

Archives



American Water Works Association

ANSI/AWWA C601-81
(Revision of AWWA C601-68)

AWWA STANDARD
for
**DISINFECTING WATER
MAINS**



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Foreword

This foreword is for information only and is not a part of AWWA C601.

I. History of Standard

AWWA C601 first was approved on Sep. 30, 1947, by the Board of Directors and published as 7D.2-1948, A Procedure for Disinfecting Water Mains. Revisions were approved by the Board on Sep. 14, 1948, Mar. 6, 1953, May 27, 1954, and Jun. 2, 1968. The 1968 Revision (C601-68) included for the first time the slug method and the tablet method along with a revision to the long-standing continuous feed method.

II. Discussion

This standard describes methods of disinfecting potable water mains that are newly constructed, mains that have been removed from service for planned repairs or maintenance that exposes the pipelines to contamination, mains that have been subjected to emergency repairs due to physical failure of the pipelines, and mains that, under normal operation, continue to show the presence of coliform organisms.

It generally is easier to achieve disinfection of a new main than of one given emergency repairs. The sanitary conditions created when an existing main bursts or is cut into are likely to be difficult to control, and the need to restore quickly water service to the community requires more rapid disinfection procedures than those prescribed for newly constructed mains.

Crews responsible for the repair of mains should be aware of the potential health hazards and should be trained to observe carefully the prescribed construction practices and disinfection procedures.

Disinfection requires skills not necessarily mastered by competent construction crews, and some utilities prefer to disinfect

water mains using specially trained water treatment crews. However, the effectiveness of disinfection depends in large measure on maintaining clean pipes and avoiding major contamination during construction; so there are some advantages in having the construction crew retain the responsibility for disinfection. Furthermore, certain functions such as the placing of tablets must be performed by the construction crew. In either case, it is strongly recommended that pipe crews be trained to be aware of the need for maintaining clean pipes and avoiding contamination.

Three methods of disinfecting newly constructed water mains are described in this standard: the tablet method, the continuous feed method, and the slug method. The utility should decide which of these methods is most suitable for a given situation. Choice of the method used should include consideration of the length and diameter of the main, type of joints, availability of materials, equipment for the disinfection, training of the personnel who will be performing the disinfection, and safety considerations. For example, the application of gas chlorination should be used only where properly designed and constructed equipment is available; make-shift equipment is not acceptable where liquid chlorine cylinders are used. Thorough consideration should be given to the impact of highly chlorinated water flushed to the receiving environment. If there is any question that damage may be caused by a chlorinated waste discharge (to fish life, plant life, physical installations, or other downstream water uses of any type), then an adequate amount of reducing agent should be applied to water being

disposed of in order to neutralize thoroughly the chlorine residual remaining in the water.

The tablet method cannot be used unless the main can be kept clean and dry. It cannot be used in large-diameter mains if it is necessary for a worker to enter the main to grout joints or perform inspection because the tablets may release toxic fumes after exposure to moist air. The chlorine concentration is not uniform throughout the main because the hypochlorite solution is dense and tends to concentrate at the bottom of the pipe. The use of the tablet method precludes preliminary flushing. It is convenient to use in mains having diameters up to 24 in., and it requires no special equipment.

The continuous feed method is suitable for general application. The preliminary flushing will remove light particulates from the main but not from the pipe joint spaces. The chlorine concentration is uniform throughout the main.

The slug method is suitable for use with mains of large diameters where the continuous feed method is not practical because of the volume of water involved. The slug method results in appreciable savings in chemicals in long, large-diameter mains, and reduces the volume of heavily chlorinated water to be flushed to waste.

III. Major Revisions

With certain exceptions, the tablet method and continuous feed method have been modified by a requirement that hypochlorite granules be placed in the upstream end of the first length of pipe. The purpose of this procedure is to provide a strong chlorine concentration in the first flow of flushing water that flows down the main. This procedure is recommended particularly where the type of pipe is such that this first flow of water will flow into annular spaces at pipe joints.

Required chlorine doses have been reduced in almost all disinfection methods.

The reductions are justified on the basis that the specified chlorine concentrations are entirely adequate to disinfect a clean main; if a main is dirty and carries significant amounts of particulate material, then even higher chlorine concentrations will not be effective.

Suggestions have been made for procedures to be used when the pipes cannot be kept clean and dry when disinfection is required. Special attention is required for caulked tapping sleeves, and special sampling procedures are required when it is not possible to keep trench water out of the main during construction.

No new procedures have been developed for disinfecting mains after repairs.

IV. Information Regarding Use of This Standard

This standard is written as though the work will be done by the owner's personnel. Where the owner is contracting for such work to be done under a separate contract or as part of a contract for installing mains,* appropriate provisions should be included in the contract agreement to assure that the contractor is specifically instructed as to his responsibilities. At least the owner should specify:

1. Standard used—that is, AWWA C601.
2. Form of chlorine to be used (Sec. 2.1, 2.2, and 2.3).
3. Method of chlorination (Sec. 5.1, 5.2, and 5.3).
4. Places where flushing may be done, rates of flushing, and locations of drainage facilities (Sec. 5.2.2, 6.1, and 6.2).
5. The number and frequency of samples for bacteriological tests (Sec. 7.1, 7.2, and 8).
6. Method of taking samples (Sec. 7.3).

*See other AWWA standards and manuals for design criteria and installation procedures for various pipe materials.