ANSI/AWWA C710-09
(Revision of ANSI/AWWA C710-02)

American Water Works Association

The Authoritative Resource on Safe Water®

AWWA Standard

Cold-Water Meters—Displacement Type, Plastic Main Case

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AWWA Standard

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Contents

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Foreword

This foreword is for information only and is not a part of ANSI/AWWA C710.

I. Introduction.

I.A. *Background.* Material goods molded from plastics have been a part of everyday life for many decades, but in the early 1960s, a new group of plastics better suited to meet more demanding applications was discovered. These materials have greatly improved properties, such as strength and stiffness, and are known as engineering plastics. With the introduction of this new class of plastics, engineers were able to achieve design objectives that previously had seemed almost beyond reach.

The water meter industry as a whole began underwriting experiments with plastic materials as far back as the 1950s. From 1963 to 1968, two principal research programs were sponsored by the meter suppliers under the auspices of AWWA at the Armour Research Institute, Chicago, and later at Columbia University, New York City. These programs primarily focused on plastic meter main-case designs and materials.

Plastic material research in the water meter industry has paid great dividends and has resulted in the design of many meter components from engineering plastics. Significant improvements, such as corrosion resistance, dimensional stability, self-lubrication, low mass, and superior surface finishes have resulted in improved meter accuracies with longer life.

When designing meter components from plastic, today's engineer has a choice of thousands of plastic compound formulations. Although many plastics appear identical, there are often vast differences in their physical properties, and it takes considerable know-how to select the one best suited for a particular application. In addition, plastics used in water meter design often contain various enhancing or reinforcing agents to give components greater rigidity, strength, and dimensional stability.

I.B. *History.* The extensive use of plastic in the design of plastic water meter parts was recognized in the Jan. 24, 1971, revision of ANSI/AWWA C700, Cold-Water Meters—Displacement Type, Bronze Main Case. The use of synthetic polymers as an alternative material for all parts except the main case was one of the major revisions.

At the 1972 AWWA annual convention, the first domestic positive-displacement water meter with a plastic main case (rather than the traditional bronze main case) was introduced. During the next 10 years, three more meter suppliers introduced plastic main-case meters.

The subject of plastic main-case materials not meeting the current standard was discussed at the 1974 meeting of the AWWA Meter Standards Committee. The committee chairman stated that the manufacturers of these meters should initiate a request for change at the next revision.

The revision of ANSI/AWWA C700 in 1977 did not include synthetic polymers as an alternative main-case material because the subcommittee could not reach agreement. The subject was tabled to be considered at the next revision in 1982. Between 1982 and 1985, revising ANSI/AWWA C700 to include synthetic polymers as a main-case alternative became an issue. To resolve this controversy, an ad hoc committee was appointed by the Standards Council. A March 4, 1985, ad hoc committee report recommended that the Standards Council direct the Water Meter Committee to "appoint a new subcommittee … to develop a new standard for displacement-type water meters with plastic main cases, including consideration of appropriate allowable nutation speed for this type of meter." This recommendation was accepted by the Standards Council in June 1985.

Because of the diversity of available materials and the continual development of new and improved materials, this standard will not specify any one material but will use the term *suitable engineering plastic*. For reference purposes only, typical materials used presently for water meter designs and found in ASTM* specifications are cited.

The first edition of ANSI/AWWA C710 was approved by the AWWA Board of Directors Jan. 25, 1988. Subsequent editions were approved on Jan. 28, 1990, June 17, 1995, and June 16, 2002. This edition was approved on Jan. 25, 2009.

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 consortium included the American Water Works Association Research Foundation (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.† Local agencies may choose to impose requirements more stringent than those required by the state. To evaluate the health

* ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

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

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, provincial, or local agency.
3. 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.
4. Other references, including AWWA standards, *Food Chemicals Codex*, *Water Chemicals Codex*,‡ 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 jurisdiction. 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 C710 does not address additives requirements. Thus, 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 parties offering to certify products for contact with, or treatment of, drinking water.
3. Determine current information on product certification.

II. Special Issues.

II.A. *Materials.* The materials section of this standard recognizes the advances that have been made in the development of nonmetallic materials for water meter construction. Plastic materials are currently being used successfully for water meter

* NSF International, 789 North Dixboro Road, Ann Arbor, MI 48105.
† American National Standards Institute, 25 West 43rd Street, Fourth Floor, New York, NY 10036.
‡ Both publications available from National Academy of Sciences, 500 Fifth Street, N.W., Washington, DC 20001.

components, and because of the continual development of new and improved materials, this standard does not require any one specific material but cites examples of materials defined by ASTM specifications typically used at this time in the construction of water meters by manufacturers.

II.B. *Fire Flow.* The meters described in this standard are not designed to be used in water service piping intended to extinguish fire. Requirements for residential fire service products and combined residential domestic/fire service products are currently being developed as part of a different ANSI/AWWA water meter 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.* This standard provides for several options and alternatives that purchasers must designate if they wish to exercise the options or if they have a preference among the alternatives. Also, several items must be specified by purchasers to describe completely the type, size, and quantity of meters required. All such items, options, and alternatives are summarized in the following itemized list. Purchasers should review each one and then make the appropriate provisions in the purchaser's specifications to describe specific requirements.

1. Standard used—that is, ANSI/AWWA C710, Cold-Water Meters—Displacement Type, Plastic Main Case, of latest revision.

2. Whether compliance with NSF/ANSI 61, Drinking Water System Components—Health Effects, is to be required, in addition to the requirements of the Safe Drinking Water Act.

3. If meters are to be furnished with nutating discs or oscillating pistons (Sec. 1.1), if there is a preference.

4. Details of other federal, state or provincial, and local requirements (Sec. 4.1).

5. If meters are to be furnished with cast-iron, stainless-steel, copper alloy, or suitable engineering plastic top or bottom covers (Sec. 4.1.9), if there is a preference.

6. Size of meter (Sec. 4.2.1 and Tables 1 and 2) and quantity required.

7. Special materials required, if any, to resist corrosion if water is highly aggressive.

8. Modifications of test specifications (Sec. 4.2.8), if operating water temperature will exceed 80°F (27°C) (Sec. B.4.2).

9. If ½-in. (13-mm), ½-in. × ¾-in. (13-mm × 20-mm), ⅝-in. (15-mm), ⅝-in. × ¾-in. (15-mm × 20-mm), ¾-in. (20-mm), and 1-in. (25-mm) meters are to be furnished with coupling nuts and tailpieces (Sec. 4.3.2.1).

10. Details of register (Sec. 4.3.3) to be provided, where there is a preference, with regard to the following:

a. If the registers should read in US gallons, cubic feet, or cubic meters.

b. If the registers should be permanently sealed against disassembly of the gear train or have replaceable change gears.

11. If a generator-type register or an encoder-type remote register is required (Sec. 4.3.3), specify in detail.

12. If warranty requirements will be specified (Sec. 5.1.1).

13. If the size of individual meters will be permanently marked on the register dial face (Sec. 6.1).

14. If an affidavit of compliance (Sec. 6.3) and certificate of testing for accuracy (Sec. B.2.3) are required.

III.B. *Modification to Standard.* Any modifications 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. Fire flow meter use has been clarified (Sec. II.B).

2. New text has been added to number-wheel numerals (Sec. 4.3.3.2).

3. A footnote to safe maximum operating capacity has been added (Table 1, p. 10).

4. The time that the test pressure is to be applied has been added to pressure tests (Sec. B.2.2).

V. Comments. If you have any comments or questions about this standard, please call the AWWA Volunteer and Technical Support Group at 303.794.7711, FAX at 303.795.7603, write to the group at 6666 West Quincy Avenue, Denver, CO 80235-3098, or e-mail the group at standards@awwa.org.

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American Water Works Association

AWWA Standard

Cold-Water Meters—Displacement Type, Plastic Main Case

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes the various types and classes of cold-water displacement meters with plastic main cases, in sizes ½ in. (13 mm) through 1 in. (25 mm), for water utility customer service, and the materials and workmanship employed in their fabrication. The displacement meters described, known as nutating-disc or oscillating-piston meters, are positive in action because the pistons and discs displace or carry over a fixed quantity of water for each nutation or oscillation when operated under positive pressure.

Sec. 1.2 Purpose

The purpose of this standard is to provide the minimum requirements for cold-water meters—displacement type, plastic main case, including materials and design.

Sec. 1.3 Application

This standard can be referenced in specifications for purchasing and receiving cold-water meters—displacement type, plastic main case. This standard can be used as a guide for manufacturing this type of meter. The stipulations of this