

Useful Formulas

1 gallon	=	3.785 liters
1 grain per gallon	=	17.1 mg/liter
1 mg/liter	=	1 ppm (parts per million)
1 micromho/cm	=	.4 mg/liter as NaCl .65 mg/liter as ion .5 mg/liter as CaCO ₃

TDS in ppm as CaCO₃ = Conductivity (micromhos) x .5

Conductivity (micromho/cm) = $\frac{1}{\text{Resistivity (megohm-cm)}}$

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Concentration Factor = Percent Recovery

Percent of Recovery = $\frac{\text{flow rate of product}}{\text{flow rate of feed}} \times 100$

Percent of Rejection = $\left(\frac{\text{Conductivity (micromho/cm) of feed} - \text{Conductivity of Product}}{\text{Conductivity of Feed}} \right) \times 100$

HARDNESS EQUATION:

$(\text{mg CaCO}_3/\text{l} = 2.497 \times \text{Ca}(\text{mg/l}) + 4.118 \times \text{mg}(\text{mg/l}) = \text{Hardness as CaCO}_3 \div 17.1 = \text{GPG}.$

CARBON SIZING EQUATION:

Empty bed contact time: $V = \frac{Q (\text{EBCT})}{7.48}$

V = Volume (cu. ft)

Q = Flow

EBCT = Empty bed contact time needed.

NOTE: Recommended contact time is 6 minutes to remove free chlorine.
Recommended contact time is 10 minutes to remove chloramine.

RO SIZING EQUATION:

Total the flow needed for hemodialysis equipment, re-use equipment and other water uses. For a recirculating loop add 1 GPM to the total flow requirements to meet the minimum standard of 1.5 ft/sec through the loop.