IAPMO PS 65-~~2019a~~2026

PUBLIC REVIEW DRAFT

Industry Standard for

Airgap Units for Water Conditioning Equipment Installation - DRAFT

IAPMO Standard

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Preface

This is the ~~fifth~~ sixth edition of IAPMO PS 65, Airgap Units for Water Conditioning Equipment Installation. This Standard supersedes IAPMO PS 65-2019a, Airgap Units for Water Conditioning Equipment Installation. The previous editions of this standard are: November 2019, February 2019, May 2002, 2000, 1993

This Standard was developed by the IAPMO Standards Review Committee (SRC) in accordance with the policies and procedures regulating IAPMO industry standards development, Policy S-001, Standards Development Process. This Standard was approved as an IAPMO Industry Standard on Month DD, YYYY.

Notes:

(1) The use of the singular does not exclude the plural (and vice versa) when the sense allows.

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(4) During its development, this Standard was made available for public review, thus providing an opportunity for additional input from stakeholders from industry, academia, regulatory agencies, and the public at large. Upon closing of public review, all comments received were duly considered and resolved by the IAPMO Standards Review Committee.

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- *(a) standard designation (number);*
- *(b) relevant section, table, or figure number, as applicable;*
- *(c) wording of the proposed change, tracking the changes between the original and the proposed wording; and*
- *(d) rationale for the change.*

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- *(a) the edition of the standard for which the interpretation is being requested;*
- *(b) the definition of the problem, making reference to the specific section and, when appropriate, an illustrative sketch explaining the question;*
- *(c) an explanation of circumstances surrounding the actual field conditions; and*
- *(d) the request for interpretation phrased in such a way that a "yes" or "no" answer will address the issue.*

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IAPMO PS 65-~~2019a~~2026
Airgap Units for Water Conditioning Equipment Installation

1 Scope

1.1 General

1.1.1 This Standard covers Airgap units intended for water conditioning equipment installation and specifies requirements for materials, physical characteristics, performance testing, and markings.

1.1.2 Airgap units with standard inlet and outlet ports also may be integrated into other larger housings or product sub-assemblies wherein they are required to perform the same airgap functions. This shall be acceptable so long as the contained airgap units meet the requirements of this standard.

1.2 Alternative Materials

The requirements 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.

1.3 Terminology

In this Standard,

(a) "shall" is used to express a requirement, i.e., a provision that the user is obliged to satisfy to comply with the Standard;
(b) "should" is used to express a recommendation, but not a requirement;
(c) "may" is used to express an option or something permissible within the scope of the Standard; and
(d) "can" is used to express a possibility or a capability.

Notes accompanying Sections of the Standard do not specify requirements or alternative requirements; their purpose is to separate explanatory or informative material from the text. Notes to tables and figures are considered part of the table or figure and can be written as requirements.

1.4 Units of Measurement

SI units are the primary units of record in global commerce. In this Standard, the inch/pound units are shown in parentheses. The values stated in each measurement system are equivalent in application, but each unit system is to be used independently. 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 current edition of those publications, including all amendments published thereto.

NSF International
NSF/ANSI/CAN 61
Drinking Water System Components - Health Effects

3 Definitions and Abbreviations

This Section is reserved for later use.

4 General Requirements

4.1 Materials

Airgap units covered by this Standard shall be made of approved materials. Dissimilar metals shall not be in contact.

4.2 Toxicity

Materials and components of airgap units intended to convey or dispense water for human consumption through drinking or cooking shall comply with the applicable requirements of NSF/ANSI/CAN 61.

4.3 Workmanship

Units shall exhibit good workmanship and finish. They shall be free of flash, burrs, or defects that would affect performance or serviceability.

4.4 Accessibility

Airgaps shall be accessible after they are installed.

4.5 Flow

Each unique airgap unit shall be flow tested by the manufacturer initially and their respective product performance data sheets shall reflect a "Recommended Maximum" flow capability that is no greater than 65% of the "Actual Tested Maximum Flow Rate Capability" for the exact same units.

4.6 Port Designations

Inlet or outlet ports shall be visibly and permanently marked on the outer housing of each unit. A directional flow arrow may be included on the outer housing either in addition to or in lieu of the port markings. The inlet port need not be marked where the unit is designed exclusively for installation on a washing machine standpipe.

4.7 Port Terminations

Inlet port terminations shall be DN 15 (1/2 NPS) or less. If threaded, they shall be standard American taper pipe threads.

4.8 Single and Multiple Airgap Opening(s)

4.8.1 All units shall have one or more principal airgap windows or opening(s) with size, shape and location sufficient to satisfy necessary physical and functional performance requirements of this standard see Figure 1. Dimensional tolerances of ± 0.8mm (± 1/32 in) shall apply.

4.8.2 The principal airgap windows or opening(s) shall be equal to or greater than 25.4 ± 0.8 mm (1 ± 1/32 in) long

4.8.3 The principal airgap windows or opening(s) shall extend at least 25.4 mm (1 in) vertically above the Critical Level (C/L) location as marked on each unit.

4.8.4 The minimum 25.4 mm (1 in) vertical window requirement shall be consistent with inlet pipe size of Section 4.7.

4.8.5 For all units tested for compliance to this standard (see Location G, Figure 1), the "Recommended Maximum" flow rate shall be ≥ 32 oz/min (0.25 gpm).

4.8.6 The bottom tip (lowest portion) of the inlet injector nozzle within the airgap chamber also shall be

(a) At least 25.4 mm (1 in) (measured vertically) above the bottom of the principal airgap window(s) or openings; and

(b) at least 25.4 mm (1 in) (measured vertically) above the unit (C/L) mark as located on each unit housing.

4.8.7 Secondary or smaller window opening(s) and/or air passage ways may be included.

4.8.8 If the airgap unit is designed and intended to be installed on the back of a sink ledge and below the flood level rim of the sink or receptacle served, then the (C/L) location mark on the unit shall be 25.4 mm (1 in) or more (measured vertically) above the unit mounting base. Dimensional tolerances of ± 0.8mm (± 1/32 in) shall apply.

4.8.9 Additional requirements for units with multiple inlet ports are included in the testing and marking requirements that follow. For all functional testing of airgap units with multiple inlet ports, the manufacturer’s listing shall specify the size and type of conduit to be connected to each inlet port.

5 Testing Requirements

5.1 Flow Testing

5.1.1 Test Specimen

For single inlet port units use one specimen, for multiple inlet port units use multiple specimens equal to the number of inlet ports and flow test each inlet port as specified in Section 5.1.2.

5.1.2 Test Procedure

The flow testing for airgap units shall be conducted as follows:

(a) Determining the "maximum steady state flow rate" which is the absolute maximum flow rate that can be introduced into the unit without the downstream water starting to back up into and flood the airgap chamber. This maximum flow rate shall be obtained for each model and for each mounting orientation (as applicable) by slowly increasing flow rate input until the unit starts to be flooded.

(b) Determine the flow/pressure drop curve.

5.1.3 Performance Requirements

(a) All units shall satisfactorily and readily convey lesser flow rates of water than their "Actual Tested Maximum Flow Rate Capability" rate as determined in Section 5.1.2.

(b) Whenever the flow is stopped, the unit design shall allow water to readily and quickly drain from each unit in each mounting orientation. The unit shall drain completely by gravity within 5 s.

5.2 Weight Resistance Test

5.2.1 Test Specimen

Use three specimens of the same model and the test shall be applied to each one of these specimens. The following weight tests shall be conducted on each of three test specimens provided. For multiple inlet port units apply the weight test to each inlet port as specified in Section 5.2.2.

5.2.2 Test Procedure

The weight resistance test for airgap units shall be conducted as follows:

(a) Drill a 2.4 mm (3/32 in) diameter hole near the top and bottom of the unit (thru the top and bottom ports at about 12.7 mm (1/2 in) from each end).

(b) For metal units, use a 45.4 kg (100 lb) weight and for plastic housing units use a 18.1 kg (40 lb) weight.

(c) Using wire, attach the top inlet port (or top of housing on some ports) to a suitable lab structure.

(d) Using wire, attach the weight to the bottom, outlet port.

(e) Allow the weight to hang freely for at least 4 h.

(f) Using the same 18.1kg (40 lb) or 45.4 kg (100 lb) loads as used above, arrange for the weight to apply a compressive load along the main axis of the test unit for at least 4 h.

5.2.3 Performance Requirements

Remove weight and visually inspect unit. There shall be no cracking or splitting at any joint or glue joint.

5.3 Vacuum Testing (Determination or Verification of "Critical Level" (C/L) Location)

5.3.1 Test Specimen

For one inlet port units use one specimen, for multiple inlet port units use three test specimens and apply the vacuum test to each inlet port as specified in Section 5.3.3.

5.3.2 Test Apparatus

Set up the testing apparatus as shown in Figure 1.

The purpose of this procedure is to verify the ability of each air gap unit submitted to provide adequate back siphonage prevention. This is accomplished through testing to verify unit response and the acceptability of the unit "critical level" (C/L) location as marked on the unit housing. By applying a strong vacuum upstream of the test unit (while the unit is covered with water), a back siphonage condition is created which enables visual and quantifiable performance assessment of each specimen test unit.

5.3.3 Test Procedure

The vacuum test for airgap units shall be conducted as follows:

(a) Install unit and fill tank with tap water to cover each unit prior to starting vacuum test.
(b) Energize vacuum source and allow it to run continuously until the surface water level appears not to recede any further.
(c) Carefully observe water droplets moving backward through poly tubing.
(d) Stop source (R) when no further droplet movement is observed.
(e) Measure and then mark the exact surface level on the test unit outer housing.
(f) Repeat steps (a), (b) for remaining two airgap unit test specimens.
(g) Reference locations (D) and (E) in Figure 1 for each tested unit there will be an actual (E) location.
(h) For the three units tested there will be generated (3) (E) locations. Designate (E1), (E2), and (E3).

5.3.4 Performance Requirements

(a) Spacing between unit (E) locations (normally quite close if like units) shall be less than 3.2 mm (1/8 in) when comparing one unit with another.
(b) In all cases, the (E) location(s) as determined by testing shall not be lower on unit housing than the "as marked" (C/L) [see Location (D) in Figure 1].

5.3.5 Multiple Inlet Port Crosstalk Test

5.3.5.1 Test Specimen

Perform a "crosstalk test" on two product samples.

5.3.5.2 Test Apparatus

Set up the apparatus using the vacuum test setup of Figure 1.

The purpose of this test is to verify no communication between the inlet ports while one port has a normal positive (forward) flow concurrent with a vacuum source connected to the adjacent inlet port. Positive flow is to be any amount from a slow drip flow up to the manufacturers recommended maximum flow rate.

5.3.5.3 Test Procedure

The crosstalk test for multiple inlet port airgap units shall be conducted as follows:

(a) Apply full vacuum to one port for 5 min while varying the positive flow rate into the adjacent inlet port.

(b) If inlet ports are not identical, then repeat this test but with the connections to the inlet ports switched.

(c) While performing the "crosstalk test", you may submerge the product in water up to the "C/L" marking on the product; however, the water level shall not rise higher than the "C/L" mark at any time.

(d) Arrange for water to exit the bottom of the chamber at a rate so as to assure the water level never rises above the "C/L" mark.

5.3.5.4 Performance Requirements

There shall be no evidence of water droplets in the conduit connected to the vacuum source.

6 Markings and Accompanying Literature

6.1 Markings

Airgap units complying with this Standard shall be marked with the:

(a) Manufacturer's name or trademark;

(b) Model or Part number; and

(c) Critical level marking.

(d) For multiple inlet port units each inlet port shall be permanently marked as “Inlet Port A”, “Inlet Port B”, “Inlet Port C”, etc.

6.2 Installation Instructions

Airgap units shall be accompanied by instructions for their installation, care and maintenance, and repair. Electronic means (i.e. QR codes) of installation instructions are acceptable.

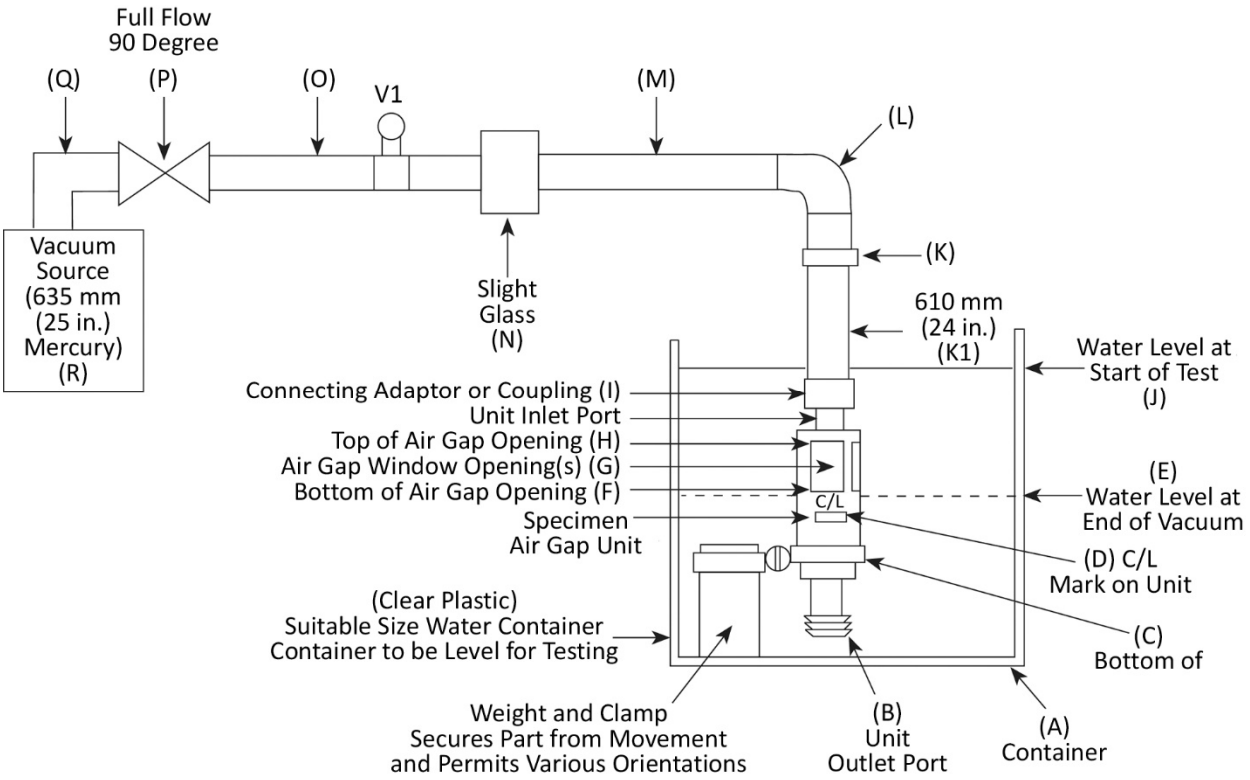

Figure 1
(Air Gap Units) Back Siphonage Test
(See Sections 4.8.1, 4.8.5, 5.3.2, 5.3.3, 5.3.4, and 5.3.5.2)

Notes

1 For each different model & type of Air Gap unit tested: The attached adaptors, couplings, and fitting extensions, specifically (K thru I) above, shall be specified or furnished by manufacturer and shall comply with manufacturer's installation or product date sheet. Manufacturer and test lab shall coordinate and comply with equipment needs between (K) and source (R). [See (9) below].

2 All pipe lengths may vary ±50.8 mm (± 2 in).

3 Meters shall have accuracy of Grade B where used [(V1) has 88.9 mm (3.5 in) face.]

4 All air gap units to be tested vertically. Other mounting positions will need to be tested in addition to vertical if so specified by the particular air gap manufacturers in their product installation sheets.

5 Container shall allow at least 101.6 mm (4 in) clearance on all sides of unit and permit water to cover top of unit.

6 As pictured above, locations (D), (E) are generalized. The "Actual Test Critical Level" [At (C/L)] depicted as (E) above and (C/L) marking (D) above, will vary by product, model, and manufacturer. Manufacturer may choose to locate C/L mark anywhere between (C) and (E).

7 Manufacturer to submit three like units to be tested per back siphonage test.

8 Piping from (R) to (K) shall be poly-flow tubing [12.7 mm (0.5 in) I.D. or larger] and clear (natural color). Backwards water flow toward (R) easily detected visually with no need for sight glass. Add dye or colorant to water if desired to enhance visibility of backflow (sight glass optional).

9 For units with "Maximum Constant" Flow rates > 3.8 L/min (1 gpm) pipe (K1) shall be 12.7 mm (0.5 in) I.D. Poly Flow tubing. For air gap units with "Maximum Constant" flow rates < (1) GPM (3.8 l/m), then pipe (K1) shall be 9.5 mm (0.375 in) O.D. Poly Flow [6.4 mm/6.6 mm (0.250 in/0.260 in) I.D.].

10 When unit installed vertical as shown, location (H) shall be 25.4 mm (1 in) or more above location (F). Inlet injector nozzle into air gap chamber also must be 25.4 mm (1 in) or more above location (F).

11 After piping and unit are installed, energize vacuum source and check for any air leaks. Retighten or tape any leaks before beginning any documented test.

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