ANSI/AWWA **C218-23**

(Revision of ANSI/AWWA C218-16)

AWWA Standard

Liquid Coatings for Aboveground Steel Water Pipe and Fittings

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American Water Works Association

Approved American National Standard ANSI

STANDARD Since 1881

AWWA Standard

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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 C218.*

I. Introduction.

I.A. *Background*. Preventing the corrosion of aboveground steel water pipe subjected to atmospheric weathering has become an increasing concern over the years. The increasing incidence of atmospheric corrosive conditions, such as acid rain, has prompted water suppliers to evaluate the paint and coating systems used to protect aboveground steel water pipe.

Although not all aboveground steel water pipe is subjected to the same atmospheric corrosive conditions, a review of the paint and coating systems currently available to the industry has become necessary. The purchasers must have the option of selecting a system that best suits their needs. These needs may be based on current surface preparation; the types of volatile organic compound (VOC) allowances permitted by regulatory agencies; and regulatory requirements for field abatement. The paint and coating systems in this standard are designed to assist the user in producing specifications to meet these needs.

I.B. *History*. In November 1986, the AWWA Standards Council authorized AWWA's Steel Pipe Committee to develop a new standard for coatings to be used on aboveground steel water pipe exposed to the atmosphere. The first edition of this standard was published as ANSI/AWWA C218-91, Standard for Coating the Exterior of Aboveground Steel Water Pipelines and Fittings, with an effective date of Nov. 1, 1991. Subsequent editions of this standard were approved by the AWWA Board of Directors on June 27, 1995; Jan. 24, 1999; June 16, 2002; Jan. 27, 2008; and June 19, 2016. This edition of C218 was approved on Jan. 12, 2023.

I.C. *Acceptance*. This standard has no applicable information for this section.

II. Special Issues.

II.A. *Advisory Information on Product Use*. This standard defines the performance and quality of external pipe coatings and coating systems designed to protect from and prevent atmospheric corrosion. This standard applies to the exterior coating of aboveground steel water pipelines and the associated fittings installed aboveground, outdoors, or inside an associated pump station, a valve chamber, or other water facilities. The coating systems cited in this standard are not all-inclusive but are

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

those most commonly used with an accepted performance record. Before selecting and specifying any of these coating systems, the purchaser should determine their suitability for the intended service.

II.A.1. General. This standard presents several alternative coating systems currently in use in the water industry, often serving dual functions of corrosion protection and aesthetics. Another function of coating systems may be to color code the pipe to identify the type of service.

Most coating manufacturers are reformulating their coatings to comply with current federal, state or provincial, and local environmental regulations. Some of the coatings discussed in this standard have been used successfully as solvent-based coatings for the last 20–30 years but are now available as water-based coatings. Others have been reformulated to reduce the amount of solvents, resulting in coatings with much lower VOCs. In some cases, high-solids coatings have been developed in which the solids content exceeds 80 percent and may reach 100 percent. Primers have been reformulated to remove heavy metals and toxic inhibitors.

In many instances, these changes have altered the application, curing, adhesion, and inhibiting characteristics of coating systems. The manufacturer should be consulted for the technical data and material safety data sheets which provide the prospective user with the information necessary to select the coating system that best satisfies the purchaser's requirements.

II.A.2. Materials. *Code of Federal Regulations* 29,[†] Labor—Part 1910, Occupational Safety and Health Administration (OSHA) regulations establish restrictive limits on the constructor regarding inhaling or absorbing lead- and chromate-bearing pigments and solvents through the skin. This regulation refers to shop applications, and it can significantly increase the cost of shop-coating applications.

Whenever coating materials are referenced to federal, military, or other standards, the reference identifies a generic type of coating material or system.

II.A.3. Selecting coating systems. Several generic coating systems (see Table 1 in Sec. 4) are included in this standard because no single coating or coating system is appropriate for all service applications. Often it is impractical for an occasional coatings user to make sufficient laboratory tests to verify and compare the relative performance characteristics of various coating systems to a given set of performance criteria. Consequently, it is necessary for the purchaser to consider the atmospheric and environmental conditions of service to which the coating or coating system will be

[†] Available from the US Government Printing Office, Superintendent of Documents, Washington, DC 20402.

exposed. For information on establishing exposure conditions, the purchaser may refer to ISO 12944-2 "Paints and varnishes—Corrosion protection of steel structures by protective paint systems—Part 2: Classification of environments." For information on the selection of coating systems based on exposure conditions, the purchaser may refer to ISO 12944-5 "Paints and varnishes—Corrosion protection of steel structures by protective paint systems—Part 5: Protective paint systems." Other industry-recognized resources are available, and the purchaser should consult a coatings professional to assist with coating system selection based on site-specific exposure conditions.

The coatings listed in this standard have been used extensively and have provided excellent corrosion protection and weathering endurance. In recent years, the development of new polymers, pigments, and solvents has contributed to the rapid advancement of materials technology for painting and coating of steel structures. These advancements, coupled with regulatory agency concerns about air pollution by VOCs, have led to the development of many new paint formulations. Although not listed in this standard, many of these new products provide performance equal to or better than the systems presented in this standard.

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 C218, Liquid Coatings for Aboveground Steel Water Pipe and Fittings, of latest revision.
2. Any exceptions to the standard that may be required.
3. Diameter, length, and location of the pipeline.
4. Coating system to be supplied (Sec. 4.3).
5. Color, if special color is specified (Sec. 4.3.1).
6. Optional four-coat system (Sec. 4.3.2).
7. Optional two-coat system (Sec. 4.3.5 and Sec. 4.3.6).
8. Surface preparation for overcoating (Sec. 4.4.6).
9. Previously coated pipe (Sec. 4.4.6.1 and Sec. 4.4.6.2).
10. Coating of special pipe fittings and appurtenances (Sec. 4.6).
11. Abrasive blasting of bolts (Sec. 4.6.2).
12. Coating requirements for threaded connections (Sec. 4.6.4).
13. Inspection (Sec. 5.4).
14. Whether adhesion testing is required (Sec. 5.5.4).

15. Adhesion test procedure (Sec. 5.5.4.1).

16. Affidavit of compliance, if required (Sec. 6.3).

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 revisions made to the standard in this edition include the following:

1. Added Sec. 1.1.2 to discuss other substrates. The change has been made to other applicable standards.

2. Sec. 4.1 Equipment and 4.2 Materials and Workmanship were added. These sections are standard language and included in all other similar AWWA coating standards.

3. Removed the color designations from the coating systems (i.e., -B, -W, -C for black, white, and other color) in Sec. 4.3.3 through Sec. 4.3.7. This change also allowed the tables in these sections to be simplified by removing the "System" column.

4. Added a new Sec. 4.3.8 Coating System No. 7 (two-coat system consisting of a prime/base coat of two-component, 100% solids aromatic polyurethane followed by a finish coat of an aliphatic polyurethane). Updated references throughout the document.

5. Sec. 4.3 Coating Material Information Requirements was removed. Product labeling and shelf life are now listed in Section 6, which is consistent with other AWWA coating standards. The other listed product information is available in the product technical data sheet.

6. Updated Sec. 4.4 Surface Preparation to be consistent with the language used in all other similar AWWA coating standards. The level of surface protection has not been changed.

7. Removed Sec. 4.5.2. The material preparation varies greatly between the different system types in this document. Manufacturer recommendations should always be followed.

8. Sec. 4.6 was removed and replaced with Sec. 4.2.3 to be consistent with other AWWA coating documents.

9. Renumbered and reformatted Sec. 4.3 through Sec. 4.9 to better match other AWWA coating standards.

10. In Sec. 5.5.3, NACE SP0274 was added as an option for electrical continuity testing.

11. Updated Section 6 Delivery language based on common language used in recently updated coating standards. Added requirement that containers shall include shelf life and/or expiration date.

V. Comments. If you have any comments or questions about this standard, please call AWWA Engineering and Technical Services at 303.794.7711; 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

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AWWA Standard

Liquid Coatings for Aboveground Steel Water Pipe and Fittings

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes seven coating systems designed to protect the exterior surfaces of steel pipelines and the associated fittings used by the water supply industry in aboveground locations. The coating systems described may not perform or cost the same, but they are presented so that the appropriate coating system can be selected for the site-specific project requirements.

1.1.1 *Maximum temperatures.* The maximum service temperature of the coating systems listed in this standard is based on the maximum service temperature of potable water. Consult the coating manufacturer for conditions and limitations.

1.1.2 *Other substrates.* Consult the coating manufacturer when this standard is referenced for substrates other than carbon steel. The surface preparation methods, application methods, and performance data listed in this standard may not be applicable.

Sec. 1.2 Purpose

The purpose of this standard is to define the minimum requirements for coating aboveground steel water pipe and fittings, including coating systems, surface preparation, coating material information requirements, coating application, inspection, and testing.