

TECHNICAL MEMORANDUM

(used in Website)

Nº TM003 REV. Nº 00

TOPIC: Softener Sizing Criteria
Sizing of system drains
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OBJECTIVE:

To follow consistent and technically sound sizing rules in quoting softeners.

PHILOSOPHY:

There is a tendency to undersize equipment in the pursuit of lower prices. Defensible sizing of equipment will lend credibility and will avoid application problems.

SOFTENER SIZING:

- **Hardness:** Use the hardness given by the customer. Absent a measured value use another analysis from the same aquifer or supply source. If no value is available our standard assumption will be 10 grains per gallon or 17.1 ppm as CaCO₃ and put a disclaimer on the quotation.
- **Continuous or Average Flow:** Use customer supplied value. If supplied value not available use per capita or fixture unit data.
- **Peak Flow:** Use customer supplied value. If supplied value not available use 1.5 to 4 times the average flow. Our standard assumption will be a peak factor of 2.0.
- **Total Flow:** Use customer supplied value. If supplied value not available use 8 to 16 hours per day of average flow. Our standard assumption will be average flow for 8 hours per day.
- **Resin Volume:**
 - For a simplex, choose the volume of resin to achieve a regeneration every 18 to 24 hours at the specified Total Flow. Use minimum of 16 hours.
 - For a twin alternating unit, choose the volume of resin to achieve a regeneration every 8 to 12 hours at

the specified Total Flow. Use minimum of 8 hours.

- Total Flow using the actual brine applied during regeneration. For a unit with timed brine assume 10 lb salt/ft³ or medium salt.

- **25/15 rule:**
 - Choose pipe and valve sizing to achieve less than 25 psi head loss at peak flow. Limiting the pressure drop over the softener piping and valves to 25 psi will limit the pressure drop across the resin bed to 20 psi. (1)
 - Choose pipe and valve sizing to achieve less than 15 psi head loss at average or continuous flow.

- **Minimum flow:** The low flow rating for a softener to prevent is 0.5 to 1 gpm/ft³ of resin.

- **Flow meters:** Make certain the meters will read the minimum and the peak specified flow. If meter will not read both flows clarify the issue with the customer and be certain to quote the flow meter range.

- **Multiple unit pipe sizing:**
 - For a twin alternating unit the piping is sized for one unit to handle all of the flow.
 - For a twin unit or alternating lead lag, the piping can be sized for each unit to handle half of the flow. Issue a disclaimer concerning flow capacity if one unit is out of service.
 - For triplex and quad units, use no spares when sizing the system. For triplex systems, the time between regenerations should be 8 hours. For quad units the time between regenerations should be 6 hours. (Note each tank is regenerated every day when system is at capacity.) Size header for peak flow and each unit for Flow/n where n is the number of units. Use the 25/15 rule.

- **Brine Tanks:** Our standard is to provide enough salt in storage for six (6) regenerations. The brine draw is fixed with the 706022, 706044 and larger brine valves. The target is 10 lb salt/ft³ of resin. Values below 7 and above 15 should be avoided although resin specifications allow 5 to 15 lb salt/ft³ of resin. Standard grid plate height is 24 inches except for the 24 x 40 tanks which have a 16 inch grid plate and the

18 x40 which have an 11 inch grid plate. Be cautious with triplex and quad systems as the brine tank size may need to be increased to allow for sufficient salt storage.

References:

(1) Tom Beggs - Purolite. 06/09/05 phone conve