



**American Water Works
Association**

The Authoritative Resource for Safe Water®

ANSI/AWWA C704-08
(Revision of ANSI/AWWA C704-02)

AWWA Standard

Propeller-Type Meters for Waterworks Applications



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AWWA Standard

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Foreword

This foreword is for information only and is not a part of ANSI/AWWA C704.

I. Introduction.

I.A. *Background.* Current-type water meters were first developed for measuring flowing air and water. A booklet published in Hamburg, Germany, in 1790, by Benjamin Gottlob Hoffman, described a form of current meter developed by Reinhard Woltman, which seems to have been the first practical meter for this purpose. It was originally developed to measure stream flow and was not considered adaptable for use in a closed pipe. Since then, current meters have changed materially in design, construction, and use and have been adapted for closed pipelines.

I.B. *History.* The first effort to standardize current-type meters for customer service in the United States resulted in the formulation of AWWA Standard Specifications for Cold-Water Meters—Current Type, in 1923. These were revised on July 25, 1947, as AWWA C701-47, Standard Specifications for Cold Water Meters—Current Type. During the period between 1923 and 1947, a different version of current-type meters was developed for use in special applications, such as pump station discharge and main line measurement. The original design for use in customer service lines contains a removable measuring cage in which a turbine operates, and the special applications meters do not. Instead, a propeller operates either directly within the pipeline itself or within the main meter body. This change in design results in differences in operating ranges, friction losses, and capacities of the two types. Because of development of this second type of propeller meter, AWWA Specification for Current Type Meters—Propeller Drive, C704, was adopted as tentative in 1949 and was made a standard on May 25, 1950.

Confusion results from having two standards for what is essentially the same type of meter, and considerable judgment is required in the selection of one or the other. The AWWA Meter Committee, in the 1970 revisions of ANSI/AWWA C701 and ANSI/AWWA C704, attempted to make the two standards more compatible in order to better assist the user in selection. Other revisions were approved by the AWWA Board of Directors on Jan. 26, 1975, Jan. 29, 1984, Jan. 26, 1992, and June 16, 2002. This edition of C704 was approved on Jan. 27, 2008.

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 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, 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.

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

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

‡ American National Standards Institute Inc., 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 20418.

ANSI/AWWA C704 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. This standard has no applicable information for this section.

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. When placing orders for meters manufactured to conform to this standard, it is necessary for the purchaser to supply specific information regarding the following:

1. Standard used—that is, ANSI/AWWA C704, Propeller-Type Meters for Waterworks Applications, of latest revision.
2. Whether compliance with NSF/ANSI 61, Drinking Water System Components—Health Effects, is required.
3. The modification of registration accuracy if the test water temperature exceeds 100° F (38° C).
4. Whether the flow tube or main casing is to be cast iron or fabricated steel (Sec. 4.1.2).
5. Size of meter (Sec. 4.2.1) and quantity required.
6. Type of end connections, including threaded, flanged, plain-end, grooved-end, welding-saddle, saddle-type, or fire hydrant connections (Sec. 4.3.2).
7. Whether companion flanges, gaskets, bolts, and nuts (Sec. 4.3.3 and 4.1.8) are to be provided with flanged meters.
8. Whether meters are to be provided with open, sealed, or permanently sealed registers; with units of measure including US gallons, cubic feet, or cubic meters (Sec. 4.3.4); with a center sweep-test hand; or with an instantaneous flow-rate indicator reading US gallons per minute, cubic feet per second, cubic meters per hour, liters per second, or other units.
9. If seal-wire holes are to be omitted (Sec. 4.3.7).
10. If an affidavit of compliance (Sec. 5.3) and certificate of testing for accuracy and capacity (Sec. A.3.3 and A.3.1) from the supplier or manufacturer is required.

11. If water is highly aggressive, whether special materials are required to resist corrosion (Sec. A.5.3).

III.B. *Modification to Standard.* Modification to the provisions, definitions, or terminology in this standard must be provided by the purchaser.

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

1. Reference to discontinued ASTM D2135 has been removed from the References section (Sec. 2), and from the Materials section for Propellers (Sec. 4.1.4).

2. Definitions for electronic display type and mechanical display type have been added (Sec. 3).

3. Normal test flow limits have been updated (Table 1).

4. The section on meter registers has been updated and expanded to describe electronic display type registers (Sec. 4.3.4 and subsections).

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 303.795.7603, write to the group at 6666 West Quincy Avenue, Denver, CO 80235-3098, or e-mail at standards@awwa.org.



American Water Works
Association

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(Revision of ANSI/AWWA C704-02)

AWWA Standard

Propeller-Type Meters for Waterworks Applications

SECTION 1: GENERAL

Sec. 1.1 Scope

This standard describes the various types and classes of propeller meters in sizes 2 in. (50 mm) through 72 in. (1,800 mm) for waterworks applications. These meters register by recording the revolutions of a propeller set in motion by the force of flowing water striking the blades.

Sec. 1.2 Purpose

The purpose of this standard is to provide the minimum requirements for propeller-type meters for waterworks applications.

Sec. 1.3 Application

This standard can be referenced when purchasing and receiving propeller-type meters for waterworks applications. This standard can be used for manufacturing this type of meter. The stipulations of this standard apply when this document has been referenced and then only to propeller-type meters for waterworks applications.