

SMALL DRINKING WATER SYSTEMS TECHNOLOGY REPORT

Tablet Chlorinators

Summary

A tablet chlorinator system substitutes calcium hypochlorite tablets for sodium hypochlorite chlorine or gas cylinders. Typically, the tablets provide 65 percent available chlorine. The hypochlorite tablets are placed in a holding tank that has a sieve plate on the bottom, allowing only the bottom layer of tablets to come into contact with the water. The bottom layer of tablets is then eroded as water flows through the chlorinator and sieve plate with the inlet water flow controlling the rate of chlorination - higher flows resulting in higher chlorine delivery. The chlorinator itself is not a pressure vessel, it operates under a slight vacuum created by the suction side of the pump or by gravity flow as shown below in Figure 1.

A positive displacement pump can be added on the discharge side of the storage reservoir to address the issue of positive displacement hypochlorite feeders, as recommended in Part II of the Public Water Supply Manual.

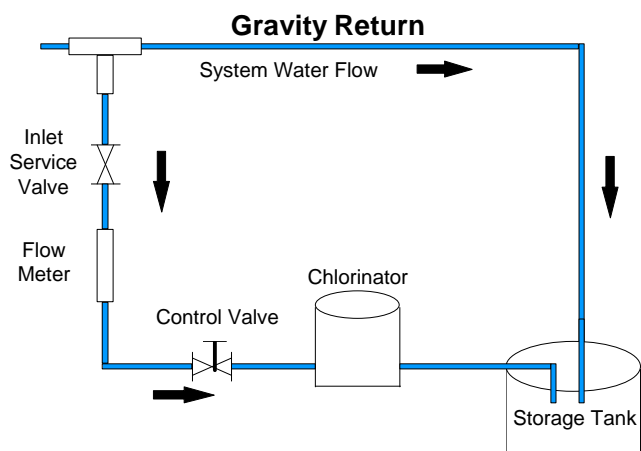


Figure 1

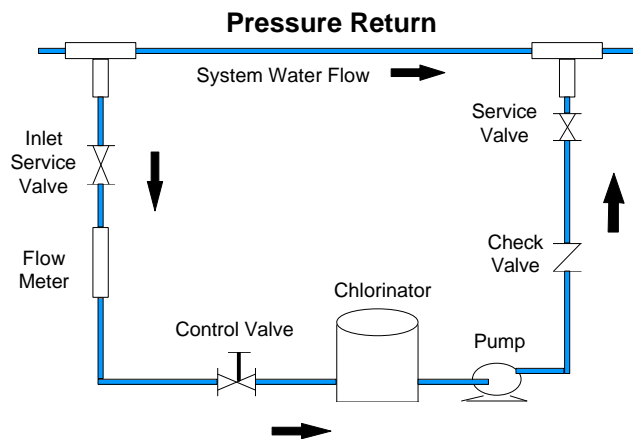


Figure 2

Both the gravity and pressure return configurations divert water from the main system flow to the chlorinator and then return the chlorinated water either to a storage reservoir or immediately back to the distribution system.

Pilot tests and field studies conducted in 1996 on tablet chlorinators in South Carolina and Virginia have produced favorable results. Tablet chlorinators have proven to be a reliable means of producing and delivering a chlorine solution and maintaining acceptable levels of chlorine residuals. In the Virginia study there was no change in the bacteriological quality of the water between using gaseous chlorine and a tablet chlorinator.

Installations:

Tablet chlorinators have been installed at numerous locations throughout the United States, including Maryland, New Jersey, Virginia, Maine, Vermont, New Hampshire, North Carolina and South Carolina.

Overall Advantages:

- Provides accurate chlorine delivery for a consistent residual.
- Tablet strength does not significantly degrade with proper storage.
- Tablets are not constantly submerged, overcoming the problem of inconsistent feed rates.
- Chlorine output is directly related to water input through a control valve.

Advantages of Particular Interest to Small Systems:

- Eliminates the handling of chlorine cylinders, liquid chlorine and corresponding chlorine spills.
- The tablet chlorinator has no moving parts and is easy to clean and maintain, thereby providing long-term reliability.
- Low capital costs and Operation and Maintenance costs.

Disadvantages:

- The chlorinators are set to deliver specific amounts of chlorine at a given rate; therefore, changes in flow and/or pressure can affect chlorine dose. These changes can be dealt with by means of flow proportioners and chlorine analyzers.
- When the system is used to accomplish rechlorination in distant parts of a distribution system, the feed rate may have to be adjusted according to incoming chlorine levels.

Design Issues:

Variations in raw water flow and pressure can be handled through the use of flow proportioners and chlorine analyzers.

The volume of calcium hypochlorite tablets in the chlorinator must be maintained at a level that insures constant contact with the water flowing through the chlorinator.

For sources with high levels of iron, one of the two options shown above can be utilized in conjunction with a filter or ion exchange treatment process following the chlorinator to avoid iron problems in the distribution system.

The storage tank in the gravity flow configuration should be designed to provide sufficient volume to achieve necessary contact times. For the pressure return configuration, if the appropriate contact time cannot be achieved in the length of distribution main prior to the first customer it may be necessary to install a storage tank in this situation as well.

For additional information regarding tablet chlorinators call the technical services section chief at the appropriate DEP regional office.

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