



## **Continuous Chlorination Disinfection System Design, Installation & Configuration Guidance for Small Water Systems April 2020**

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DISCLAIMER: The purpose of this document is to provide guidance to small water systems for provisions of continuous disinfection treatment. All treatment changes at public water systems must be reviewed and approved by the Division of Drinking Water prior to use. Nothing in this document supersedes any statutory or regulatory requirements or permit provisions for public water systems. The information below is provided for general information only.

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### **Basic Features of Continuous Chlorination Systems**



- Chlorine feed pump – Positive displacement type solution feed pumps, such as diaphragm or peristaltic pumps, should be used to feed liquid chemicals. The pump should have sufficient capacity to supply the average chlorine demand plus maintain a free chlorine residual of at least 2 mg/L at all flow rates and back pressure.
  
- Injector/diffuser – The chlorine solution injector/diffuser should be compatible with the point of application to provide rapid and thorough mixing with all the water being treated. Injection quills and static mixers should be considered to improve mixing within pipelines greater than 6 inches in diameter.
  
- Chlorine solution tank – The chlorine solution tank should be designed to provide a minimum chlorine supply of 30 days. The amount of chemical in the tank should be accurately measured by taking readings marked on the container.
  
- Chlorine solution – All chemicals or products, including chlorine, added directly to the drinking water as part of a treatment process must meet ANSI/NSF Standard 60.

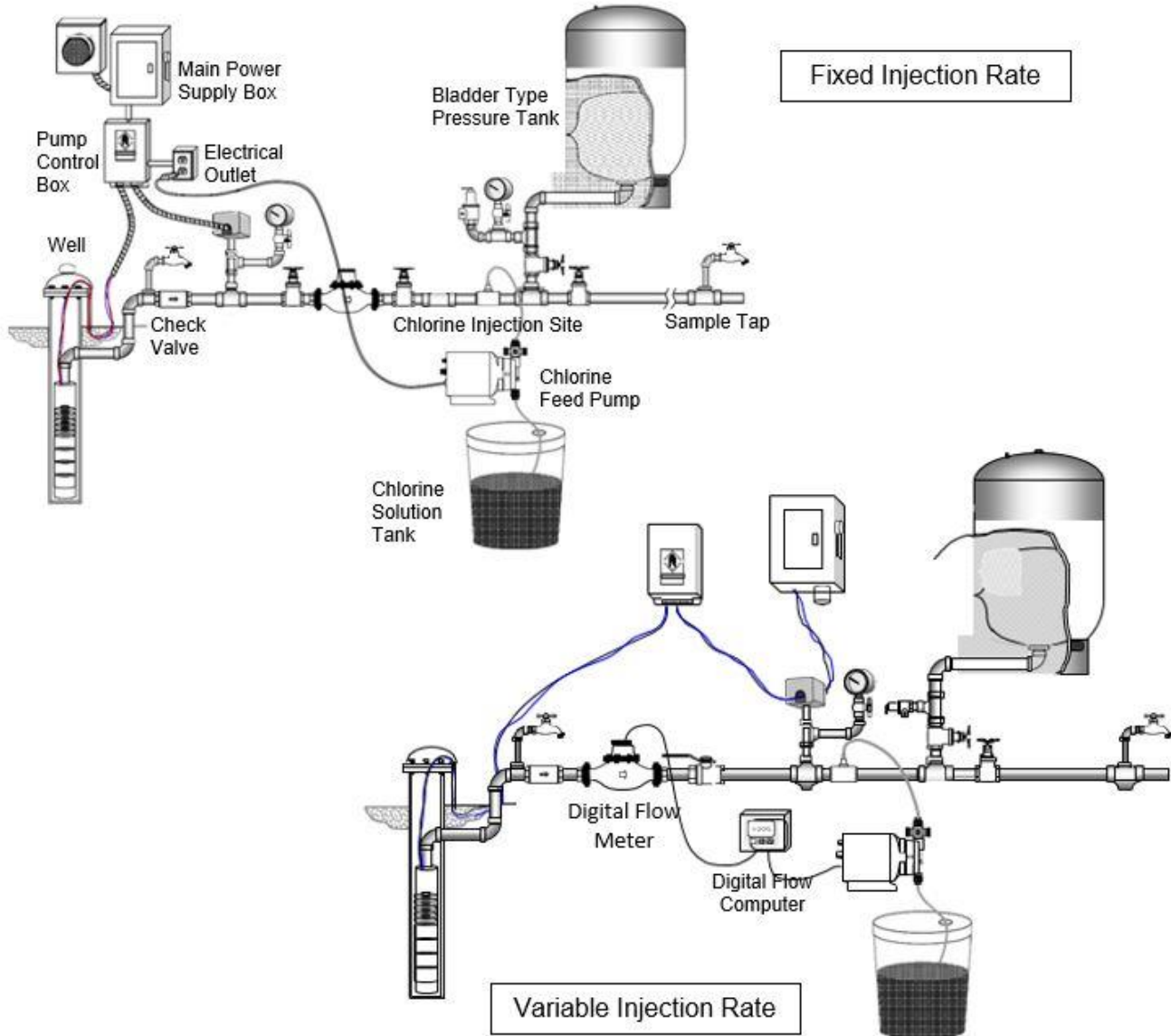
- Spare parts – Sufficient repair kits, spare parts and equipment for routine maintenance and repair should be kept on hand.
- Free chlorine residual monitoring kit – The free chlorine residual should be measured using the DPD method and recorded on a regular basis. A pool test kit is **not** acceptable. The required frequency for measuring the residual is set on a case-by-case basis. Daily measurement of the residual is strongly recommended.

### **Installation of Continuous Chlorination Systems**

- The chlorine solution tank should be located in a covered, cool, dry area. High temperatures speed up the chemical decomposition of chlorine to form chlorate and perchlorate.
- In order to prevent contamination of the chlorine feed solution, no chemicals of any kind should be stored on or over the chlorine tank. Make sure that dust, debris and insects cannot enter the top of the tank.
- Avoid exposure of the chlorine solution to metal materials that might contain iron, copper, nickel and cobalt.
- The chlorine injection line should be as short as possible to avoid looping and bending but should be long enough to allow for minor changes in placement of the chlorine solution tank.
- Chlorine solution piping and fittings should be rubber, PVC or polyethylene. Nylon products are not acceptable for any part of the chlorine solution piping system.
- If a hose is used to fill the chlorine solution tank with water, do not leave the hose in the tank after filling it. This is a hazardous cross connection with potential serious health risks.
- If a water line for filling a chlorine solution tank is hard piped, an air gap or a backflow device should be provided to prevent back siphonage on the supply line. The air gap must be at least two times the diameter of the supply line and not less than one inch.
- Chlorine solution tank and storage area should be vented to the outside of the building.

## Configuration of Continuous Chlorination Systems

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**Fixed Injection Rate** - If the system operates off of one well with steady flow rate, the chlorine feed pump should be electrically wired or controlled so that the feed pump activates when the well pump turns on. The chlorine feed pump injects at a fixed rate.

**Variable Injection Rate** - For multiple wells or if the flow of water being treated varies, the chlorine feed pump should be paced to the water flow rate. When using this type of system, the water meter sends an electrical signal to the chemical feed pump. As the meter turns faster, the speed of the pump increases, injecting the proper amount of chlorine.