

## **SECTION 02675**

### **DISINFECTION**

#### **PART 1 GENERAL**

##### **1.01 SECTION INCLUDES**

- A. Disinfection of potable water system.
- B. Test and report results.

##### **1.02 REFERENCES**

- A. AWWA A100: AWWA Standard for Water Wells.
- B. AWWA B300: AWWA Standard for Hypochlorites.
- C. AWWA B301: AWWA Standard for Liquid Chlorine.
- D. AWWA C651: AWWA Standard for Disinfecting Water Mains.
- E. AWWA C652: AWWA Standard for Disinfection of Water-Storage Facilities.
- F. State of Utah: Public Drinking Water Regulations, Part 2, Section 12.

##### **1.03 DEFINITIONS**

- A. Disinfectant Residual: The quantity of disinfectant in treated water.
- B. ppm: Parts per million.

##### **1.04 SUBMITTALS**

- A. Contractor's evidence of experience in disinfection.
- B. Bacteriological laboratory's evidence of certification.
- C. Disinfection Report: 3 copies including:
  - 1. Date issued.
  - 2. Project name and location.
  - 3. Treatment contractor's name, address and phone number.
  - 4. Type and form of disinfectant used.
  - 5. Time and date of disinfectant injection started.
  - 6. Time and date of disinfectant injection completed.

7. Test locations.
8. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
9. Time and date of flushing start.
10. Time and date of flushing completion.
11. Disinfectant residual after flushing in ppm for each outlet tested.

D. Bacteriological Report: 3 copies including:

1. Date issued.
2. Project name and location.
3. Laboratory's name, certification number, address, and phone number.
4. Time and date of water sample collection.
5. Name of person collecting samples.
6. Test locations.
7. Time and date of laboratory test start.
8. Coliform bacteria test results for each outlet tested.
9. Certification that water conforms or fails to conform to bacterial standards of State of Utah public drinking water regulations.
10. Bacteriologist's signature.

1.05 QUALITY ASSURANCE

- A. Affidavit by manufacturer that disinfectant conforms to AWWA and NSF standards.
- B. Bacteriological Laboratory: Certified by State of Utah.

1.06 PRODUCT HANDLING

- A. Store and protect disinfectant in accordance with manufacturer's recommendations to protect against damage or contamination. Do not use unsuitable disinfectant.
- B. Follow all instruction labeling for safe handling and storage of disinfectant materials.

1.07 REGULATORY REQUIREMENTS

- A. Conform to State of Utah public drinking water regulations.

PART 2 PRODUCTS

2.01 DISINFECTANT

- A. Liquid Chlorine: AWWA B301 with chlorine 99.5 percent pure by volume.
- B. Sodium Hypochlorite: AWWA B300 with not less than 100 grams per liter available chlorine.
- C. Calcium Hypochlorite: AWWA B300 with 65 to 70 percent available chlorine by weight in granular form.
- D. Powder, tablet, or gas according to manufacturer's specification.

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Disinfect the potable water pipelines prior to pressure testing if connected to an existing system.
- B. Ensure that the pipeline to be disinfected is isolated from the existing system.
- C. Follow all guidelines set forth in AWWA C651.

**3.02 DISINFECTION OF WATER LINES**

- A. Use one of the approved chlorination methods in AWWA C651.
- B. Chlorination shall provide a minimum of 25 ppm residual after 24-hours contact in the pipeline. In general, this residual may be expected with an application of 50 ppm although some conditions may require more.
- C. If calcium hypochlorite granules are used, 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 foot intervals. The quantity of granules shall be shown in table below, where D is the inside diameter in feet.

PIPE SIZE (inches)	CALCIUM HYPOCHLORITE GRANULES (oz)	CALCIUM HYPOCHLORITE GRANULES (g)
4	1.7	48
6	3.8	108
8	6.7	190
10	10.5	298
12	15.1	428
14 and larger	D <sup>2</sup> x 15.1	D <sup>2</sup> x 428

- D. During the process of chlorinating the pipeline all valves and other pipeline appurtenances shall be operated several times to provide sufficient contact with the chlorinating agent.
- E. See Section 02660 3.02 H for requirements of potable service lines.

**3.03 DISINFECTION OF CULINARY WELLS**

- A. Use one method defined under AWWA A100 as approved by City Engineer.

- B. Do not start disinfection until well is thoroughly cleaned.
- C. Use a disinfecting solution containing a minimum of 50 ppm residual chlorine.

#### 3.04 DISINFECTION OF WATER STORAGE RESERVOIRS

- A. Use one method defined under AWWA C652, as approved by City Engineer.
- B. Do not start disinfection until water storage tank is thoroughly cleaned.
- C. Provide and use necessary safety equipment for workers in contact with disinfectant or gasses they may produce.

#### 3.05 QUALITY CONTROL - BACTERIOLOGICAL TEST

- A. No samples for testing shall be taken sooner than 24 hours after system flushing.
- B. At least one set of samples shall be collected from every 1,200 feet of new water main, plus one set from the end of the line and at least one set from each branch. Sample water at each of the following locations, as applicable:
  - 1. Where water enters system, including each source.
  - 2. Ends of piping runs.
  - 3. Remote outlets.
- C. Analyze water samples in accordance with State of Utah requirements. Two (2) samples, 24 hours apart, will be taken at each location.
- D. If bacteriological test proves water quality to be unacceptable, repeat system treatment.
- E. Water systems shall not be accepted or placed into service until a negative bacteriological test is made on water taken. Repeat dosing as necessary until a negative test is obtained. Provide a copy of the negative bacteriological test to City Engineer.
- F. The Public Works Department will perform bacteriological sampling on all new water distribution system infrastructure intended to become part of the community's water system. All locations for sampling will be determined by water department personnel. The cost for each sample will be billed to Developer / Contractor.

#### 3.06 FLUSHING AND DISPOSAL OF DISINFECTANT

- A. After the 24 hour retention period, flush the chlorinated water from the main until chlorine measurements show the concentration in the water leaving the main is no higher than that generally prevailing in the system or is acceptable for domestic use.
- B. Legally dispose of disinfecting water and ensure no chlorine buildup or damage to the environment. Unless otherwise approved by the Public Works Director, disinfecting water shall not be discharged onto the ground. Disinfecting water shall normally be discharged into a holding container or water truck where the chlorine concentration level shall be brought down to an acceptable level prior to discharge per the direction of the Public Works Director through the use of de-chlorination tablets or other acceptable reducing agents.

- C. Failing to flush the line may require Contractor to replace all gaskets and valves within the system at Contractor's expense.
- D. Flushing shall be accomplished through hydrants or, if a hydrant does not exist at the end of the line, the Contractor shall install a tap of sufficient size to provide for a 2.5 foot per second flushing velocity in the line. When flushing water service lines, all water meter vault inlets and/or ball valves shall be flushed of all disinfectant.
- E. The following flow quantity required to provide a 2.5 foot per second flushing velocity:

PIPE SIZE (In.)	FLOW (gpm)
4	100
6	220
8	390
10	610
12	880
16	1567

END OF SECTION