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J. Menard  CSA Group, Toronto, Ontario, Canada  Project Manager
Preface

This is the first second edition of ASME A112.4.2/CSA B45.16, Personal hygiene devices for water closets.

This joint Standard was developed in response to an industry request for testing that would be acceptable in both Canada and the United States. Its coverage is restricted to personal hygiene devices. Harmonized standards for plumbing fixtures made of other materials are also available or under development.


This Standard was prepared by the ASME/CSA Joint Harmonization Task Group on Plumbing Fixtures, under the jurisdiction of the ASME Standards Committee A112 on Plumbing Materials and Equipment and the CSA B45 Technical Committee on Plumbing Fixtures. The CSA Technical Committee operates under the jurisdiction of the CSA Strategic Steering Committee on Plumbing Products and Materials Construction and Civil Infrastructure. This Standard has been formally approved by the ASME Standards Committee A112 and the CSA Technical Committee.

This Standard was will be approved as an American National Standard by the American National Standards Institute on June 18XXXX XX, 201520XX.

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It will be published as a National Standard of Canada by CSA Group.

ASME Notes:

(1) This standard was developed under procedures accredited as meeting the criteria for American National Standards and it is an American National Standard. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed Standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

(2) ASME does not “approve,” “rate,” or “endorse” any item, construction, proprietary device, or activity.

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(4) Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this standard.

(5) ASME accepts responsibility for only those interpretations of this document issued in accordance with the established ASME procedures and policies, which precludes the issuance of interpretations by individuals.

(6) ASME issues written replies to inquiries concerning interpretation of technical aspects of this Standard. All inquiries regarding this Standard, including requests for interpretations, should be addressed to:

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The American Society of Mechanical Engineers
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A request for interpretation should be clear and unambiguous. The request should

• cite the applicable edition of the Standard for which the interpretation is being requested.

• 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, which are necessary to explain the question; however, they should not contain proprietary names or information.

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Interpretations are published on the ASME Web site under the Committee Pages at http://www.asme.org/codes/ as they are issued.

CSA Notes:
(1) Use of the singular does not exclude the plural (and vice versa) when the sense allows.
(2) Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.
(3) This publication was developed by consensus, which is defined by CSA Policy governing standardization — Code of good practice for standardization as “substantial agreement. Consensus implies much more than a simple majority, but not necessarily unanimity”. It is consistent with this definition that a member may be included in the Technical Committee list and yet not be in full agreement with all clauses of this publication.
(4) To submit a request for interpretation of this Standard, please send the following information to inquiries@csagroup.org and include “Request for interpretation” in the subject line:
   (a) define the problem, making reference to the specific clause, and, where appropriate, include an illustrative sketch;
   (b) provide an explanation of circumstances surrounding the actual field condition; and
   (c) where possible, phrase the request in such a way that a specific “yes” or “no” answer will address the issue.
   Committee interpretations are processed in accordance with the CSA Directives and guidelines governing standardization and are available on the Current Standards Activities page at standardsactivities.csa.ca.
(5) This Standard is subject to periodic review, and suggestions for its improvement will be referred to the appropriate committee. To submit a proposal for change, please send the following information to inquiries@csagroup.org and include “Proposal for change” in the subject line:
   (a) Standard designation (number);
   (b) relevant clause, table, and/or figure number;
   (c) wording of the proposed change; and
   (d) rationale for the change.
(6) Attention is drawn to the possibility that some of the elements of this Standard may be the subject of patent rights. CSA is not to be held responsible for identifying any or all such patent rights. Users of this Standard are expressly advised that determination of the validity of any such patent rights is entirely their own responsibility.
1 Scope

1.1 This Standard covers personal hygiene devices for water closets and specifies requirements for materials, construction, performance, testing, and markings.

1.2 Products covered by this Standard include bidet sprayers and other retrofit personal hygiene devices intended
(a) for water closets and water closet seats; and
(b) to be used with hot and cold water or cold water only.

1.3 The provisions of this Standard are not intended to prevent the use of alternative materials or methods of construction, provided such alternatives meet the intent and requirements of this Standard.

1.4 In this Standard, “shall” is used to express a requirement, i.e., a provision that the user is obliged to satisfy in order to comply with the standard; “should” is used to express a recommendation or that which is advised but not required; and “may” is used to express an option or that which is permissible within the limits of the Standard.

Notes accompanying clauses do not include requirements or alternative requirements; the purpose of a note accompanying a clause is to separate from the text explanatory or informative material.

Notes to tables and figures are considered part of the table or figure and may be written as requirements.

Annexes are designated normative (mandatory) or informative (non-mandatory) to define their application.

1.5 SI units are the units of record in Canada. In this Standard, the inch/pound units are shown in parentheses.

The values stated in each measurement system are equivalent in application; however, each system is to be used independently. Combining values from the two measurement systems may result in non-conformance with this Standard.

All references to gallons are to U.S. gallons.
2 Reference publications
This Standard refers to the following publications, and where such reference is made, it shall be to the edition listed below, including all amendments published thereto.

ASME International
A112.1.3-2000
Air gap fittings for use with plumbing fixtures, appliances, and appurtenances

ASME International/CSA Group
A112.19.2-2013/CSA B45.1-13
Ceramic plumbing fixtures

A112.19.3-200817/CSA B45.4-0817 (R2013)
Stainless steel plumbing fixtures

A112.18.6-20XX17/CSA B125.6-XX17
Flexible water connectors

ASSE International
1001-2017
Performance Requirements for Atmospheric Type Vacuum Breakers

CSA Group
B64 Series-11
Backflow preventers and vacuum breakers

B64.1.1-11 (R2016)
Atmospheric vacuum breakers (AVB)

B64.1.4-11 (R2016)
Vacuum breakers, air space type (ASVB)

C22.2 No. 0.15:15 (R2020)
Adhesive labels

C22.2 No. 64-1940
Household cooking and liquid heating appliances

C22.2 No. 68-09 (R2014)18
Motor-operated appliances (household and commercial)

CSA Group/IAPMO (International Association of Plumbing and Mechanical Officials)
CSA B45.5-1744/IAPMO Z124-201744
Plastic plumbing fixtures

IAPMO (International Association of Plumbing and Mechanical Officials)
Z124.5-2013 (R2018)
Plastic toilet seats

UL (Underwriters Laboratories)
969, edition 5
Standard for marking and labelling systems
3 Definitions
The following definitions shall apply in this Standard:

**Bidet sprayer** — a component of a personal hygiene device intended for genital and perineal cleanliness, and intended for installation in water closets and water closet seats.

**Note:** In this Standard, bidet sprayers are referred to as “sprayers”.

4 General requirements

4.1 Water closets
Water closets shall comply with ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4, or CSA B45.5/IAPMO Z124, as applicable.

4.2 Backflow prevention

4.2.1 Personal hygiene devices intended for connection to the potable water supply shall be equipped with a backflow prevention device.

4.2.2 When used, atmospheric vacuum breakers shall
(a) comply with Clause 5.5.1; and
(b) be installed with the
   (i) critical level located not less than 25 mm (1 in) above the flood level rim; or
   (ii) lowest point located not less than 25 mm (1 in) above the flood level rim, when the critical level is not marked.

4.2.3 When used, air gap fittings or vacuum breakers — air space type (ASVB) shall
(a) comply with Clause 5.5.1.2; and
(b) be installed with the
   (i) critical level located not less than 25 mm (1 in) above the flood level rim; or
   (ii) lowest point located not less than 25 mm (1 in) above the flood level rim, when the critical level is not marked.

4.3 Electrical components
Personal hygiene devices with electrical features or components shall comply with UL 1431, CSA C22.2 No. 68, or CSA C22.2 No. 64.

4.4 Plastic toilet seats
Plastic toilet seats shall comply with IAPMO/ANSI Z124.5.
4.5 Bidet sprayers
Bidet sprayers shall be
(a) fully retractable and not subject to contamination in the retracted position, (i.e., be completely removed from the liquid and solid waste path);
(b) self-cleaning, (i.e., have a means to rinse the bidet sprayer with water); and
(c) concealed when not in use to prevent soiling by the user.

4.6 Source of water
The water from the water closet tank shall not be used as a source of water for the bidet sprayer.

4.7 Automatic seat cover dispensers
Automatic seat cover dispensers shall be life cycle tested in accordance with Clause 5.6.

4.8 Temperature safety device
Personal hygiene devices shall be equipped with a safety device to shut off the flow of water when the temperature reaches 48 °C (118°F).

4.9 Flexible water connectors
Flexible water connectors intended for use under continuous pressure shall comply with ASME A112.18.6/CSA B125.6. Such flexible water connectors shall be in accessible locations.

5 Performance requirements and test procedures

5.1 Order of tests
The tests shall be conducted in the order in which they appear in this Standard.

5.2 Bidet spray pressure tests

5.2.1 Flowing pressure test

5.2.1.1 Test procedure
The flowing pressure test shall be conducted as follows:
(a) Connect the specimen to a water supply.
(b) Increase the flowing pressure to 860 kPa (125 psi), measured at the specimen inlet.
(c) Allow the water flow through the specimen for 5 min.
(d) Inspect for leakage and structural damage.

5.2.1.2 Performance requirements
There shall be no leakage. Flow from the bidet sprayer shall be as intended by the manufacturer.

5.2.2 Static pressure test

5.2.2.1 Test procedure
The static pressure test shall be conducted as follows:
(a) Set the specimen in the off position (fully closed).
(b) Increase the static water pressure to 1720 kPa (250 psi).
(c) Maintain the pressure for 5 min.
5.2.2.2 Performance requirements
There shall be no leakage or structural damage.

5.3 Temperature tests

5.3.1 Normal operating temperature test

5.3.1.1 Test procedure
The normal operating temperature test shall be conducted as follows:
(a) Set the inlet flowing pressure at $345 \pm 35$ kPa (50 ± 5 psi).
(b) Set the inlet temperature at $18 \pm 3$ °C (65 ± 5°F).
(c) Operate the specimen at its maximum temperature setting for 5 min.
(d) Measure the temperature at the outlet.

5.3.1.2 Performance requirement
The water temperature at the outlet shall not exceed 43 °C (110°F).

5.3.2 Maximum shutoff temperature for safety devices

5.3.2.1 Test procedure
The maximum shutoff temperature test shall be conducted as follows:
(a) Supply water to the specimen at an initial temperature of $41 \pm 0/–6$ °C (105 ±0/–10°F).
(b) Set the inlet flowing pressure at $345 \pm 35$ kPa (50 ± 5 psi) pressure.
(c) Activate the specimen and slowly raise the temperature to 48 °C (118°F).
(d) Increase the water temperature no faster than 0.5 °C (1°F) every 5 s.
(e) Record the time to shut off the flow of water when the temperature reaches 48 °C (118°F).
(f) Repeat this test following the bidet sprayer cycle test.

5.3.2.2 Performance requirements
The water flow through the specimen shall shut off within 5 s of the bidet spray discharge water temperature reaching 48 °C (118°F). Water may continue to flow from the bidet sprayer discharge as long as the temperature remains below 48 °C (118°F) and the sprayer is in the process of returning to its off position/state. The specimen shall be considered to have complied with the requirements of this Clause if water ceases to flow prior to reaching a temperature of 48 °C (118°F).

5.4 Bidet sprayer life cycle test

5.4.1 Test procedure
The life cycle test shall be conducted as follows:
(a) Set the inlet flowing pressure at $345 \pm 35$ kPa (50 ± 5 psi).
(b) Set the device to its maximum water temperature setting.
(c) Operate the specimen 75,000 times:
   (i) At each cycle, the bidet sprayer shall fully extend and then fully retract.
   (ii)For specimens with multiple bidet sprayers, the anterior (front) sprayer shall be tested for 50,000 cycles and the posterior (rear) sprayer shall be tested for 25,000 cycles.

5.4.2 Performance requirements
At the end of the life cycle test, the specimen shall continue to function at the operating pressure as it did before the test. In addition, there shall be no leakage, and the flow from the bidet sprayer shall be as intended by the manufacturer.
5.5 **Atmospheric vacuum breaker Backflow prevention** test

5.5.1.1 **Atmospheric vacuum breaker**

5.5.1.1.1 **Test procedure**

Atmospheric vacuum breakers shall be tested for back siphonage in accordance with ASSE 1001 or CSA B64.1.1.

5.5.1.2 **Performance requirements**

Water in the sight tube shall not rise more than 13 mm (0.5 in).

5.5.1.2 Air gap fitting /vacuum breaker – air space type

5.5.1.2.1 **Test procedure**

Air gap fittings or vacuum breakers – air space type (ASVB) shall be tested for back siphonage in accordance with ASME A112.1.3 or CSA B64.1.4.

5.5.1.2.2 **Performance requirements**

The water shall not rise in the sight glass.

5.6 **Seat cover dispenser test**

5.6.1 **Test procedure**

The seat cover dispenser shall be operated for 5,000 cycles. Each cycle shall consist of dispensing one seat cover.

5.6.2 **Performance requirements**

Failure to dispense the seat cover in 100 or more of the 5,000 cycles shall be cause for rejection. Continuous feed dispensers shall render previously dispensed seat covers unusable.

5.7 **Bidet sprayer self-cleaning test**

5.7.1 **Test procedure**

The self-cleaning test shall be conducted as follows:

(a) Operate the bidet sprayer enough cycles to ensure that it is purged of air and filled with water at normal operating pressure and temperature.

(b) Extend the bidet sprayer and dry it thoroughly.

(c) Use a water-soluble marker of a contrasting colour to draw lines on the bidet sprayer as follows:

(i) Draw three rings around the bidet sprayer, one in the upper third of its length, one in the middle third, and one in the lower third.

(ii) Draw a fourth line longitudinally, along the top of the bidet sprayer from one end to the other.

(d) Release the bidet sprayer and allow it to retract into its off position.

(e) The bidet sprayer self-cleaning function shall be actuated two times.

(f) Inspect and record any lines remaining.

5.7.2 **Performance requirements**

All of the four lines shall be washed off the bidet sprayer. Any ink lines remaining on the bidet sprayer, shall be considered a failure.
5.8 Seat securement test

5.8.1 Test apparatus
The test apparatus for the seat securement test shall (a) consist of
(i) a test stand in which the specimen can be installed simulating the manner specified by the manufacturer in the instructions. The test stand shall have a flat area to allow for mounting the specimen securely;
(ii) a compatible water closet (bowl only); or
(iii) when integrated, an integral water closet and personal hygiene device (i.e., no separate test apparatus is necessary); and
(b) include the following
(i) a strap or similar instrument (i.e., band, belt, etc.) to wrap around the front edge of the toilet seat; and
(ii) a push-pull force gauge capable of measuring at least 178 N (40 lbf).

5.8.2 Test procedure
The seat securement test shall be conducted as follows:
(a) Mount the specimen on the test apparatus specified in Clause 5.8.1. Follow the manufacturer’s installation instructions when assembly is required.
(b) Maintain the seat in the horizontal (closed) position and the lid upward or detached if functionality permits.
(c) Place a strap or similar instrument around the front edge of the seat and secure it around the front-most portion of the seat so it does not move out of place.
(d) Attach the pull end of the push-pull gauge to the strap.
(e) Apply a lateral pull load of 90 N (20 lbf) perpendicularly to the length of the seat. See Figure 1.
(f) Maintain the load for 5 s and release it.
(g) Repeat the steps in Items (e) and (f) three times.
(h) Raise and lower the seat and lid cover, if attached, three times gradually, within 10 s.
(i) Inspect for any damage or impairment of seat movement while raising and lowering the seat and lid cover.
(j) Raise the seat and lid cover to its maximum allowed position. The lid may be detached if functionality permits.
(k) Apply a perpendicular load of 45 N (10 lbf) to the front-most portion of the seat at its center. For non-integrated specimens, there shall be no vertical support as part of the test stand. See Figure 2.
(l) Maintain the load for 5 s and release it.
(m) Repeat the steps in Items (k) and (l) three times.
(n) Raise and lower the seat and lid cover three times gradually, within 10 s and inspect for any visual damage or impairment of seat movement while raising and lowering.

5.8.3 Performance requirements
There shall be no visible signs of cracking and the seat movement shall not be impaired (i.e., it shall be possible to lift the seat and return it to the closed position).
6 Markings and packaging

6.1 Personal hygiene devices complying with this Standard shall be marked with the manufacturer’s name or trademark and the model number. Alternatively, the model number may be marked on the packaging.

6.2 Markings shall be permanent, legible, and visible after installation.

6.3 Acceptable means of applying permanent markings shall include firing on, etching, sand blasting, mechanical stamping, stamping with permanent (non-water soluble) ink, and casting in. Adhesive labels that comply with CAN/CSA C22.2 No. 0.15 or UL 969 shall also be considered permanent when placed on a surface that is not normally submerged in water. The exposure conditions specified in Clause 7.1 of UL 969 shall apply.