

**San Antonio Water System Standard Specifications for Construction**

**ITEM NO. 847  
DISINFECTION**

- 847.1 DESCRIPTION:** This item shall consist of disinfection of new mains utilizing Calcium Hypochlorite (HTH) in accordance with these specifications. Machine chlorination shall be performed by SAWS as specified in the specifications and drawings. The Contractor is required to provide all appurtenances to the pipe to allow machine chlorination.
- 847.2 MATERIALS:** The materials for disinfection shall conform to the appropriate specifications contained within the latest revision of SAWS' Material Specifications, Item No. 100-20.
- 847.3 CONSTRUCTION:** After the new mains have successfully passed the pressure test specified in "Hydrostatic Testing Operations" Item No. 841, the Owner will disinfect only those mains shown on the plans or otherwise indicated as "Machine Chlorination by SAWS," and in accordance with the Standard Drawing DD-847. This disinfection shall include; chlorination, flushing, and placing the mains in service, as follows. All other disinfection requirements shall be accomplished by the Contractor. Disinfection by the Contractor is limited to sections of pipe less than 800 feet in length between sections.
1. Operation of Valves: During and after the disinfection of the mains, the Contractor shall be notified by the Engineer sufficiently in advance to enable the Contractor to have a competent representative present whenever valves are to be operated that will affect the pressure in any part of the work for which the Contractor is responsible.
  2. Contractor's Personnel and Equipment: The Contractor shall supply labor and equipment necessary to make all excavations required for chlorination, equipment connections, subsequent flushing, and placing the mains in service.
  3. Safeguarding and Backfilling Open Holes: The Contractor shall be responsible for safeguarding any open holes excavated or left open for flushing and disinfection purposes. Following completion of disinfection, the Contractor shall backfill holes in accordance with appropriate provisions of "Excavation, Trenching and Backfill", Item No. 804.
  4. General: Mains shall be disinfected with dry HTH where shown on the

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plans or as directed by the Engineer, and shall not exceed a total length of 800 feet. This method of disinfection will also be followed for main repairs. The Contractor shall utilize all appropriate safety measures to protect his personnel during disinfection operations.

5. Dosage: The Contractor shall disinfect the new or replaced mains with HTH of 70% available chlorine furnished by the Contractor. Sufficient HTH shall be used to obtain a minimum chlorine concentration of 50 ppm. Table 847-1, "Chlorine Dosage," is included for the convenience of the Contractor.

A heaping tablespoon holds approximately ½ ounce, and a standard measuring cup holds approximately 8 ounces.

6. Filling the Main: Those sections of main to which the dry HTH has been applied shall be filled slowly to allow for the even distribution of the disinfecting material. The manipulation of valves shall be under the supervision of the Engineer's representative in accordance with "Operation of Valves", Item No. 847.3.1.
7. Holding Time: The length of time that sections of main disinfected with HTH shall be allowed to stand undisturbed will depend upon the particular job and Texas Commission on Environmental Quality (TCEQ) criteria.
  - a. When circumstances permit a shutdown with no customers out of service, the required minimum detention time will be 24 hours with a 50 ppm chlorine dosage.
  - b. When customers are out of service during a shutdown with no leakage past valves, the required minimum detention time will be 3 hours and the chlorine dosage will be 300 ppm.
  - c. When customers are out of service with some leakage past valves, the required minimum detention time will be 30 minutes with a 500 ppm chlorine dosage.
8. Flushing: Following the expiration of the specified holding time, the treated section of main shall be flushed thoroughly by the Contractor in accordance with the applicable provisions of "Hydrostatic Testing Operations", Item No. 841. Flushing shall continue until no chlorine remains detectable by taste or odor or until the chlorine residual is less than 0.3 ppm. The Contractor must make provisions for the disposal and

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runoff of the flushing operations in order to minimize erosion or impact to residents.

9. Preventing Reverse Flow: Valves shall be manipulated so that the strong chlorine solution in the line being treated will be flushed out of the main and will not flow back into the line supplying the water.
10. Supervision. All disinfection of mains shall be done under the general supervision of a representative of the Owner.
11. Additional Treatment: Should the new main fail to meet minimum public health standards for bacteriological quality after flushing, further treatment shall be as directed by the Engineer. If further disinfection is required, chlorination shall be done in accordance with the SAWS guidelines for Disinfection of New Mains Utilizing Machine Chlorination. In no case, however, shall the new line be acceptable as complete and satisfactory until the bacteriological quality of the water taken from the main meets the standards of the TCEQ.
12. Safeguarding and Backfilling Open Holes: The requirements for safeguarding and backfilling all holes excavated or left open for chlorinating and sampling shall be as specified in "Trench Excavation Safety Protection", Item No. 550, of the City of San Antonio Specifications.

If an open hole is unsafe and does not have proper trench protection, SAWS Chlorination Crew will not chlorinate project until acceptable trench protection is provided.

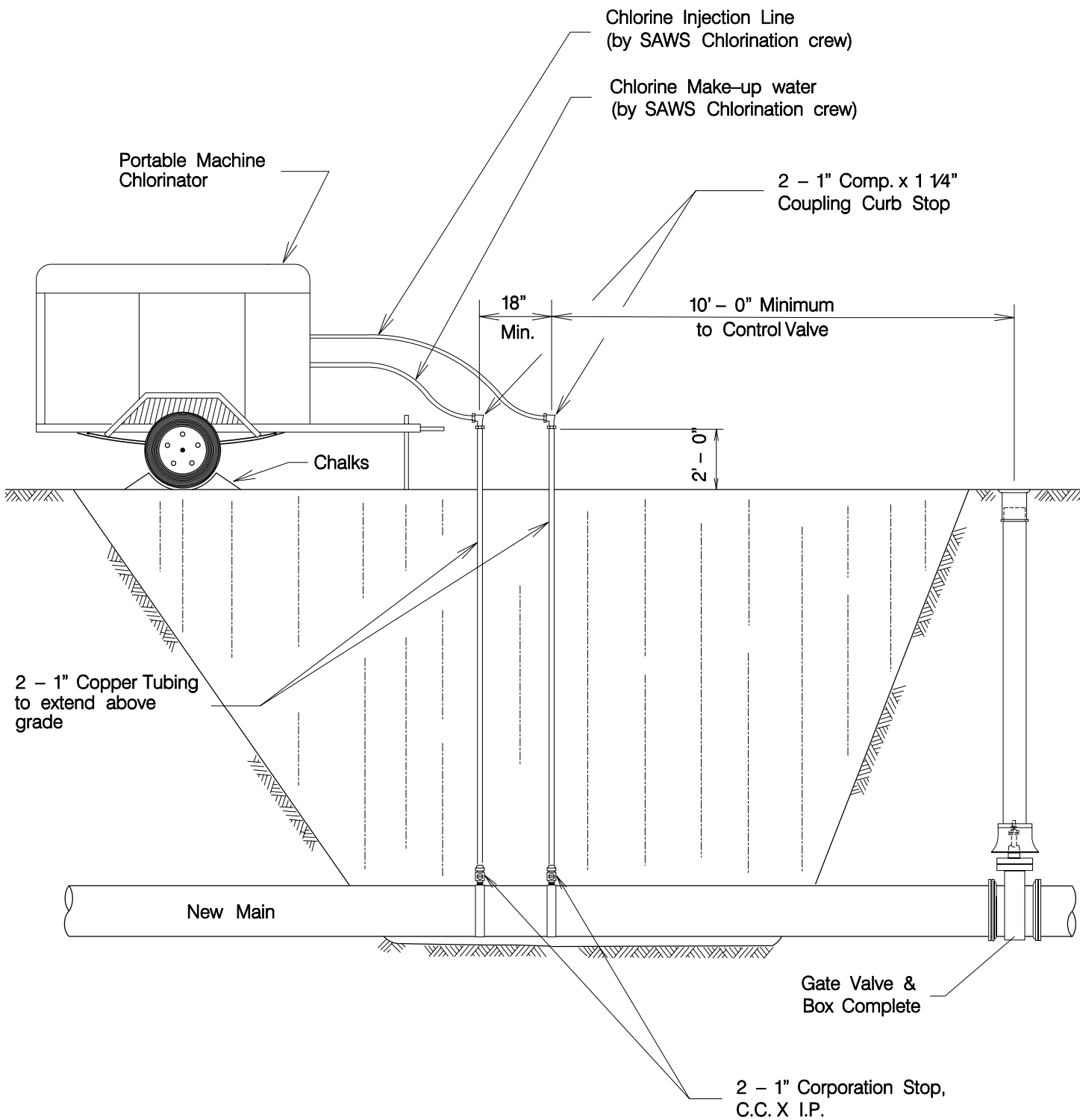
**847.4**      **MEASUREMENT:** Disinfection operations are considered subsidiary to the work and no separate measurement will be made by the Contractor for this work.

**847.5**      **PAYMENT:** Disinfection operations are considered subsidiary to the work and no separate payment will be made to the Contractor for this work.

The Contractor is required to provide all appurtenances to the pipe to allow for machine chlorination at no additional cost or separate pay item.

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<b>TABLE 847-1</b>	
<b>CHLORINE DOSAGE</b>	
<b>Ounces Per Foot; Diameter of Pipe in Inches</b>	<b>To Obtain 50 ppm Chlorine Dosage</b>
6	0.0138
8	0.0233
10	1.0
12	0.0523
14	0.0708
16	0.0934
18	0.1175
20	0.1455
24	0.208
30	0.327
36	0.469
42	0.637
48	0.0833
54	1.0575
60	1.308



Note:  
 2 - 1 1/4" Solid Cap, Thd. to be installed on Corporation Stop after chlorination