Maine CDC Drinking Water Program

Disinfection Equations for Water Pipes and Storage Tanks

The DWP often gets calls about how much bleach is needed to add to a tank or a pipeline to disinfect it to a given chlorine residual using a given disinfectant. Usually someone wants to know how to meet an AWWA Standard (like C651-92, Disinfection of Water Mains).

The equation below should be used to estimate the amount of sodium hypochlorite (laundry bleach is 6.00% sodium hypochlorite) needed to disinfect a given quantity of water to a desired chlorine concentration in parts-per-million (ppm).

$$\textbf{Volume of Hypo} = \textbf{volume of water} \times \left(\frac{\textbf{required residual in ppm}}{\textbf{1,000,000} \times \textbf{hypo \%}} \right)$$

For example, say you had installed a new 5,000-gallon tank and wanted to make sure that you had at least a 100-ppm solution of chlorine in it.

How much 6.00% sodium hypochlorite (laundry bleach) would you need to add?

- (5,000 gallons x 100 ppm) / (1,000,000 x .06) = 8.33 gallons

How much 12% sodium hypochlorite solution would you need?

- (5,000 gallons x 100 ppm) / (1,000,000 x .12) = 4.17 gallons

If you use calcium hypochlorite (the white, powder version of chlorine, like HTH pool cleaner), the equation becomes:

$$\textbf{Weight of Calcium Hypo (lbs.)} = \textbf{gallon of water} \times \textbf{8.33 lbs. / gallon} \left(\frac{\textbf{required residual in ppm}}{\textbf{1,000,000} \times \textbf{hypo \%}} \right)$$

This is simply the previous equation multiplied by the conversion factor of 8.33 pounds per gallon of water.

Let's assume that we still need to disinfect 5,000 gallons at 100 ppm.

How many pounds of 65% calcium hypochlorite (HTH pool cleaner) are needed?

- (8.33 lbs./gallon x 5,000 gallons x 100 ppm) / (1,000,000 x .65) = 6.4 pounds

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