



**American Water Works
Association**

The Authoritative Resource for Safe Drinking WaterSM

ANSI/AWWA C710-02
(Revision of ANSI/AWWA C710-95)

AWWA Standard

Cold-Water Meters— Displacement Type, Plastic Main Case



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Foreword

This foreword is for information only and is not a part of 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 more than 4,500 plastic compound formulations. Although many plastics look the same, 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 AWWA C700, *Standard for 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 then-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 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 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 Mar. 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 C710 was approved by the AWWA Board of Directors Jan. 25, 1988. Subsequent editions were approved on Jan. 28, 1990, and June 17, 1995. This edition was approved by the AWWA Board of Directors on June 16, 2002.

I.C. *Acceptance*. In May 1985, the US Environmental Protection Agency (USEPA) entered into a cooperative agreement with a consortium led by NSF International (NSI) to develop voluntary third-party consensus standards and a certification program for all 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

*American Society for Testing and Materials, 100 Barr Harbor Dr., West Conshohocken, PA 19428-2959

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 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, ANSI[†]/NSF[‡] 60, *Drinking Water Treatment Chemicals—Health Effects*, and ANSI/NSF 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 ANSI/NSF 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 ANSI/NSF 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.

*Persons in Canada, Mexico, and non-North American countries should contact the appropriate authority having jurisdiction.

†American National Standards Institute, 25 W. 43rd St., Fourth Floor, New York, NY 10036.

‡NSF International, 789 N. Dixboro Rd., Ann Arbor, MI 48105-9723.

§Both publications available from National Academy of Sciences, 2102 Constitution Avenue N.W., Washington, DC 20418.

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 all 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 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. The flow measuring components of the meters have relatively close tolerances. While instantaneous fire flows called upon to supply fire sprinkler heads might pass through the measuring chamber without problems, the pistons or discs could be stopped by small particles in the flow stream which become lodged between the chamber and adjacent components, thus shutting off the fire flow. If this condition occurs in a domestic water supply scenario, only a “temporary” interruption in service will occur until the cause is discovered and corrected. However, in a “fire protection” scenario, the risk of using a meter covered by this standard could interrupt expected fire flow, rendering the sprinkler system useless.

III. Use of This Standard. AWWA has no responsibility for the suitability or compatibility of this standard to any intended application by any user. Accordingly, each user of this standard is responsible for determining that the standard’s provisions are suitable for and compatible with that user’s intended application.

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, AWWA C710, Standard for Cold-Water Meters—Displacement Type, Plastic Main Case, of latest revision.

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

3. The purchaser should state whether compliance with ANSI/NSF 61 Drinking Water System Components—Health Effects, is to be required, in addition to the requirements of the Safe Drinking Water Act.

4. 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.

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

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

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

8. If 1/2-in. (13-mm), 1/2-in. × 3/4-in. (13-mm × 20-mm), 5/8-in. (15-mm), 5/8-in. × 3/4-in. (15-mm × 20-mm), 3/4-in. (20-mm), and 1-in. (25-mm) meters are to be furnished with coupling nuts and tailpieces (Sec. 4.3.2.1).

9. 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.

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

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

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

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

III.B. *Modification to Standard.* Any modifications to the provisions, definitions, or terminology in this standard must be provided in the purchaser's specifications.

IV. Major Revisions. Major revisions made to the standard in this edition include the following:

1. A section on fire flow service has been added to the foreword (Sec. II.B).
2. Updated AWWA materials language has been added (Sec. III.A.3 and Sec. 4.1).
3. Metric equivalents for $\frac{5}{8}$ in. meter size has been corrected.
4. A note on test details for $\frac{1}{2}$ -in. and $\frac{1}{2}$ -in. $\times$ $\frac{3}{4}$ -in. meters has been added (Sec. B.2.3).
5. The relaxation for test intervals for magnetic couplings has been removed (Sec. B.5.1).

V. Comments. If you have any comments or questions about this standard, please call the AWWA Volunteer & Technical Support Group, (303) 794-7711 ext. 6285, FAX (303) 795-7603, or write to the group at 6666 West Quincy Avenue, Denver, CO 80235-3098.