



**American Water Works  
Association**

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**ANSI/AWWA B603-16**  
(Revision of ANSI/AWWA B603-10)

**AWWA Standard**

# Permanganates

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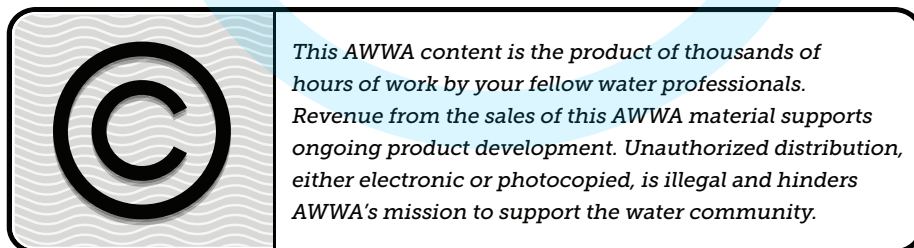
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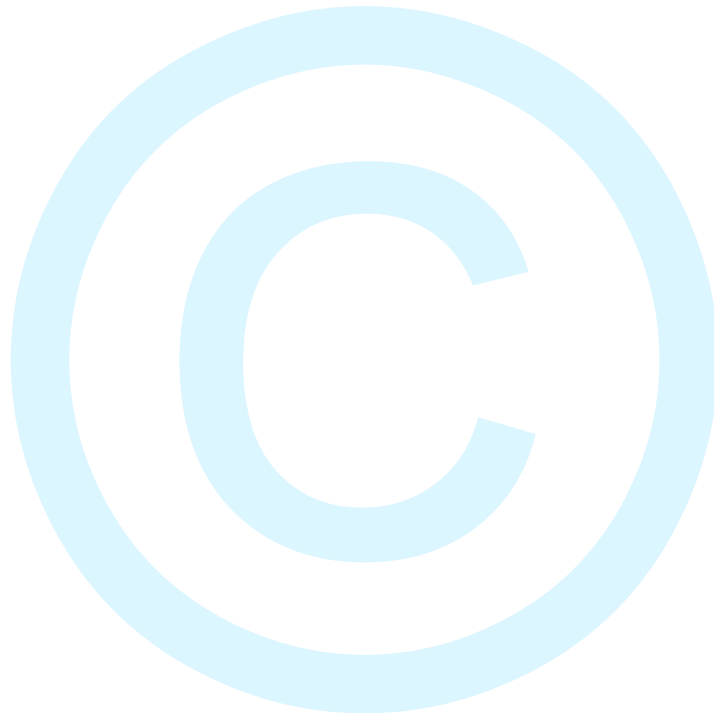
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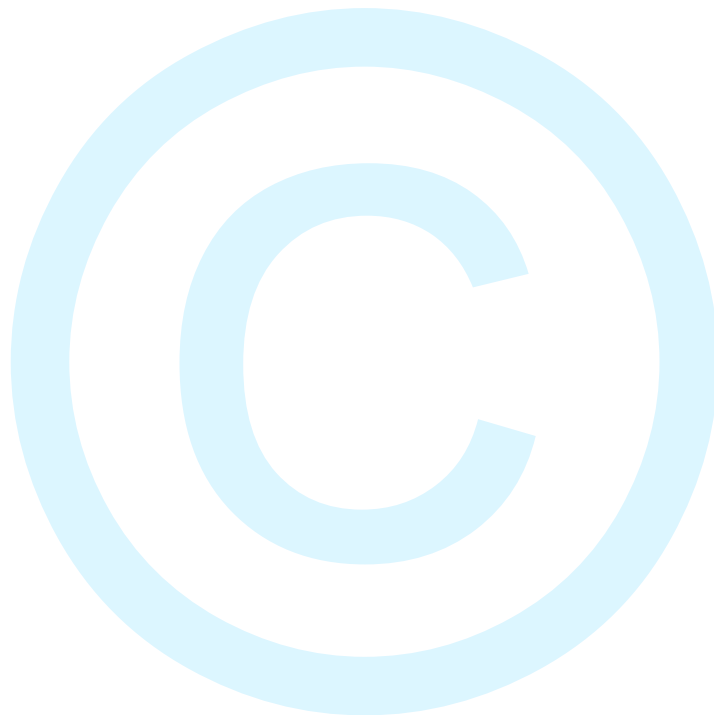


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# Foreword

*This foreword is for information only and is not a part of ANSI\* / AWWA B603.*

## I. Introduction.

I.A. *Background.* Potassium permanganate and sodium permanganate are strong oxidizing agents. They oxidize organic matter responsible for many types of tastes, odors, and colors. Potassium permanganate and sodium permanganate oxidize dissolved iron, manganese, and arsenic to produce oxides, which can then be settled or filtered out. They also oxidize hydrogen sulfide, thereby eliminating the rotten-egg odor. Potassium permanganate is listed by the US Environmental Protection Agency (USEPA) as a substitute preoxidant for chlorine to control total trihalomethanes (TTHMs).

Potassium permanganate ( $\text{KMnO}_4$ ) is a manufactured product. Potassium permanganate crystals are rhombic or needlelike in shape and are purple or bronze in color. They are manufactured in several different grades. Any grade of potassium permanganate that meets quality and feed requirements may be used in water treatment. The two most widely used grades are technical grade, designed for solution feed, and free-flowing grade, suitable for either solid or solution feed. The free-flowing grade contains an additive to minimize caking and lumping caused by moisture and compaction. It may be gray because of the additive.

Liquid sodium permanganate ( $\text{NaMnO}_4$ ) solution is an alternative to dry potassium permanganate crystals. This product was developed in response to requests by users for a liquid permanganate solution. Because of the limited solubility of potassium permanganate (6 percent at room temperature), the cation was exchanged to increase the solubility. Sodium permanganate is commercially available in concentrations up to 40 percent by weight and is manufactured according to the same manufacturing practices described above that are used in the manufacture of potassium permanganate.

I.B. *History.* AWWA B603 was initially approved as a standard by the AWWA Board of Directors on Jan. 28, 1968. Revisions were approved on May 8, 1977; June 5, 1983; June 19, 1988; June 6, 1993; June 21, 1998; June 15, 2003; and Jan. 17, 2010. This edition was approved on Jan. 16, 2016.

I.C. *Acceptance.* In May 1985, the US Environmental Protection Agency (USEPA) entered into a cooperative agreement with a consortium led by NSF

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

International (NSF\*) to develop voluntary third-party consensus standards and a certification program for direct and indirect drinking water additives. Other members of the original consortium included the Water Research Foundation<sup>†</sup> (formerly AwwaRF) and the Conference of State Health and Environmental Managers (COSHEM). The American Water Works Association (AWWA) and the Association of State Drinking Water Administrators (ASDWA) joined later.

In the United States, authority to regulate products for use in, or in contact with, drinking water rests with individual states.<sup>‡</sup> Local agencies may choose to impose requirements more stringent than those required by the state. To evaluate the health effects of products and drinking water additives from such products, state and local agencies may use various references, including two standards developed under the direction of NSF: NSF/ANSI 60, Drinking Water Treatment Chemicals—Health Effects, and NSF/ANSI 61, Drinking Water System Components—Health Effects.

Various certification organizations may be involved in certifying products in accordance with NSF/ANSI 60. Individual states or local agencies have authority to accept or accredit certification organizations within their jurisdictions. Accreditation of certification organizations may vary from jurisdiction to jurisdiction.

Annex A, “Toxicology Review and Evaluation Procedures,” to NSF/ANSI 60 does not stipulate a maximum allowable level (MAL) of a contaminant for substances not regulated by a USEPA final maximum contaminant level (MCL). The MALs of an unspecified list of “unregulated contaminants” are based on toxicity testing guidelines (noncarcinogens) and risk characterization methodology (carcinogens). Use of Annex A procedures may not always be identical, depending on the certifier.

ANSI/AWWA B603 addresses additives requirements in Sec. 4.3.2 of the standard. The transfer of contaminants from chemicals to processed water or to the residual solids is becoming a problem of great concern. The language in Sec. 4.3.2 is a recommendation only for direct additives used in the treatment of potable water to be certified by an accredited certification organization in accordance with NSF/ANSI 60, Drinking Water Treatment Chemicals—Health Effects. However, users of the standard may opt to make this certification a requirement for the product. Users of this standard should also consult the appropriate state or local agency having jurisdiction in order to

1. Determine additives requirements, including applicable standards.

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

† Water Research Foundation, 6666 West Quincy Avenue, Denver, CO 80235.

‡ Persons outside the United States should contact the appropriate authority having jurisdiction.