Summary of Substantive Changes
between the 2008[e1] and 2020 edition of
ASSE 1035 "Performance Requirements for Laboratory Faucet Backflow Preventers"

Presented to the IAPMO Standards Review Committee on July 12, 2021

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

- Clarified scope and removed some minimum requirements regarding minimum flow capacity, connections and flow way open area (see Section 1.2)
- Changed number of samples required from to any number required by the certifying body (see Section 2.0)
- Revised most of the test procedures, added an air flow test and clarified some of the performance requirements (see Section 3.0)
- Revised marking requirements and added the Standard designation (see Section 4.2)

Section 1.2, Scope: Clarified scope and removed some minimum requirements as follows:

1.2.3 Temperature Range

The devices shall be designed for ~~flow~~ a temperature~~s between~~ range that includes 33.0 °F to 180.0 °F (0.6 °C to 82.2 °C).

~~***1.2.4 Minimum Flow Capacity***~~

~~*The device shall have a minimum flow capacity of 4.0 GPM (15.0 L/min) with a maximum pressure loss through the device of 20.0 psi (137.9 kPa).*~~

~~***1.2.5 Connections***~~

~~*Connections shall be suitable for laboratory faucets. (Inlet and/or outlet connections are permitted to be different when required for special installations.)*~~

~~***1.2.6 Flow Way Open Area***~~

~~*The least total cross-sectional area of the air flow ways, including the seat area of the air vent valve, shall be not less than the least total cross-sectional area of the waterflow passage or passages upstream from the air vent valve. The minimum cross-sectional dimensions of any air port or flow way, not including the valve lift, shall not be less than 3/32" (2.4 mm). These requirements shall be verified by the testing agency.*~~

Section 1.3, Reference Standards:

Referenced industry standards shall be to the revision stated below.

- *ANSI/ASME B 1.20.1-~~83~~ 2013– Pipe Threads, General Purpose, (inch)*
- *CFR Title 21, Section 177 2016 – Food and Drugs: Indirect Food Additives: Polymers*
- *UL 969-2017, Standard for Marking and Labeling Systems*

Section 2.0, Test Specimens: Changed number of samples required from to any number required by the certifying body as follows:

~~***2.1 Samples Submitted for Test***~~

~~*Three (3) devices of each size and model shall be submitted by the manufacturer.*~~

~~***2.2 Samples Tested***~~

~~*The testing agency shall select one (1) of each type or model and size for the full test.*~~ *Tests shall be performed in the order listed on one* ~~*(1)*~~ *device* *of each size. The number of samples required is determined by the laboratory or certification body.*

~~***2.3 Drawings***~~

~~*Assembly drawings and other data which are needed to enable a testing agency to determine compliance with this standard, together with installation drawings, shall accompany devices when submitted for examination and performance tests under this standard.*~~

~~***2.4 Rejection***~~

~~*Failure of one (1) device shall result in a rejection of that type or model and size.*~~

Section 3.0, Performance Requirements and Compliance Testing: Revised most of the test procedures, added an air flow test and clarified some of the performance requirements as follows:

~~***3.2***~~***3.1*** ~~*Deterioration of Extremes of Manufacturer's*~~ ***Hydrostatic Sustained Pressure Test for Fittings with an Elevated*** *Temperature* ***or*** *Pressure Rating*

~~***3.2.1***~~***3.1.1 Purpose***

The purpose of this test is to evaluate the material's performance at extremes of manufacturer's temperatures and pressures.

~~***3.2.2***~~***3.1.2 Procedure***

Install the device ~~*with equipment capable of maintaining the manufacturer's maximum rated temperature and pressure*~~ *per Figure 1.*

a. Set the inlet static pressure at P1 to 125psi (861.9 kPa) or the manufacturer's maximum pressure, whichever is greater.

b. ~~*Flow*~~ *Set the hot water supply at 180.0 °F ± 5.0 °F (82.2 °C ±* ~~*3.*~~*02.8 °C) or the manufacturer's maximum rated temperature ±5.0 °F (*~~*v30*~~*± 2.8 °C), whichever is greater,* ~~*through to the device on test at 2.0 GPM (7.6 L/min) continuously*~~*.*

c. Close all valves. Open valves V1, V3, and V11. Set the dynamic pressure to 20 psi (137.9 kPa).

d. Flow hot water ~~*at 180.0 °F ± 5.0 °F (82.2 °C ± 3.0 °C) or the manufacturer's maximum rated temperature ± 5.0 °F (v 3.0 °C), whichever is greater*~~*, through the device for* ~~*eight hours per day for a total of ten days*~~ *80 hours within a 14-day period.*

e. At the completion of 80 hours, run water ~~*maintained between 33.0 °F and*~~ *at 40°F ± 3°F (*~~*0.6 °C*~~ *4.4 °C ± 1.7 °C) through the device for a minimum of 1 hour.*

~~***3.1***~~ ***3.2 Pressure Test of the Complete Device***

~~***3.1.1***~~***3.2.1 Purpose***

The purpose of this test is to determine if the device withstands pressures of 250.0 psi (1723.7 kPa), or two (2) times the manufacturer's maximum rated working pressure, whichever is greater, without leakage or damage to the device.

~~***3.1.2***~~***3.2.2 Procedure***

Install the device in the test system as in Figure 1. Admit water through the inlet of the device allowing water to flow through it to purge it of air. Close ~~*the outlet valve and*~~ *all valves except valves V1 and V3 in order to build up the supply pressure to 250.0 psi (1723.7 kPa), or 2 times the manufacturer's* ~~*the*~~

maximum ~~required~~ rated working ~~test~~ pressure, whichever is greater. Allow the device to stand under pressure for 5 minutes and examine it for leaks.

3.3 Back Pressure of ~~Downstream~~ Outlet Check

3.3.1 Purpose

The purpose of this test is to verify the tightness of the ~~downstream~~ outlet check when subjected to a backpressure equal to the rated working pressure.

3.3.2 Procedure

a. ~~The inlet check valve shall be~~ Remove~~d~~ or mechanically ~~held~~ hold open the inlet check valve. ~~And the air vent shall be sealed~~ Seal the air vent closed.

b. Install the device as shown in Figure 1, including the sight glass with the shut-off cock installed upstream of the device inlet.

c. Flow water at ambient temperature for 2 minutes through the device and purge the device of air.

d. Close ~~the supply~~ valve V1 and open the shut-off cock to the sight glass, V7. Adjust ~~T~~the height of the water in the sight glass ~~shall be adjusted~~ to 6.0 inches (152.4 mm) above the top of the ~~water space in the assemply~~ device. ~~Raise the pressure downstream of the check valve to the minimum working pressure of the device and r~~Record the water level in the sight glass.

e. Open valves V9 and V10 and adjust PRV 2 until P3 achieves the maximum rated working pressure of the device. Hold for 5 minutes.

f. Record the water level in the sight glass.

3.4 Tightness of Checks

3.4.2 Procedure

a. Install the device as shown in Figure 1~~, including the sight glass with the shut-off cock installed upstream of the inlet check valve.~~

b. By suitable means, hold the ~~downstream~~ outlet check valve partially open (fully clear of its seat) without affecting the inlet check.

c. Purge the device of air and open the shut-off cock, V7 to the sight glass.

d. ~~With the downstream gate and throttling valve open, pressurize the inlet to the device until there is flow from the outlet of the valve filling~~ Fill the sight glass column to at least 42.0 inches (1066.8 mm) as measured from the ~~center of the pipe line or the center of the check valve disc face (whichever is the shortest)~~ top of the device.

e. Close ~~the filling or~~ supply valve ~~tightly~~ V1. Hold for 5 minutes.

f. Repeat ~~on second check~~ steps 3.4.2.b through 3.4.2.e on the inlet check valve with the vent sealed, if necessary.

3.4.3 Criteria

Any loss of level in the sight glass below 28.0 inches (711 mm) above the ~~center of the pipe line, when horizontally mounted, or the center of the disc face, when vertically mounted~~ device, shall result in a rejection of the device.

3.5 Automatic Vent Valve Leakage

3.5.2 Procedure

a. ~~The device shall be installed~~ Install the device as in Figure 1 ~~with a means for accurately measuring the rate of flow through the device~~.

b. ~~A pressure of~~ Set the supply pressure to 10.0 psi ± 1.0 psi (68.9 kPa ± 6.9 kPa) ~~shall be maintained upstream of the supply valve.~~

c. Open ~~the inlet~~ valve V1 ~~very slowly until the pressure in the inlet of the device is at the supply pressure~~ and increase the inlet pressure to the device over 5 seconds to the supply pressure. Close valve V1.

d. ~~Repeat the test by opening the supply valve rapidly, within one (1) second maximum at 10.0 psi (68.9 kPa).~~ Open valve V1 and increase the inlet pressure to the device over 1 second to the supply pressure. Close valve V1.

e. Repeat ~~the tests~~ sections 3.5.2.c and 3.5.2.d with the supply pressure at 125.0 psi ± 1.0 psi (861.9 kPa ± 6.9 kPa) or the manufacturer's maximum rated working pressure, whichever is greater.

3.5.3 Criteria

Any leakage from the vent port(s) ~~during any of these tests~~ shall result in a rejection of the device.

3.9 Back Siphonage Back Pressure

3.9.2 Procedure

3.9.2.1 Foul the inlet check valve with an appropriate 0.032 inch (0.8 mm) diameter fouling wire, in the location for the type of valve construction (see Figure~~s 3, 4 and 5~~ 2), and the outlet check valve is in its normal closed position. The device shall be installed as in Figure ~~6~~3, substituting a pressure connection for the sight glass and water reservoir and adding a sight glass in the inlet connection. Use colored water in the pressurized line connected to the outlet of the device. Run the test with 4.0 psi (27.6 kPa) back pressure. The vacuum shall be applied in the following sequence:

a. Slowly apply and hold a vacuum of 25.0 inches (635.0 mm) mercury column for five (5) minutes. Then slowly reduce the vacuum from 25.0 inches to 0 inches (635.0 mm to 0 mm) mercury column.

b. By means of a quick acting valve, create a surge effect by quickly opening and closing the valve. During the test, the vacuum shall range between 25.0 inches to 0 inches (635.0 mm to 0 mm) mercury column.

3.9.2.2 Repeat ~~the tests with the outlet check valve fouled with an appropriate 0.032 inch (0.8 mm) diameter fouling wire, in the location for the type of valve construction (see Figures 3, 4 and 5), and~~ 3.9.2.1 except with the inlet check valve in its normal closed position rather than the outlet check valve and the outlet check valve fouled rather than the inlet check valve.

3.10 Flow and Pressure Loss

3.10.1 Purpose

The purpose of this test is to determine the minimum water flow capacity at the maximum allowable pressure loss across the device ~~as required by Section 1.2.4~~..

3.10.2 Procedure

~~Measure the rate of flow through the device and record the pressure (see Figure 1). Pressure gauges shall be located in accordance with ANSI/ISA 75.02.~~

a. Install the device per Figure 1.

b. Purge the air from the system, and then close discharge valve V11.

c. ~~Open the supply valve fully and maintain the maximum rated working pressure.~~ Set the inlet static pressure to the 125 psi (861.9 kPa) or the maximum pressure as stated by the manufacturer, whichever is greater.

d. Gradually open ~~the~~ discharge valve V11 until either the minimum required rate of flow [4.0 GPM (15 L/min)] or the maximum allowable pressure loss [20.0 psi (137.9 kPa)] in the piping between the gauges and the device is attained.

3.11 Air Flow Test

3.11.1 Purpose

The purpose of this test is to ascertain the effective throughway area of the device in relation to the effective throughway area of the air inlet valve from the water inlet to the outlet.

3.11.1 Purpose

a. Install the device per Figure 4 in the normal operating position with the checks of the device held fully open and the air inlet valve held closed.

b. Dissipate the vacuum in the tank from 25 to 5.0 inches of mercury (85 to 17 kPa) through the check valve orifice by operating the quick opening valve (fully open in less than 1 second).

c. Record the amount of time needed to dissipate the vacuum.

d. Repeat 3.11.2.a through 3.11.2.c for 3 test runs. Average the results.

e. Keep the outlet connected to the vacuum tank with the outlet check held fully open, and the water inlet check held in a closed position.

f. Hold the air inlet valve open and dissipate the vacuum in the tank from 25 to 5.0 inches of mercury (85 to 17 kPa) in the same manner through the air port or ports.

g. Record the amount of time needed to dissipate the vacuum.

h. Repeat 3.11.2.e through g for 3 test runs. Average the results.

3.11.3 Criteria

The average time of section 3.11.2(d) shall be less than or equal to the average time of section 3.11.2(h).

Section 4.0, Detailed Requirements: Removed some of the material requirements as follows:

4.1 Materials

~~***4.1.1 Allowable Materials***~~

~~*Alloys, rubbers, engineered plastics, or other materials can be used provided the materials meet the requirements of this specification and are submitted for approval.*~~

~~***4.1.1.1 Contaminated Materials***~~

~~*Materials which could contaminate the water and make it injurious to persons consuming it shall not be used in the assembly where the material would be in contact with the water.*~~

~~***4.1.1.2 Compliance and Certification***~~

~~*All elastomers and polymers in contact with the water shall comply with the requirements of the United States Code of Federal Regulations (CFR) Title 21, 177, or the material shall be certified as non-toxic by an independent approved laboratory.*~~

~~***4.1.2 Corrosion Resistance of Interior Parts***~~

~~*All metal parts (except springs) in contact with the water flowing through the device shall have a corrosion resistance at least equal to a copper alloy of not less than 58% copper.*~~

~~***4.1.3 Springs***~~

~~*Springs in contact with the water flowing through the device shall have a corrosion resistance at least equal to chrome nickel steel, Series 300.*~~

~~***4.1.4 Diaphragms***~~

~~*Diaphragms, valve discs, seat facings or other flexible or non-flexible, nonmetallic parts shall be designed for continuous exposure to water at the maximum rated temperature of the device without change in physical characteristics which would prevent full compliance with all requirements of the standard.*~~

~~***4.1.5***~~ ***4.1.1 Metal to Metal***

Metal to metal seating of check valves and relief means venting to atmosphere shall not be acceptable. The seat, the valve disc or both shall be of nonmetallic materials which will assure pressure tight seating and reseating.

~~***4.1.6***~~ ***4.1.2 Pipe Threads***

~~***4.1.6.1***~~ ***4.1.2.1*** *Taper pipe threads except dryseal shall be in compliance with ANSI/ASME B1.20.1.*

~~***4.1.6.2***~~ ***4.1.2.2*** *Dryseal shall comply with ANSI/ASME B1.20.~~1~~3.*

~~***4.1.6.3*** *Other types of connections shall conform to appropriate standards.***~~

Section 4.2, Markings: Revised marking requirements and added the Standard designation as follows:

4.2 Markings

4.2.1 Marking of Devices

Each device shall have the following information marked on it where it will be visible after the device has been installed:

a. Name of manufacturer or trademark.
b. Type or model number of the device.
c. Maximum rated working pressure.
d. Maximum rated working temperature.
e. The direction of water flow through the device.
f. ASSE 1035.

4.2.2 *Markings shall be ~~either cast, etched, stamped or engraved on the body of the device or on a durable plate attached securely to the device~~ permanent per UL 969.*

~~***4.2 Markings***~~***4.3 Installation Instructions***

4.3.1 Complete installation instructions including ~~drawings or schematic sketches shall be provided~~4.3.2 ~~I~~instructions ~~shall be provided~~ for maintenance and repair of such devices shall be provided.

Figure 1 was revised
Figure 2 was revised and renumbered to Figure 3.
Figures 3, 4 and 5 were combined into one figure and renumbered as Figure 2
Figure 6 was revised and renumbered to Figure 4