Disinfection of New Water Mains

Disinfection of mains should be accomplished only by workmen who have had experience with chlorine or other disinfecting agents. Often this work is performed by water utility employees as they are usually well acquainted with the use of chlorine.

Liquid chlorine (gas at atmospheric pressure), calcium hypochlorite granules and tablets, and sodium hypochlorite solutions are the most common disinfectants used. Chlorine gas and water solutions are fed into the main being disinfected to a concentration of at least 50 mg./L available chlorine. To insure that the required concentration is maintained, chlorine residuals are obtained. This chlorinated water solution should remain in the pipe for at least 24 hours, at the end of which period the chlorine concentration should be at least 25 mg./L. If this is achieved, final flushing can then be accomplished and chlorine residuals checked to determine that the heavily chlorinated water has been removed from the pipeline.

The Slug Method of chlorination, which is used for large diameter water mains, consists of moving a column of highly concentrated chlorine water solution (at least 300 mg./L) along the interior of the pipe with a contact time of at least three hours with the pipe wall.

The Tablet Method is generally used for short extensions up to 2,500 feet of 12 inch and smaller diameter mains. The required number of tablets are placed on the inside top of each joint and held in place by an approved mastic. The main is then filled with water at a velocity of less than 1 fps and the water is left in the main for at least 24 hours before flushing. The table below indicates the number of tablets required for each size of pipe up to 12" in diameter.

NUMBER OF HYPOCHLORITE TABLETS OF 5-G REQUIRED FOR DOSE OF 50 MG./L*

LENGTH OF SECTION (feet)	DIAMETER OF PIPE (inches)					
	2"	4"	6"	8"	10"	12"
13 or <	1	1	2	2	3	5
18	1	1	2	3	5	6
20	1	1	2	3	5	7
30	1	2	3	5	7	10
40	1	2	4	6	9	14

* Based on 3¾ grams available chlorine per tablet.

The EJP Method of chlorination consists of calculating the number of gallons of sodium hypochlorite required to disinfect a water main to a concentration of 50 mg/L (PPM).

• **Example:** Determine the amount of sodium hypochlorite required to disinfect 1100 lf. of 8" pipe and 4800 lf. of 12" pipe using 12.5% solution.

1. From Contents of Pipe table, page S-11
   8" pipe = 2.611 gallons per 1 foot length
   12" pipe = 5.876 gallons per 1 foot length

2. Determine concentration of available chlorine required (usually 50 ppm is minimum standard).
   1% of a million = 1 ppm = 10,000 in 1,000,000

3. Determine percentage of chlorine available in sodium hypochlorite being used.
   Note: Clorox™ is 5.25% available chlorine
          Supershock™ is 12.5% available chlorine

4. Determine volume of water to be chlorinated:
   1100 LF of 8" pipe × 2.611 gal./ft. = 2,872 gal.
   4800 LF of 12" pipe × 5.876 gal./ft = 28,204 gal.
   Total Pipe Volume: =   31,076 gallons

5. Calculate amount of 12.5% sodium hypochlorite required.

Formula:

x = Gallons of sodium hypochlorite required.

$$x = \frac{\text{Required ppm chlorine} \times \text{Volume of pipe in gals.}}{\text{\% of chlorine used} \times 1 \text{ part of } 1{,}000{,}000}$$

Where:

Required ppm chlorine	= 50 PPM
% of chlorine used	= 12.5%
Volume of pipe	= 31,076 gallons
1% (1,000,000)	= 10,000

$$x = \frac{50 \times 31{,}076 \text{ gal.}}{12.5 \times 10{,}000} = 12.43 \text{ gal. req'd}$$

After final flushing, bacteriological tests are performed in accordance with state and local regulations to insure that no coliform organisms are present. For more detailed information, refer to AWWA Standard C651 for Disinfecting Water Mains.