ANSI/AWWA C712-15
(Revision of ANSI/AWWA C712-10)

American Water Works Association
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AWWA Standard

# Cold-Water Meters—Singlejet Type

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## AWWA Standard

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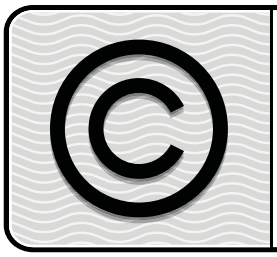

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*All AWWA standards follow the general format indicated subsequently. Some variations from this format may be found in a particular standard.*

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# Foreword

*This foreword is for information only and is not a part of ANSI*/AWWA C712.*

## I. Introduction.

I.A. *Background.* The subcommittee that drafted this standard was formed in June 1998 from the AWWA Standards Committee on Water Meters.

Singlejet meters have been available commercially in the United States and Canada for use in potable water applications since 1991.

The singlejet type, like some class I turbine (with helical blades or flat blades) and multijet types, is an inferential meter in which the moving element is a multibladed rotor mounted on a vertical spindle within a cylindrical cavity. The operating objective is that the speed of rotation of the rotor is linearly proportional to the velocity of water flow through the meter.

The singlejet-type meter has one large opening at the inlet side that gradually reduces in diameter, resulting in the water flow becoming a jet, usually integral with the main case that directs the water flow against the rotor. The opening is sized to achieve the above-linear speed objective. Most singlejet meters do not have a separate measuring chamber to house the rotor and jet nozzle. Also, the singlejet type differs from other meters in that it does not usually employ a valved bypass to adjust the rotor speed, as is done on many multijet and turbine-type meters. In a singlejet, rotor speed adjustments are made by either gear selection in the register or by moving the upper or lower damping vane's position relative to the rotor surfaces, thereby adjusting the fluid drag effects on rotor speed.

I.B. *History.* Early European references to singlejet (originally called *Faller*) meters date back to the turn of the 20th century. An early text reference can be found in an article by G. Daries, engineer for the Water Service in Paris, France, entitled "Note on Water Meters," published in 1911, in which he questioned the early design's accuracy and longevity. These meters were used primarily in Europe and Asia, where low price was of more concern than performance.

In the 1950s and 1960s, some US water meter companies produced low-cost singlejet meters in relatively small numbers for the submetering and export markets.

With the advent of the modern singlejet meter in the 1970s, the deficiencies in performance and durability were reduced from the earlier designs of singlejet meters.

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

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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.

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 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

* Persons outside the United States should contact the appropriate authority having jurisdiction.
† NSF International, 789 North Dixboro Road, Ann Arbor, MI 48113.
‡ Both publications available from National Academy of Sciences, 500 Fifth Street, NW, Washington, DC 20001.

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.

In an alternative approach to inadvertent drinking water additives, some jurisdictions (including California, Louisiana, Maryland, and Vermont, at the time of this writing) are calling for reduced lead limits for materials in contact with potable water. Various third-party certifiers have been assessing products against these lead content criteria, and a new ANSI-approved national standard, NSF/ANSI 372, Drinking Water System Components—Lead Content, was published in 2010.

On Jan. 4, 2011, legislation was signed revising the definition for "lead free" within the Safe Drinking Water Act (SDWA) as it pertains to "pipe, pipe fittings, plumbing fittings, and fixtures." The changes went into effect on Jan. 4, 2014. In brief, the new provisions to the SDWA require that these products meet a weighted average lead content of not more than 0.25 percent.

ANSI/AWWA C712 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 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. *Fire Flow.* The meters described in this standard are not designed to be used in water service piping intended to extinguish fire. Requirements for meters used for residential fire sprinkler applications that meet the requirements of NFPA* 13D in single- and two-family dwellings and manufactured homes, sizes ¾ in. (20 mm) through 2 in. (50 mm), are found in ANSI/AWWA C714.

**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 preferences among 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

* National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

itemized list. Purchasers should review each one and make the appropriate provisions in the purchaser's documents to describe specific requirements.

1. Standard used—that is, ANSI/AWWA C712, Cold-Water Meters—Singlejet Type, of latest revision.

2. Whether compliance with NSF/ANSI 61, Drinking Water System Components—Health Effects; NSF/ANSI 372, Drinking Water System Components—Lead Content; or an alternative lead content criterion is required.

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

4. Whether main cases are to be constructed of a copper alloy, stainless steel, or a suitable engineering plastic (Sec. 4.1.2).

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

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

7. Type of connections for 1½-in. (40-mm) and 2-in. (50-mm) meters (Sec. 4.3.3).

8. Type of connections for ⅝-in. (15-mm), ⅝-in. × ¾-in. (15-mm × 20-mm), ¾-in. (20-mm), and 1-in. (25-mm) meters (Sec. 4.3.3.3).

9. Whether couplings (tailpieces) are to be provided (Sec. 4.3.4), and whether components are to be of a copper alloy or a suitable engineering plastic (Sec. 4.1.9).

10. Whether companion flanges, gaskets, bolts, and nuts are to be provided with flanged meters (Sec. 4.3.5), and whether companion flanges are to be made of a copper alloy, cast iron, stainless steel, or a suitable engineering plastic (Sec. 4.1.10).

11. Details of the register to be provided (i.e., US gallons, cubic feet, or cubic meters; dry or wet register; mechanical or electronic display type) (Sec. 4.3.6).

12. If a direct-reading remote register or a remote-encoder register is required (Sec. 4.3.7), to be specified in detail.

13. If warranty requirements will be required (Sec. 5.1).

14. Whether an affidavit of compliance will be required (Sec. 6.3).

15. Special materials required, if any, to resist corrosion if water is highly aggressive (Sec. A.4.3).

III.B. *Modification to Standard.* Any modification of 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. Foreword Sec. I.C provides information on lead content criteria and the new NSF/ANSI Standard 372, Drinking Water System Components—Lead Content,

as well as recent federal legislation revising the definition of "lead free" in the Safe Drinking Water Act.

2. Foreword Sec. II.A provides new information that meters used for residential fire sprinkler applications meeting the requirements of NFPA 13D, sizes ¾ in. (20 mm) through 2 in. (50 mm), are found in ANSI/AWWA C714.

3. Foreword Sec. III.A contains a new purchaser option for compliance with NSF/AWWA 372 or other lead content criterion.

4. In Section 3, the definition of "manufacturer" has been changed to include the party that supplies the product marked with its brand name.

5. In Section 4, the materials have been updated in response to legislation revising the definition of "lead free" in the Safe Drinking Water Act. Stainless steel has been added as a material for main casings (Sec. 4.1.2), measuring cages or chambers (Sec. 4.1.4), and companion flanges (Sec. 4.1.10).

6. Sec. 4.3.6.2 has been expanded to include more comprehensive language and greater details on the requirements for electronic display registers.

7. Editorial clarifications have been provided throughout the standard.

**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.

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# Cold-Water Meters—Singlejet Type

## SECTION 1: GENERAL

### Sec. 1.1 Scope

This standard describes the various types and classes of cold-water singlejet meters in sizes ⅝ in. (15 mm) through 6 in. (150 mm) for water utilities' customer service and the materials and workmanship employed in their fabrication. These meters register by recording the revolutions of a rotor powered by the force of flowing water striking its blades.

### Sec. 1.2 Purpose

The purpose of this standard is to provide the minimum requirements for cold-water singlejet meters, including material and design.

### Sec. 1.3 Application

This standard can be referenced in specifications for purchasing and receiving cold-water singlejet meters. 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 cold-water singlejet meters.