



**American Water Works  
Association**

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**ANSI/AWWA A100-15**  
(Revision of ANSI/AWWA A100-06)

**AWWA Standard**

# Water Wells

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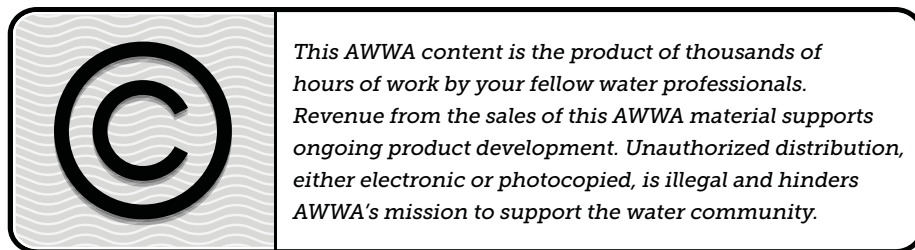
## AWWA Standard

This document is an American Water Works Association (AWWA) standard. It is not a specification. AWWA standards describe minimum requirements and do not contain all of the engineering and administrative information normally contained in specifications. The AWWA standards usually contain options that must be evaluated by the user of the standard. Until each optional feature is specified by the user, the product or service is not fully defined. AWWA publication of a standard does not constitute endorsement of any product or product type, nor does AWWA test, certify, or approve any product. The use of AWWA standards is entirely voluntary. This standard does not supersede or take precedence over or displace any applicable law, regulation, or code of any governmental authority. AWWA standards are intended to represent a consensus of the water supply industry that the product described will provide satisfactory service. When AWWA revises or withdraws this standard, an official notice of action will be placed on the first page of the Official Notice section of *Journal - American Water Works Association*. The action becomes effective on the first day of the month following the month of *Journal - American Water Works Association* publication of the official notice.

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# Foreword

*This foreword is for information only and is not a part of ANSI\*/AWWA A100.*

## **I. Introduction.**

I.A. *Background.* This standard was originally used more as a specification than as a standard. Subsequent changes have been directed at developing a true standard as opposed to a specification.

This standard is designed primarily for vertical wells for municipal and industrial water supply.

I.B. *History.* The first edition of this standard was approved by the AWWA Board of Directors on May 10, 1946, and was titled "Standard Specifications for Deep Wells," with the designation 4A1-1946. Amendments to Sec. 1-1.1, Sec. 1-3.2, and Sec. 1-3.3 of that standard were approved by the board on Oct. 1, 1946, and the standard was redesignated AWWA A100-46. Subsequently, a number of minor editorial changes were made; a recommended procedure for sealing abandoned wells was added as appendix Sec. A1-13; and the standard was published on June 18, 1952, titled "Standard for Deep Wells." The standard was revised on Jan. 26, 1958, and was adopted jointly by AWWA and the National Water Well Association (NWWA). The standard was revised again in 1966. In 1984, the standard was reorganized substantially and revised to be a standard for well construction, rather than a specification, and republished under the title "Standard for Water Wells." The standard was again revised in 1990 and 1997. The ninth edition was approved by the AWWA Board of Directors on Feb. 12, 2006. This edition was approved on June 7, 2015.

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

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

In the United States, authority to regulate products for use in, or in contact with, drinking water rests with individual states.\* 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

1. An advisory program formerly administered by USEPA, Office of Drinking Water, discontinued on Apr. 7, 1990.
2. Specific policies of the state or local agency.
3. Two standards developed under the direction of NSF<sup>†</sup>: NSF/ANSI 60, Drinking Water Treatment Chemicals—Health Effects, and NSF/ANSI 61, Drinking Water System Components—Health Effects.
4. Other references, including AWWA standards, *Food Chemicals Codex*, *Water Chemicals Codex*,<sup>‡</sup> and other standards considered appropriate by the state or local agency.

Various certification organizations may be involved in certifying products in accordance with NSF/ANSI 61. 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 61 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 A100 does not address additives requirements. Users of this standard should consult the appropriate state or local agency having jurisdiction in order to

1. Determine additives requirements, including applicable standards.
2. Determine the status of certifications by all parties offering to certify products for contact with, or treatment of, drinking water.
3. Determine current information on product certification.

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

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

‡ Both publications available from National Academy of Sciences, 500 Fifth Street, NW, Washington, DC 20001.

## **II. Special Issues.**

II.A. *Screen Capacity.* The physical conditions of aquifers, as well as the experience and practice related to their utilization as groundwater resources, vary between well sites and geographic regions. Historically, a common practice for sizing well-screen length and diameter was based on screen open area and inlet velocity (entrance velocity). However, the recommended upper limit for this screen inlet velocity has varied greatly among designers and remains a subject of considerable technical debate. Many designers have, for various technical reasons, limited well-screen entrance velocities to not exceed 0.1 ft/sec (0.03 m/sec). Others have used and demonstrated successful well designs and installations with velocities substantially exceeding 0.1 ft/sec (0.03 m/sec), and the previous edition of this standard proposed an upper limit of entrance velocity of 1.5 ft/sec (0.46 m/sec).

Based on a significant body of ongoing research within the groundwater industry, the committee recognizes as part of this current standard that there is no singular uniquely defined criterion for permissible velocity through the screen slot openings that is solely suitable for designing a well screen without consideration of the aquifer characteristics and the manner of well construction. In particular, the aspects of flow surrounding the well screen in the filter and at the filter–aquifer interface are known to play a prominent role in the well’s performance and are, in fact, more influential than screen entrance velocity in determining screen dimensions. Similarly, the sizing of screen length and diameter are greatly influenced by the aquifer thickness, stratigraphic layering, and pump size. Accordingly, the applicable design approach must be regarded as a multifaceted and dynamic problem. Within this context, the current edition of the standard no longer recommends screen design solely on the basis of screen entrance velocity criterion (Sec. 4.5.3).

**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 A100, Water Wells, of latest revision.
2. Whether compliance with NSF/ANSI 61, Drinking Water System Components—Health Effects, is required, in addition to the requirements of the Safe Drinking Water Act.
3. Scope of the exploratory investigation (Sec. 4.2.1).
4. Whether additional formation samples are needed (Sec. 4.2.2.2).

5. Time, place, and mode of sample delivery (Sec. 4.2.2.5).
6. Type of geophysical log desired, if any (Sec. 4.2.3).
7. Details of other federal, state or provincial, and local requirements (Sec. 4.3).
8. Options for type of casing material (Sec. 4.3.4).
9. Whether the purchaser wants to specify temporary casings (Sec. 4.4.1).
10. Minimum casing wall thickness (Sec. 4.4.5).
11. Determination of the capacity of the well screen by careful evaluation of the composition of the aquifer. (The well-screen selection should be made by a qualified professional engineer, hydrogeologist, or well-drilling constructor.) (See Sec. 4.5, appendix L, and Sec. II.A, Screen Capacity, of the foreword.)
12. Maximum rate of flow from well (Sec. 4.5.2 and 4.5.3).
13. Available options for screen construction (Sec. 4.5.7).
14. Requirements for approval of gravel filter sampling (Sec. 4.6.3).
15. Alternate-alignment tolerance (Sec. 4.7.9.4 and appendix D).
16. The depth of the completed well, which defines the lower limit to which construction tolerances are to be applied (Sec. 4.7.9.5).
17. Height of well casing above ground level (Sec. 4.7.10.3).
18. Flow rate and protocol for performance testing (Sec. 5.1 and Sec. E.4.2 in appendix E).
19. Accuracy of water-level measurements (Sec. E.2.2 in appendix E).

III.B. *Modification to Standard.* Any modification to 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 applicable definitions for the following: *manufacturer*, *naturally developed wells*, and *supplier*.
2. Material Requirements (Sec. 4.3) were updated to add NSF/ANSI 61 (Sec. 4.3.1) and Toxicity Levels (Sec. 4.3.2) requirements for all materials.
3. The water–cement ratio of neat cement grout when using bentonite additive is clarified in Sec. 4.3.7.1.1.
4. Provisions requiring current laboratory analysis and quality assurance of gravel filter materials delivered to jobsite are provided in Sec. 4.6.3.
5. Disinfection requirements for well casing above the standing water level (Sec. 4.9.2) are clarified.
6. Ability to reject materials not complying with the requirements of this standard were added in Sec. 5.3.

7. Provision for purchaser to require an Affidavit of Compliance that the well is in compliance with this standard (Sec. 6.1) has been added.

8. Methods of measuring operating parameters during well development were updated in appendix E, including clarification of the Electric-Sounder Method (Sec. E.4.3.1) and addition of Pressure Transducer Method (Sec. E.4.3.2).

9. Table K.4 was updated to correctly define standard dimension ratio and to add parameters for the 24-in. nominal size.

**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](mailto:standards@awwa.org).

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## Water Wells

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### SECTION 1: GENERAL

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**Sec. 1.1 Scope**

This standard describes the minimum requirements for vertical water supply wells.

**Sec. 1.2 Purpose**

The purpose of this standard is to provide the minimum requirements for water wells, including consideration of the influences of geologic and hydrologic conditions and water quality and well construction.

**Sec. 1.3 Application**

This standard can be referenced in specifications for constructing water wells and can be used as a guide for vertical water supply wells. The stipulations of this standard apply when this document has been referenced and only to water wells used in water supply service applications. Application of this standard is not limited by well depth.