ANSI/AWWA **C653-20**

(Revision of ANSI/AWWA C653-13)

AWWA Standard

Disinfection of Water Treatment Plants

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American Water Works Association

AWWA Standard

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Committee Personnel

The AWWA Subcommittee on Disinfection of Water Treatment Plants, which developed revisions to this standard, had the following personnel at the time:

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Contents

All AWWA standards follow the general format indicated subsequently. Some variations from this format may be found in a particular standard.

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Foreword

This foreword is for information only and is not a part of ANSI/AWWA C653.*

I. Introduction.

I.A. *Background*. This standard describes methods of disinfecting new treatment facilities before they are placed in service; existing treatment facilities before they are returned to service after construction, inspection, or other event causing potential contamination; and existing treatment facilities that, under normal operation, continue to demonstrate the presence of total coliform bacteria in the plant effluent. Because of the complexity and diversity of treatment plants, the formulation of firm rules for application of this standard is not practicable. Nevertheless, principles described in this standard do apply generally and must be followed to enable proper disinfection of treatment plant facilities. Several alternative disinfection procedures are provided for those parts of the treatment plant generally referred to as conveyance facilities (such as pipes) and storage facilities (such as basins tanks, clearwells, and so forth).

Disinfection is required for all portions of the facility that are either downstream from the filter influent, downstream from the first point of primary disinfectant application in the treatment process, or all portions of a facility if no primary disinfection is provided (for example, some groundwater systems) as described in Sec. 4.2. The section of the treatment facility handling raw water does not need to be disinfected but should be thoroughly cleaned as described in Sec. 4.1.

I.B. *History*. The first edition of ANSI/AWWA C653 was approved by the AWWA Board of Directors on Jan. 25, 1987. Subsequent editions were approved on Feb. 2, 1997; Jan. 19, 2003; and June 9, 2013. This edition was approved June 11, 2020.

II. Special Issues.

II.A. *Alternative Disinfection Procedures*. The utility should decide which of the alternative disinfection procedures is most suitable for a given situation. Choice of the procedure used should include consideration of the availability of materials and equipment for the disinfection operation, the training of personnel to perform the disinfection, and safety considerations. For example, gas chlorination should be used only where properly designed and constructed equipment is available; makeshift

* American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036.

equipment is not acceptable when liquid chlorine gas cylinders are used. Spray equipment should be used inside tanks or enclosures only when thorough ventilation is assured or when appropriate protection for personnel is provided. If a procedure is selected that requires the disposal of highly chlorinated water, then thorough consideration should be given to the impact on the environment and local regulations. If there is any question that the discharge of chlorinated waste may cause damage to aquatic life, wildlife, human health, physical installations, or other downstream water uses of any type, then a reducing agent should be applied to water being disposed of to thoroughly neutralize the chlorine residual remaining in the water. Refer to ANSI/AWWA C655, Field Dechlorination for appropriate dechlorination requirements.

Disinfection of treatment plants requires high levels of disinfectant to be applied to ensure bacteria and other potential pathogens are inactivated. It should be noted that pH and temperature are two important factors affecting the disinfection process. Above pH 9, chlorine exists primarily in the form of hypochlorite, which is not as effective a disinfectant as hypochlorous acid, which is more prevalent at pH less than 9. Water temperature also affects the disinfection process; disinfection at low temperatures is not as effective as at high temperatures.

Disinfectants other than chlorine may be appropriate to use. While this standard describes only the use of liquid chlorine, sodium hypochlorite solutions, and calcium hypochlorite, the applicability of other disinfectants should be evaluated. Ozone and chemical cleaners have been used, and these warrant further investigation. Whichever disinfectant or method is selected, approval from the local regulatory agency may be required.

III. Use of This Standard. It is the responsibility of the user of an AWWA standard to determine that the products described in that standard are suitable for use in the particular application being considered.

III.A. *Purchaser Options and Alternatives*. The following information should be provided by the purchaser:

1. Standard used—that is, ANSI/AWWA C653, Disinfection of Water Treatment Plants, of latest revision.

2. Whether compliance with NSF*/ANSI/CAN† 60, Drinking Water Treatment Chemicals—Health Effects, is required.

3. Details of federal, state, and local requirements (Sec. 4.1.1).

* NSF International, 789 North Dixboro Road, Ann Arbor, MI 48105

† Standards Council of Canada, 55 Metcalfe Street, Suite 600, Ottawa, ON K1P 6L5 Canada.

4. Form of chlorine to be used (Sec. 4.3).
5. Method of chlorination of piping (Sec. 4.4.1).
6. Precautions for disposal of chlorinated water (Sec. 4.4.3.6).
7. Bacteriological testing method to be used (Sec. 5.1).
8. Redisinfection, if required (Sec. 5.1).
9. Method of dechlorination, if required.

III.B. *Modification to Standard*. Any modification of the provisions, definitions, or terminology in this standard must be provided by the purchaser.

IV. Major Revisions. Major changes made to the standard in this revision include the following:

1. The scope was updated to include the use of disinfection on all portions of a facility if no primary disinfection is provided (Sec. I.A, Sec. 1.1, Sec. 4.2).
2. Definitions for potable water, reclaimed water, and wastewater were added (Sec. 3).
3. Sec. 4.3 *Forms of Chlorine for Disinfection* was updated to align with C652.

V. Comments. If you have any comments or questions about this standard, please call AWWA Engineering and Technical Services at 303.794.7711, FAX at 303.795.7603, write to the department at 6666 West Quincy Avenue, Denver, CO 80235-3098, or email at standards@awwa.org.

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American Water Works Association
Dedicated to the World's Most Important Resource®

AWWA Standard

Disinfection of Water Treatment Plants

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes chlorination materials, procedures, and requirements for disinfection of new treatment facilities and existing water treatment facilities temporarily taken out of service for cleaning, inspection, maintenance, painting, repair, or any other activity or event that might lead to contamination of water. Typically, this standard applies to treatment components, including filter basins, filter media, clearwells, pump suction wells, and associated piping and appurtenances located downstream from the filter influent, or from the first point of application of disinfectant in the treatment process, or all portions of a facility if no primary disinfection is provided. The disinfection method employed is surface contact with a high-strength chlorine solution for a specific time period. The absence of total coliform bacteria in addition to the use of proper disinfection practices is confirmation that the disinfection process has been accomplished in compliance with this standard.

Sec. 1.2 Purpose

The purpose of this standard is to define the minimum requirements for the disinfection of water treatment plants, including facility preparation, application