

New Water Main Chlorination, Flushing, Pressure/Leak Testing, Sampling and Tie-In



The following are guidelines in accordance with OVWSD Water Standard Detail Drawings, Design Guidelines, Approved Materials List, and AWWA procedures. It is understood that each installation may vary based on field conditions. The procedures below must be completed in the presence of the District's assigned representative. Any deviation from these procedures must be approved by the District.

Note – Until the procedures described below have been completed, the new water main must be considered contaminated and maintain a physical separation from the existing water system. A temporary connection to the water system through an approved meter and backflow prevention assembly is allowed only during filling and flushing activities.

After approval by the District and final tie in to the existing water system, all new infrastructure is to be operated by District staff only.

Chlorination

Calcium hypochlorite granules with ~65 percent available chlorine by weight shall be used for chlorination. During construction, calcium hypochlorite granules shall be placed at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500-ft intervals. The quantity of granules placed at these intervals shall be as shown in Table 1.

Table 1 - Calcium hypochlorite granules to be placed inside new water main at specified locations

Pipe Diameter (<i>d</i>)	Calcium Hypochlorite Granules
4"	1.7 oz
6"	3.8 oz
8"	6.7 oz
10"	10.5 oz
12"	15.1 oz

Filling and Chlorine Contact

When installation has been completed, the main shall be filled with water at a rate to ensure that the water within the main will flow at a velocity no greater than 1 ft/sec (0.3 m/sec) (See Table 2). Precautions shall be taken to ensure that air pockets are eliminated. This water shall remain in the pipe for at least 24 hr. If the water temperature is less than 41°F (5°C), the water shall remain in the pipe for at least 48 hr. Water used to fill the new main shall be supplied through a temporary meter connection that shall include an appropriate cross-connection control device to be supplied by the District upon payment of all prevailing fees. A detectable free chlorine residual should be found at each sampling point after the 24-hr period.

Table 2 – 1 ft/sec Flushing Velocity

Pipe ID	Gallons Per Minute
2"	10 GPM
4"	39 GPM
6"	88 GPM
8"	157 GPM
10"	245 GPM
12"	353 GPM

Hydrostatic Pressure Test/Leakage Test

After the chlorine contact time is completed and prior to flushing, a pressure test and leakage test are conducted concurrently. The temporary meter connection and backflow device are to be disconnected during the test.

All new infrastructure installed shall successfully pass a pressure test of 250 psi for a duration of 15 minutes.

New infrastructure shall not exceed allowable leakage determined using the following formula:

$L = \frac{SDVP}{133,200}$

Where:

L is the allowable leakage in gallons per hour	S is the length of pipe in feet
D is the nominal pipe diameter in inches	P is the average test pressure in psi

Flushing

Heavily chlorinated water must be neutralized to a level so as not to cause harm or damage to the environment. Flushing shall take place until chlorine measurements show that the concentration of the water leaving the new water main is no higher than that generally prevailing in the distribution system or that is acceptable for domestic use.

Bacteriological and HPC Sampling

After flushing and before the new water main is connected to the distribution system, two sets of acceptable samples, taken at least 24 hours apart, shall be collected from the new main. The number of samples shall be representative of the new infrastructure installed and at minimum be collected at/from:

- every 1,200 ft of new water main
- end of the of the new water main
- each branch

Sample collection and lab analysis is performed by the District and its designated lab or under the direction and approval of the District.

Sample Results

If any of the sample results indicate the presence of coliforms represented by Total Coliforms and/or E. Coli or the Heterotrophic Plate Count (HPC) is greater than 500 colony-forming units (cfu) per mL, flushing and/or re-chlorination should be resumed and another coliform and HPC set of samples should be taken until no coliforms are present and the HPC is less than 500 cfu/mL.

Final Connections to Existing Main, Flush and Bacteriological Sample

Final pipe connections from the new water main to the existing water main shall be one pipe length, 20ft, or less. All pipe, fittings, valves, etc. are to be spray disinfected or swabbed with a minimum 1-5% solution of chlorine just prior to being installed.

A final flush is to be completed to ensure air or foreign material in the main, as a result of the final connection, is expelled.

A bacteriological sample shall be collected downstream of the nearest point from the final tie in connection on the new water main.

All distribution gate valves shall be in the open position and any future operation of any part of the new infrastructure shall be performed by District staff only.