



**American Water Works
Association**

The Authoritative Resource for Safe Drinking WaterSM

ANSI/AWWA C703-96 (R04)
(Revision of ANSI/AWWA C703-86)
Reaffirmed without revision 2004.

AWWA Standard

Cold-Water Meters— Fire-Service Type



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Foreword

This foreword is for information only and is not a part of AWWA C703.

I. Introduction.

I.A. *Background.* Fire-service meters were developed in 1908 to assure water agencies that water was not being taken from fire-service lines by unauthorized persons and was not being used at unauthorized flow rates for purposes other than fire protection. The meters were designed to register the amount of water used for fires and domestic purposes at the lowest possible loss in pressure.

Some of the earlier meters were equipped with valves, referred to as atmospheric valves, in the mainline section. An opening from the atmosphere led to a groove in the face of the seat ring. When the rubber seat ring was in the closed position, it bore against this groove and opened a small lever-actuated needle valve located within the groove. This lowered the pressure in the groove to atmospheric, increasing the valve closing force. When the main valve opened and the rubber seat ring moved away from the groove, the small needle valve closed the groove to the atmosphere, thereby preventing the flow of water from within the meter.

Rather than measuring the water that passed through the mainline section by measuring chamber and register, as is currently the case, the first fire-service meters used a time meter to indicate how long the mainline valve was in the open position. The time registered in hours and minutes. The displacement-type time meter had a cap with a small orifice placed over the outlet end of the meter and was connected at the inlet end of the seat-ring groove mentioned above. When the mainline valve opened, a small amount of water was discharged from the groove and passed through the displacement meter to the atmosphere. The small discharge of water was carefully regulated to pass a relatively definite amount of water per hour and would be registered on the meter dial as 1-hr duration.

In the ensuing years, many design changes have been made to fire-service meters to improve their performance at different flow rates, from the lowest up to the torrents encountered under fire-fighting conditions, as well as heavy city and industrial loads. Fire-service meters are also used as master meters to measure widely variable flow rates from reservoirs and other water services.

I.B. *History.* The first standard covering fire-service meters was adopted by the New England Water Works Association (NEWWA) in March 1923 and by the

American Water Works Association (AWWA) on May 24, 1923. The second and third editions, with the interim designations 7M.4-T and 7M.4-1949, were approved on Oct. 24, 1946, and Jan. 18, 1949, respectively. The fourth edition, designated as C703-49, was approved on Jan. 18, 1949. Subsequent editions of AWWA C703 were approved on Jan. 26, 1970, Feb. 3, 1979, and June 22, 1986. ANSI/AWWA C703-96 was approved by the Board of Directors on June 23, 1996.

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 all direct and indirect drinking water additives. Other members of the original 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 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.

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

†American National Standards Institute, 25 W. 43th St., Fourth Floor, New York, NY 10036-7406.

‡NSF International, 789 N. Dixboro Rd., Ann Arbor, MI 48113.

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.

Appendix 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 Appendix A procedures may not always be identical, depending on the certifier.

AWWA C703-96 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. This standard has no applicable information for this section.

III. Use of This Standard. AWWA has no responsibility for the suitability or compatibility of the provisions 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. The following items should be included in the purchaser’s specifications:

1. Standard used—that is, ANSI/AWWA C703, Standard for Cold-Water Meters—Fire-Service Type, of latest revision.

^{*}Both publications available from National Academy of Sciences, 2102 Constitution Ave. N.W., Washington, DC 20418.

2. Whether an affidavit of compliance (Sec. 6.3), a certificate of testing accuracy (Sec. A.3.3), or both, are to be provided.
3. Limitations on acceptable materials, if any, as referenced throughout Sec. 4.1.
4. Restrictions on corrosion resistance treatment process (Sec. 4.1.8), if any.
5. Size of meters (Sec. 4.2.1) and quantity required.
6. Length of filler piece (Sec. 4.2.3), if required.
7. Modifications of test specifications (Sec. 4.2.6), if required, if operating water temperatures are to exceed 80°F (27°C) (Sec. A.5.2).
8. Whether companion flanges, gaskets, bolts, and nuts (Sec. 4.3.4) are to be provided and if flanges are of copper alloy rather than cast iron (Sec. 4.1.9).
9. Details of register to be provided: US gallons, cubic feet, cubic meters, or other units; with or without center-sweep test hand; open, sealed, or permanently sealed (Sec. 4.3.5).
10. Whether or not an encoder-type register, direct-reading remote register, or an adaptor (Sec. 4.3.6) is required.
11. Whether a proportional-type or turbine-type meter with or without a bypass meter (Sec. 4.3.12) is required.
12. Special materials required, if any, to resist corrosion if water is highly aggressive (Sec. A.5.3).
13. Whether the meter serial number is imprinted on the main case (Sec. 6.1).
14. Whether specific warranty provisions are required.

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

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

1. ASTM standards have been added to the references (Sec. 2).
2. It is recognized in the materials section (Sec. 2) of this standard that advances have been made in the development of nonmetallic materials for water meter construction. Plastic materials are currently used successfully for meter components. The development of new and improved materials is ongoing; therefore, this standard will not require any one specific material but will cite examples of material defined by ASTM specifications

and typically used in construction of water meters. The materials section has been modified to recognize these advances.

3. The reference to unsealed or unprotected lead for valve weights has been deleted from Sec. 4.1.10 to comply with the latest USEPA rulings on lead in contact with potable water.
4. The scope (Sec. 1.1) has been expanded to include a turbine (Class II) mainline meter with strainer and bypass as a type of fire-service meter.
5. In Sec. 4.1.2, fabricated steel has been added as a material with which main cases can be made.
6. Table 1 has been revised to reflect manufacturer advances and has been expanded to include short-term deluge maximum flow, flow spread at changeover flow, and accuracy information. Table 1 has also been expanded to include the operating characteristics of the turbine mainline meter with strainer and bypass type of fire service meter.
7. A separate Table 1M has been added.
8. A new Table 5 was added and includes mainline register information that was formerly listed in Table 1.
9. Table 3 (formerly of ANSI/AWWA C703-86) has been deleted and included in the expanded Table 1.
10. In Sec. 4.2.4 the maximum working pressure has been raised from 150 psi (1,030 kPa) to 175 psi (1,200 kPa).
11. A section has been added to appendix A stating AWWA's position on grounding of electrical systems to pipe systems conveying drinking water to customers' premises.
12. The workmanship and materials section has been deleted (Sec. 1.4.2).
13. The format has been changed to AWWA standard style.
14. The acceptance clause (Sec. I.C) has been added and the definitions (Sec. 3) have been revised to approved wording.

V. Comments. If you have any comments or questions about this standard, please call the AWWA Volunteer and Technical Support Group, 303. 794.7711, FAX 303.795.7603, or write to the group at 6666 West Quincy Ave., Denver, CO 80235-3098, or by e-mail at standards@awwa.org.

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