away from the center of the tank. Internal piping material shall be constructed of PVC and/or ABS plastic. A washed gravel underbedding shall be provided as a support bed for the exchange media and an aid in backwashing. Systems under 180,000 grains and smaller shall have single point distributors. Systems 60,000 grains and smaller do not have gravel underbedding.
4. The softener shall be provided with \_\_\_\_\_ cubic feet of high-capacity, non-phenolic resin per vessel(s) having a minimum exchange of capacity of 30,000 grains per cubic foot when regenerated with 15 lbs. 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 screen, wet screening) and shall contain no plates, shells, agglomerates or other shapes which might interfere with the normal function of the water softener.
5. The combination salt storage and brine measuring tank with cover shall be sized to hold \_\_\_\_\_ lbs. of salt and have the dimensions of \_\_\_\_\_ diameter x \_\_\_\_\_ tall. The tank shall be of rotationally molded rigid polyethylene. The brine tank shall be equipped with an elevated salt plate for the collection of brine and shall have a chamber to house a brine valve assembly. The brine valve assembly shall include an automatic air eliminator and safety float shut-off valve. It shall open automatically, to educt brine, close to prevent the entrance of air after the brine has been drawn, and permit refill of the tank with the correct amount of water. Brine dosage shall be controlled by the softener control valve through an adjustment on the clock timer. The system shall be designed to allow proper refilling regardless of the salt level in the tank.
6. The control valve shall have \_\_\_\_\_ inch inlet and outlet connections and be constructed of lead-free brass. It shall be of the mechanically actuated, four position type to accomplish the

regeneration steps of backwash, brine draw / slow rinse, fast rinse and brine tank refill. The valve shall contain a fixed orifice eductor nozzle and self-adjusting backwash flow control. For simplex systems, the control valve shall allow for the bypass of hard water to service during the regeneration cycle.

7. The control system shall have an integral timer for adjustable duration of the various steps in the regeneration cycle and shall allow for the manual initiation of the regeneration cycle. The regeneration cycle shall also be capable of automatic initiation by one (1) of the following methods:
  - Timeclock – Each softener control valve shall be equipped with a 12-day electrical timeclock controller that can be adjusted to initiate regeneration at any hour of the day and any day of the week.
  - Volumetric Meter – Each softener control valve shall be equipped with a volumetric meter, mechanically coupled to the timer control, to initiate regeneration. After a preset volume of treated water has passed through the softener, the meter timer shall initiate a delayed regeneration at a preset time of day or night. All controls shall have provisions for individual setting of all regeneration cycles. The meter shall be attached to the control valve and be of the same pipe size as the outlet of the control valve.
    - Electronic Meter Option – *The standard mechanically operated water meter shall be substituted with the model 3200 ET and electronic microprocessor based water meter. The meter register shall have a digital display for volume batch size, volume batch remaining, continuous flow rate, and volume totalization.*
  - Twin Alternating Control – The regeneration shall be controlled by a mechanically operated automatic reset water meter installed in the common soft water effluent line. Softeners shall be regenerated based on total gallons through the meter. An alternator shall be supplied to allow only one unit to be in regeneration or standby at a time while the other unit is in-service. This system shall provide a continuous supply of soft water. Indicating lights shall be provided to show which unit is in-service and which one is regenerating. The meter shall be remote mounted and be \_\_\_\_\_ inches in pipe size.
    - Electronic Meter Option – *The standard mechanically operated water meter shall be substituted with the model 3200 ET and electronic microprocessor based water meter. The meter register shall have a digital display for volume batch size, volume batch remaining, continuous flow rate, and volume totalization.*
  - 'MX' Programmable Controller – A solid-state programmable microprocessor controller shall be furnished and be capable of operating up to three (3) softener vessels in either a parallel, alternating, or additive flow configuration. Softener regeneration shall be initiated by an insertion type paddle wheel flow sensor that is to be installed remotely in the soft water effluent line of each softener unit. The controller shall have a digital display for the volume batch, volume remaining, continuous flow rate, peak flow rate, and totalization for up to three (3) softener units.
8. Skid Mount Option – *The softener resin tanks and brine tank shall be factory mounted on an epoxy-coated carbon steel skid. The control valves shall be pre-installed on the softener tanks and connected to the brine tank. All resin and support gravel shall be pre-loaded in the softener units. All interconnecting piping and isolation valves between softener tanks shall be furnished. Piping and fittings shall be constructed of (galvanized steel) or (Sch 80 PVC). Controls and water meters shall be factory wired.*
9. A complete hardness test kit shall be furnished (ASTM soap test method).
10. The water softening equipment shall be warranted against failure due to faulty materials, and workmanship for a period of one (1) year. In addition, the fiberglass reinforced pressure vessel(s) shall be warranted for a period of five (5) years.