ASME A112.18.3-2002
(Revision of ASME A112.18.3M-1996)

# PERFORMANCE REQUIREMENTS FOR BACKFLOW PROTECTION DEVICES AND SYSTEMS IN PLUMBING FIXTURE FITTINGS

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

**REAFFIRMED 2012**

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Mechanical Engineers

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This Standard will be revised when the Society approves the issuance of a new edition. There will be no addenda issued to this edition.

ASME issues written replies to inquiries concerning interpretations of technical aspects of this Standard. Interpretations are published on the ASME Web site under the Committee Pages at http://www.asme.org/codes/ as they are issued.



The American Society of Mechanical Engineers
Three Park Avenue, New York, NY 10016-5990

*In memory of, and dedicated to the life of,*
*our dear friend, colleague, and long-standing industry leader,*
*Thomas P. Konen. His contributions to the plumbing industry at large and to this committee will never be forgotten.*

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# FOREWORD

In November 1987, Panel 18 of the ASME Committee A112, Plumbing Materials and Equipment, initiated work to develop requirements for the protection against back pressure backflow and back siphonage in an emerging class of fittings, wherein the spout and side spray were combined for efficient use and operation. The increased concern for the protection of drinking water encouraged the Committee to look beyond traditional protection methods and develop a performance standard which excludes the contamination of potable water but gives needed freedom to manufacturers to produce fittings of complex design and construction as demanded by today's worldwide markets.

While the probability of occurrence associated with the contamination of potable water through backflow at various plumbing fixture fittings is minimal, there remains a need for a protection system. This Standard establishes performance requirements with specific criteria for acceptance, to ensure a high degree of reliability for the safety system throughout the useful life of the fitting.

Extensive testing and engineering reviews of current practice demonstrated that backflow protection is mainly a function of the check valve or check valve assembly and that reliance on vacuum breakers is dependent on the adequacy of the air vent. In achieving this, para. 6.3 of this Standard requires durability testing of multiple specimens and internationally recognized statistical methods for evaluating the results.

This Standard provides for the evaluation and approval of devices which may be combined to form a safety system being integrated into different products without further durability tests. In addition, this Standard provides for the evaluation of production fittings complete with an integrated protection system, which however does not examine the performance of the device individually. It is designed to confirm the overall reliability of the integrated safety system.

This Standard is written to give freedom to the manufacturer in design and technology to produce products with devices and system reliability consistent with good engineering practices for the protection of public health.

Suggestions for improvement of this Standard will be welcomed. They should be sent to The American Society of Mechanical Engineers; Attn: Secretary, A112 Standards Committee; Three Park Avenue; New York, NY 10016.

This Standard was approved as an American National Standard on September 6, 2002.

# ASME A112 COMMITTEE
# Standardization of Plumbing Materials and Equipment

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**General.** ASME Standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by requesting interpretations, proposing revisions, and attending Committee meetings. Correspondence should be addressed to:

Secretary, A112 Standards Committee
The American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990

**Proposing Revisions.** Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the edition, the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation. When appropriate, proposals should be submitted using the A112 Project Initiation Request Form.

**Interpretations.** Upon request, the A112 Committee will render an interpretation of any requirement of the Standard. Interpretations can only be rendered in response to a written request sent to the Secretary of the A112 Standards Committee.

The request for interpretation should be clear and unambiguous. It is further recommended that the inquirer submit his/her request in the following format:

| | |
|---|---|
| Subject: | Cite the applicable paragraph number(s) and the topic of the inquiry. |
| Edition: | Cite the applicable edition of the Standard for which the interpretation is being requested. |
| Question: | Phrase the question as a request for an interpretation of a specific requirement suitable for general understanding and use, not as a request for an approval of a proprietary design or situation. The inquirer may also include any plans or drawings that are necessary to explain the question; however, they should not contain proprietary names or information. |

Requests that are not in this format will be rewritten in this format by the Committee prior to being answered, which may inadvertently change the intent of the original request.

ASME procedures provide for reconsideration of any interpretation when or if additional information that might affect an interpretation is available. Further, persons aggrieved by an interpretation may appeal to the cognizant ASME Committee or Subcommittee. ASME does not "approve," "certify," "rate," or "endorse" any item, construction, proprietary device, or activity.

**Attending Committee Meetings.** The A112 Standards Committee schedules meetings as needed, which are open to the public. Persons wishing to attend any meeting should contact the Secretary of the A112 Standards Committee. The A112 home page contains information on future meeting dates and locations.

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# PERFORMANCE REQUIREMENTS FOR BACKFLOW PROTECTION DEVICES AND SYSTEMS IN PLUMBING FIXTURE FITTINGS

## 1 PURPOSE

The purpose of this Standard is to establish performance requirements and statistically valid evaluation methods including durability tests for the manufacture of safe, efficient, and reliable backflow protection devices and systems for plumbing fixture fittings.

Alternative designs or configurations which comply with the intent of this Standard shall be permitted.

## 2 SCOPE

This Standard addresses functional performance and requires physical characteristics of devices and systems which provide backflow protection consistent with the level of risk associated with the plumbing fixture fitting application. The Standard establishes specific performance criteria and provides the test methods to prove compliance. It is applicable to all plumbing fixture fittings with outlets not protected by an air gap.

## 3 REFERENCE STANDARDS

The following documents form a part of this Standard to the extent specified herein. The latest issue shall apply.

ASTM D 1193, Specification for Reagent Water

Publisher: The American Society for Testing and Materials (ASTM), 100 Barr Harbor Drive, West Conshohocken, PA 19428

ASME A112.1.2, Air Gaps in Plumbing Systems

ASME A112.18.1, Plumbing Fixture Fittings

ASME PTC 19.2, Supplement on Instruments and Apparatus, Part 2 Pressure Measurement

Publisher:The American Society of Mechanical Engineers (ASME International), Three Park Avenue, New York, NY 10016-5990

ANSI/ASSE 1001, Pipe Applied Atmospheric Type Vacuum Breakers

ANSI/ASSE 1011, Performance Requirements for Hose Connection Vacuum Breakers

ANSI/ASSE 1014, Performance Requirements for Hand-Held Showers

ANSI/ASSE 1025, Performance Requirements for Diverters for Plumbing Faucets With Hose Spray, Anti-Siphon Type, Residential Applications

ANSI/ASSE 1052, Hose Connection Backflow Preventors

ASSE 1012, Performance Requirements for Backflow Preventers With Intermediate Atmospheric Vent

ASSE 1013, Performance Requirements for Reduced Pressure Principle Backflow Preventers

ASSE 1019, Vacuum Breaker Wall Hydrants, Frost Resistant Automatic Draining Type

ASSE 1035, Performance Requirements for Laboratory Faucet Vacuum Breakers

ASSE 1056, Performance Requirements for Back Siphonage Backflow Vacuum Breakers

Publisher: The American Society of Sanitary Engineering, 2890 Clemens Road, Suite 100, West Lake, OH 44145

AWWA C511, Reduce Pressure Principle Backflow Preventor Assembly

AWWA 10079, Standard Methods for the Examination of Water and Wastewater

Publisher: The American Water Water Works Association (AWWA), 6666 West Quincy Ave., Denver, CO 80235

CSA B 64, Backflow Preventers and Vacuum Breakers

CSA B 125, Plumbing Fittings

Publisher: CSA International, 178 Rexdale Blvd., Toronto, Ontario, Canada M9W1R3

## 4 DEFINITIONS

Nomenclature and definitions applicable to faucets, fixture fittings, and backflow requirements shall be as follows:

*acceptance sampling plan:* the correlation of sample size and allowed failure rate.

*air gap:* the unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or faucet and the flood-level rim of a receptor. See ASME A112.1.2.

*approved:* accepted by the authority having jurisdiction

*backflow:* the reversal of flow direction from that normally intended. Back siphonage is one type of backflow. Back pressure backflow is another type.

*backflow prevention system:* any mechanical system, consisting of two or more devices, designed to automatically prevent an unintentional reversal of flow in a potable water distribution system. A backflow prevention system prevents back siphonage and back pressure backflow.