

1 WATERLINE DISINFECTION AND TESTING

The following procedures are required of all contractors or developers prior to connection of any new construction with any portion of the Skagit PUD water system. All new potable water lines, fire services and appurtenances must be cleaned, disinfected, flushed, and pass testing for chlorine concentration and coliform absence before a connection will be scheduled. Waterline disinfection and testing shall also be in accordance with AWWA Standard C600-17, C605-13, C651-14, and C655-18. The following procedures supersede any conflicts with AWWA standards.

The general sequence of activities for waterline disinfection and testing are:

- A. Filling
- B. Hydrostatic pressure testing (during the disinfection process)
- C. Disinfection
- D. Final flushing
- E. Bacteriological testing

1.1 Filling, Disinfection, and Flushing

1.1.1 Filling and Backflow Prevention

- A. The contractor is required to obtain and use a USC approved lead free reduced pressure backflow assembly (RPBA) when filling a new waterline. Double check valves are not authorized for filling and flushing.
- B. Coordinate fill locations with the Skagit PUD inspector.
- C. All Skagit PUD source water for filling and flushing must be metered. The contractor will not be charged for this water usage. The Skagit PUD inspector will provide a fire hydrant meter at no cost to the contractor, for the purpose of filling and flushing. If the contractor has already obtained a fire hydrant meter from Skagit PUD for construction water, the inspector will read the meter before and after filling and flushing.
- D. Connect the RPBA to fire hydrant meter. Typically, an existing fire hydrant or flushing assembly will be provided as a source. Contractors are not authorized to operate valves owned by Skagit PUD. If using a flushing assembly, the contractor will be required to install a temporary ball valve on the flushing assembly standpipe.
- E. The RPBA must be tested by a certified backflow assembly tester (BAT) before filling can commence. The Skagit PUD inspector can provide the contractor a list of certified testers if needed. A copy of a passing test must be submitted to the Skagit PUD inspector before filling the waterline.

1.1.2 Disinfection/Chlorination and Final Flushing

- A. Waterlines subjected to the disinfection process shall be physically separated from portions of the new water system that have not been disinfected and tested, and from the existing system.
- B. Waterlines can be disinfected with the tablet/granule method (calcium hypochlorite) or the continuous-feed/liquid chlorine method (sodium hypochlorite) of chlorination.
- C. If granular chlorine is placed in the waterline during installation, fill the waterline slowly. Filling the waterline too fast could result in the chlorine flowing to the opposite end of the pipe. The Skagit PUD inspector will check the chlorine concentration at different locations when the waterline is full to determine if the disinfectant is uniformly distributed.
- D. Skagit PUD recommends all test locations have an initial chlorine residual of 50 mg/L. The minimum chlorine residual at all test locations is 25 mg/L.
- E. After the Skagit PUD inspector confirms the initial chlorine concentration, the waterline shall have a minimum contact time of 24 hours (but not more than 48 hours).
- F. The Skagit PUD inspector will check the chlorine concentrations again after 24 hours to ensure the level has not dropped below an acceptable level of 25 mg/L.
- G. After successful completion of the chlorination requirements, the contractor will flush the system until the chlorine residual is at a similar level to the existing waterlines in that area. The Skagit PUD inspector will check the chlorine level and determine if the correct chlorine level has been achieved. Highly chlorinated water should not remain in contact with the waterline for more than four working days to prevent damage to the pipe lining or cause corrosion.
- H. The contractor is responsible for dechlorinating while flushing. The contractor shall contact the local jurisdiction to determine special provisions for disposal of heavily chlorinated water.

1.2 Hydrostatic Pressure Testing

A successful hydrostatic pressure test is required prior to bacteriological testing, and normally occurs during the disinfection process and prior to final flushing

1.2.1 General Requirements

- A. Waterline appurtenances and service connections to the meter setter shall be tested in sections of convenient length under a hydrostatic pressure equal to 1.5 times the system pressure but not less than 225 psi. The Pressure test should not exceed the design pressure of any fitting, pipe, or thrust restraint system used on the waterline.
- B. Sections to be tested shall normally be limited to 1,500 feet.
- C. Pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished and operated by the contractor.
- D. The contractor must contact the Skagit PUD inspector to schedule a time for testing. The Inspector must be on site during testing. The contractor is permitted to conduct an independent pressure test before contacting the inspector.

- E. The waterline shall be backfilled sufficiently to prevent movement of the waterline under pressure. Thrust blocks shall be in place and adequate time allowed for the concrete to cure before testing. Where permanent blocking is not required, the contractor shall furnish and install temporary blocking and remove it after testing.
- F. The waterlines shall be filled with water and allowed to stand under pressure a sufficient length of time to allow the escape of air and allow the lining of the waterline to absorb water. Skagit PUD will furnish the water necessary to fill the waterline for testing purposes at a time of day when sufficient quantities of water are available for normal system operation.
- G. All visible leaks are to be repaired regardless of allowances used for testing.
- H. The Skagit PUD inspector will check the chlorine residual following a successful pressure test.

1.2.2 Ductile iron and PVC waterlines

- A. For ductile iron waterlines, the required pressure shall be maintained for a minimum of 24 hours prior to the hydrostatic pressure test.
- B. The hydrostatic test period shall be a minimum of two hours in duration. Makeup water is not allowed during the test period.
- C. Pressures during the hydrostatic test period shall not vary by more than ± 5 psi.

1.2.3 HDPE Pipe

- A. The required pressure shall be maintained for a minimum of four hours to allow for expansion. Water shall be added as needed to maintain the required pressure.
- B. The pressure must remain steady for at least one hour following the expansion phase.
- C. The overall test period, including the expansion phase, shall not exceed eight hours because of leakage, equipment failure, or other reason. The test section should be depressurized and allowed to “relax” for at least eight hours before reattempting a second test.
- D. There is no allowable leakage for HDPE pipe during the one hour period following the expansion phase.

1.3 Bacteriological Testing

After disinfection, final flushing, and hydrostatic pressure testing, and before a connection can be scheduled, the new waterline must pass bacteriological testing from an independent lab.

1.3.1 Water Sampling for Testing

- A. The contractor or representative of the contractor must be on-site during water sample collection. Skagit PUD will provide all materials (paperwork, bottles, chlorimeter, etc.) for collecting water samples. Sets of samples shall be collected every 1,200 ft of new waterline, plus one set from the end of the line and at least one from each branch greater than one pipe length, including services. The Skagit PUD inspector will inform the contractor of sample locations. It is the contractor’s responsibility to provide and install the fittings needed for the collection of the samples.

- B. The sampling process is as follows:
- a. After disinfection, final flushing, and hydrostatic pressure testing, the water shall remain in the waterline for a minimum of 16 hours before any samples are collected.
 - b. The Skagit PUD inspector will determine where and how many samples will be needed.
 - c. The Skagit PUD inspector will check the residual chlorine level again and then disinfect the sample location with bleach and by torching.
 - d. The Skagit PUD inspector will give the contractor a sample bottle to fill.
 - e. Two sets of samples shall be taken a minimum of 15 minutes apart at each sampling site. Sampling taps shall be left running between the two sets of samples.
 - f. After collecting samples, the inspector will complete the required paperwork and take the samples to the lab for testing. The contractor shall have an open account with the testing facility for billing purposes. Test results are generally available within two to three business days. If any sample fails, the contractor is required to repeat the original disinfection procedure. Once the inspector is notified of satisfactory results the connection can be scheduled.