



**Summary of Substantive Changes
between the 2011 and the 2017 edition of
ASME A112.19.5/CSA B45.11
“Flush valves and spuds for water closets, urinals, and tanks”**

Presented to the IAPMO Standards Review Committee on August 7, 2017

General: The changes to this standard might have an impact on currently listed products. The significant changes are:

- Added a note to clarify the allowance of alternate dimensions, increased the minimum effective thread length of reducing spuds, and expanded Table 2 to include $\frac{3}{4}$ Nominal regular spuds (see Section 4.4 and Tables 1 and 2).
- Clarified the use of two test vessels and two chemicals (A and B), and changed the requirement to replace the test solution from every day to only on weekdays, for the accelerated chemical resistance test (see Section 5.5).
- Removed specific text to include in markings on the product and packaging, and replaced with a general requirement for the manufacturers to provide information to identify the appropriate replacements (see Section 6).

Section 2 Reference publications: The following standards were either updated to the current edition or deleted.

ASME A112.19.2-~~2008~~ [2013](#)/CSA B45.1-~~08~~ [13](#) - Ceramic plumbing fixtures

ASME B1.20.1-~~1983 (R2006)~~ [2013](#) Pipe Threads, General Purpose, Inch

~~CSA B125.3-11—Plumbing fittings~~

Section 4.4, Spud dimensions: Added a note to clarify the allowance of alternate dimensions as follows:

4.4 Spud dimensions

Threaded spuds shall comply with the dimensions specified in Tables 1 and 2.

Note: [Alternate dimensions may be used provided that compatibility is maintained with mating components.](#)

Section 5.5, Leak rate and accelerated chemical resistance tests: Clarified the use of two test vessels and two chemicals (A and B), and changed the requirement to replace the test solution from every day to only on weekdays, for the accelerated chemical resistance test as follows:

5.5 Leak rate and accelerated chemical resistance tests

5.5.1 General

The flush valve seal shall be tested with a flush valve for the leak rate test. The tests shall be conducted in the following order:

- a) leak rate test (see Clause 5.5.3.2); and*
- b) accelerated chemical resistance test (see Clause 5.5.3.3).*



5.5.2 Performance requirement

Leakage through the flush valve seal during the initial leak rate test period and after the accelerated chemical resistance test shall not exceed 0.25 mL/h.

5.5.3 Test methods

5.5.3.1 Apparatus

The test apparatus for the leak rate and accelerated chemical resistance tests shall consist of an NPS-8 clear PVC pipe attached to a piece of 6.4 mm (0.25 in) PVC flat stock. The joint between the pipe and the flat stock shall be completely sealed. The flat stock shall have a hole bored through it that is 1 to 5 mm (0.04 to 0.20 in) larger than the outside diameter of the flush valve thread or attachment mechanism. The flush valve shall be assembled into the hole in the flat stock. The clear PVC pipe shall be marked with a fill line 178 ± 1.5 mm (7 ± 0.06 in) above the lowest point of the flush valve seat.

Leakage from the flush valve seal shall be collected and measured.

Note: An alternative test apparatus may be used if the conditions of this Clause are met.

5.5.3.3 Accelerated chemical resistance test procedure

The accelerated chemical resistance test shall be conducted on two new test specimens ~~for~~ with two different bowl cleaner solutions (each specimen to be tested with one cleaner only), as follows:

- a) Prepare master solutions of two different chlorine-based bowl cleaners* at 2000 ± 100 ppm of total chlorine ~~in~~ by dissolving and mixing with distilled or deionized water[†] in a clean glass or plastic container. Chlorine concentration (ppm) shall be measured and the measurement rounded to the nearest whole number. Equipment capable of yielding such accuracy is deemed suitable. Label one container with solution as "Master Solution A" and the second as "Master Solution B". Analyze each solution upon preparation and at each solution change [see Item ~~(e)~~] and record the concentration each time. Maintain the concentration between 2000 ± 200 ppm. If the analyses indicate that the concentrations of the solutions have changed to be outside of this range, discard the solutions and prepare new ones from the same cleaner.

Note:*Clorox Bleach[®] and 2000 Flushes Bleach[®] tablet forms are acceptable and may be ground to a powder for dissolving in the solution. If either product is discontinued, the tests may be conducted using an available bowl cleaner. The discontinued product should be reported to the ASME and CSA technical committees.

[†] Distilled and deionized water have a substantial amount of impurities removed. If another alternative exists to the same effect, it too shall be deemed permissible.

- b) ~~Attach the specimen to the test apparatus. Do not use more than one specimen per test apparatus.~~ Prepare two test vessels for the testing of the flush valve seals. The test vessels shall have a lid and be large enough to totally contain the seal without applying stress to it. The first test vessel shall be labeled "Test Vessel A". The second test vessel shall be labeled "Test Vessel B". Insert one valve seal test specimen into each glass test vessel such that the sealing surface of the test specimen is not under physical stress. Add "Solution A" to the test vessel labeled "Test Vessel A" so as to completely cover the test specimen with solution and fill the vessel as completely as possible. A lid shall be placed on the vessel as a means to reduce fume exposure and outgassing. Add "Solution B" to the test vessel labeled "Test Vessel B" so as to completely cover the test specimen and fill the vessel as completely as possible. A lid shall be placed on this vessel as well.

~~(c) Fill the test apparatus to the fill line with the solution.~~

- d) Place ~~the test apparatus with the solution and the specimen~~ "Test Vessel A" and "Test Vessel B" in a convection oven or other device capable of maintaining a temperature of 40 ± 3 °C (104 ± 5 °F) for 28 days.



- ed) On weekdays, replace the solution in ~~the test apparatus once a day with fresh solution~~ each test vessel with new solution from the same Master Solution every 24 h (± 1 h). After replacing and analyzing the solution in each test vessel, return the test vessels to the oven. On weekends, maintain the test vessels with solution and test samples at 40 ± 3 °C (104 ± 5 °F) without changing the test solutions.*
- fe) Within 1 h of the end of the 28-day test period, subject the specimen to the leak rate test specified in Clause 5.5.3.2.*

Section 6, Markings: Removed specific text to include in markings on the product and packaging, and replaced with a general requirement for the manufacturers to provide information to identify the appropriate replacements as follows:

6.1 Manufacturer's name or trademark

6.1.1

Flush valves shall be marked with the manufacturer's name or registered trademark or, in the case of private labelling, with the name of the customer for whom the flush valve was manufactured.

6.1.2

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

6.2 Replaceable components of flush valves

Note: Replacing flush valve seals can change the water closet water consumption. Therefore, manufacturers of water closets should provide adequate information about replacement flush valves. See Clause 9.3 of ASME A112.19.2/CSA B45.1.

6.2.1 Standard buoyant flappers

All 50 mm (2 in) flush valves with standard buoyant flappers shall have a label stating "Use Only Standard 50 mm (2 in) Replacement Flappers".

6.2.2 Early closure flush valves with adjustable flush valve seals

All 50 mm (2 in) flush valves with early closure flush valve seals in which the flush valve seal is adjustable to control the water level in the tank shall have a label stating "Use only EC-Txx or EC-Dyy Replacement Flush Valve Seals", where (a) xx is the time (in seconds, to one decimal place) from when the water closet tank is flushed until the flush valve closes.

Note: An early closure time of 1.7 s would be shown as EC-T17. An early closure time of 2 s would be shown as EC-T20.

(b) yy is the distance (in inches, to one decimal place) from the waterline to the water level at the time of flush valve closure.

Note: A distance of 3.7 in would be shown as EC-D37.

6.3 6.2 Packaging

6.2.1

Packaging for replacement flush valves and flush valve seals shall be marked with ~~one of~~ the following, as appropriate:

(a) the statement "Standard 50 mm (2 in) Replacement Flapper";

(b) the "EC" (early closure) numbers that the flush valve seal replaces; or



- a) the manufacturer's name ~~/or registered~~ trademark ~~and model part number of the flush valve seal it replaces~~; or, in the case of private labeling, the name of the customer for whom the flush valve or flush valve seal was manufactured;
- b) the model part number(s) and identification of the manufacturer(s) of the flush valve(s) or flush valve seal(s) it is intended to replace; and
- c) where an intended design is a general or universal replacement product for flush valves or flush valve seals, package marking shall indicate this to satisfy the requirements of Item b).

6.2.2

Adjustable replacement flush valves and flush valve seals shall include installation instructions required to maintain the original flush volume of the toilet(s) for which they are intended to be installed.

Table 1, Dimensions of reducing water closet and urinal spuds: Increased the minimum effective thread length from from 26.5 mm (1.04 in) to 28 mm (1.10 in)

Table 2, Dimensions of regular water closet and urinal spuds: Table was revised to add $\frac{3}{4}$ Nominal spud size, along with the corresponding dimension requirements.