Summary of Substantive Changes
between the 2004 and the 2017 edition of
ASSE 1024 "Dual Check Backflow Preventers"

Presented to the IAPMO Standards Review Committee on May 6, 2019

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

- Added water meter sizes to all tables with connection information and expanded the scope to include 1-1/4 NPS size to all sizing tables (see Table 1, Table 2, Table 3 and Table 4)
- Removed Figure 2 from the hydrostatic leakage test (see Section 3.4)
- Clarified all figures with new symbols (see Figures 1 and 2)
- Specified the required pressure for deterioration at extremes of manufacturer's temperature and pressure test (see Section 3.2.2)
- Revised how to adjust the water level height in the hydrostatic leakage tests of check valves (see Section 3.4)

Section 1.2, Scope: Added water meter sizes to all tables with connection information and expanded the scope to include 1-1/4 NPS size to all sizing tables as follows:

1.2.2 Size Range

The device shall be designed to accommodate the following nominal pipe sizes: 1/4 NPS, 3/8 NPS, 1/2 NPS, ~~(~~5/8 ~~water meter)~~ NPSM, 5/8 NPS, 3/4 NPS, 1 NPSM, 1 NPS, 1-1/4 NPSM, 1-1/4 NPS, 1-1/2 NPS, and 2 NPS (8 DN, 10 DN, 15 DN, 18 DN, 20 DN, 25 DN, 32 DN, 40 DN, and 50 DN).

~~*Note: Devices with a 5/8 water meter connection shall meet the flow requirements of a 1/2 inch (15 DN) nominal pipe size.*~~

Section 1.3, Reference Standards: Reference standards have been added as follows:

References to industry standards shall mean the ~~latest~~ edition ~~of the standard~~ referenced below.

• ASME B1.20.1- 2013, Pipe Threads, General Purpose, Inch
• ASME B1.20.3-1976 (R2013), Dryseal Pipe Threads, Inch
• AWWA C700-15, Cold Water Meters – Displacement Type, Metal Alloy Main Case
• UL 969-2017, Marking and Labelling Systems

Section 2.0, Test Specimens: Clarified the failure statement as follows:

2.4 Rejection

Failure of one (1) device shall result in a rejection of that model and size ~~until the manufacturer has corrected the fault and submitted new devices for testing~~.

Section 3.0, Performance Requirements and Compliance Testing:
Section 3.1, Connection Torque: Specified angle of applied torque and clarified the refence of Table 1 as follows:

3.1 Connection Torque

3.1.1 Purpose

The device shall be capable of withstanding, without deformation, breakage or leakage, the axial torque exerted at the end connection of the device to the pipe line per Table 1.

Section 3.1.2, Procedure: Added tolerance for pressure ratings as follows:

3.1.2 Procedure

Install the device in its normal operating position. With the inlet securely anchored, apply the torque shown in Table 1 for a period of not less than ~~five (~~5~~)~~ minutes. The device shall be pressurized at 160~~.0~~ psi ± 2 psi (1103~~.2~~ ± 14 kPa) or the manufacturer's maximum rated working pressure ± 2 psi (± 14 kPa), whichever is greater, during the torque test.*

Section 3.2, Deterioration at Extremes of Manufacturer's Temperature and Pressure: Clarified the purpose statement as follows:

~~3.6~~3.2 Deterioration at Extremes of Manufacturer's Temperature and Pressure

~~3.6.1~~3.2.1 *Purpose*

The purpose of this test is to evaluate the material's performance at extremes in temperature and pressure. The geometry of any material shall not be adversely affected when exposed to water at the extremes of the manufacturer's temperature and pressure ranges~~, which is essential to the continued function of the device shall not be adversely affected~~.

Section 3.2.2, Procedure: Added tolerance for temperature ratings and specified the operating pressure as follows:

~~3.6.2~~3.2.2 *Procedure*

~~3.6.2.1~~3.2.2.1 *Cold Water Devices*

Cold water devices shall be tested at 40.0 °F ± 5 °F and 110.0 °F ± 5 °F (4.4 °C ± 2.8 °C and 43.3 °C ± 2.8 °C), or the manufacturer's maximum rated temperature, whichever is greater, and the manufacturer's maximum rated pressure.

~~3.6.2.2~~3.2.2.2 *Hot Water Devices*

Hot water devices shall be tested at 40.0 °F ± 5 °F and 180.0 °F ± 5 °F (4.4 °C ± 2.8 °C and 82.2 °C ± 2.8 °C) or the manufacturer's maximum rated temperature, whichever is greater, and the manufacturer's maximum rated pressure.

Section 3.2.2.3, Procedure: Clarified the test procedure as follows:

~~3.6.2.3~~3.2.2.3 *Procedure*

Install the device as shown in Figure ~~3~~1~~, with a heater capable of maintaining the required temperature and a pump capable of circulating water listed in Table 3 continuously through the device. The reservoir shall be closed, and vented to atmosphere~~. A recirculating system shall be permitted to be used instead of the vented reservoir at the option of the testing laboratory.

Water at the ~~manufacturer's maximum rated temperature and pressure shall be circulated through the device for eight (8) hours per day for a total of ten (10) days (total of 80 hours). At the option of the testing laboratory, this test shall be permitted to be run~~ pressure and lower temperature per either section 3.2.2.1 or 3.2.2.2 shall be circulated through the device continuously for ~~eighty (~~80~~)~~ hrs. Repeat at the higher temperature of either section for 80 hrs. If this time interval is not possible, the minimum continuous run time shall be 8 hrs such that the cumulative run time is 80 hrs. The device shall be insulated to maintain the required temperature through the device. ~~While at temperature, repeat Section 3.5. Then run water maintained at 104.0 °F (40.0 °C) for at least one (1) hour through the device. At ambient temperature, repeat test 3.2.~~

Section 3.4, Hydrostatic Leakage Tests of Check Valves: Clarified the test procedure and the water level guide as follows:

~~3.3~~ 3.4 Hydrostatic Leakage Tests of Check Valves

3.4.2 Procedure

3.4.2.1 Upstream Check Valve

Install the device as shown in Figure ~~1~~ 2~~, with a sight glass (See Figure 2), shut-off and drain cock installed in the tee upstream of the inlet check valve~~. Hold the downstream check valve partially open (fully clear of its seat). Purge the device of air, close the supply valve, open the shut-off cock to the sight glass. Adjust the water level in the sight glass to be ~~at the height not less than that corresponding to the top of the water space in~~ 0.50 in (13 mm) above the highest level of the device. Raise the pressure on the downstream side of the check valve to 320 psi (2206 kPa) or two (2) times the manufacturer's maximum rated working pressure of the device, whichever is greater, and record the water level in the sight glass. Hold for 5 minutes. Observe for indications of damage or leakage by the check valve. Water rise due to disc compression shall not be cause for rejection of the device.

3.4.2.2 Downstream Check Valve

Repeat the test with the upstream check valve held partially open (fully clear of its seat), ~~the sight glass installed as described in Section 3.3.2.1,~~ the downstream check in a fully closed position, and a pressure of 320 psi (2206 kPa) or two (2) times the manufacturer's maximum rated working pressure, whichever is greater, applied on the downstream side of the check valve with atmospheric pressure on the upstream side. Hold for 5 minutes and observe for indication of damage or leakage by the check valve. Water rise due to disc compression shall not be cause for rejection of the device.

Section 3.5, Flow and Pressure Loss: Clarified the test procedure as follows:

~~3.4~~ 3.5 Flow and Pressure Loss

3.5.2 Procedure

Install the device as shown in Figure ~~1~~ 2~~, with a differential manometer or pressure indicating instrument connected to positions where the gauges are shown. These connections shall be to ring piezometers~~. The supply source shall be capable of supplying a volume of water adequate to meet the flow requirements of the device being tested in accordance with Table ~~2~~ 3. Maintain a minimum inlet pressure of 10.0 psi (~~68.9~~ 69.0 kPa) greater than the allowable pressure loss at rated flow. Purge the system of air. Gradually increase the flow of water through the device until the required rated flow of water is achieved or the maximum allowable pressure loss is reached. The pressure loss through valves and piping between the device on test and ~~piezometer~~ pressure gauge connections shall be subtracted from the differential pressure reading between pressure gauge connections.

Section 3.6, Drip Tightness of Check Valves: Clarified the test procedure as follows:

~~3.5~~ 3.6 Drip Tightness of Check Valves

~~3.5.1~~ 3.6.1 Purpose

The purpose of this test is to determine if the check valves prevent flow at 1.0 psi (6.9 kPa).

~~3.5.2~~ 3.6.2 Procedure – Inlet Check Valve

Install the device as shown in Figure ~~1~~ 2, ~~with a sight glass, shut-off and drain cock installed upstream of the inlet check valve. (See Figure 2.)~~. Hold the downstream check valve partially open (fully clear of its seat).

1. Purge the device of air and open shut-off ~~cock~~ valve, V3, to the sight glass.

2. Open valves V1, V5, and V6.

3. ~~With the downstream gate and throttling valve open,~~ Slowly pressurize the inlet of the device using valve V2 ~~there is flow from the outlet of the valve filling~~ until the sight glass column fills to a height not less than 42.0 inches (~~1066.8~~ ~~1070~~mm), as measured from the center of the pipe line or the center of the check valve disc face, ~~(~~whichever ~~is the shortest~~ shorter~~)~~.

4. Close ~~the filling or supply~~ valves V1 and V2 tightly. Hold for 5 minutes.

5. Measure the height of the water column. Close valve V3.

~~3.5.3~~ 3.6.3 Procedure – Outlet Check Valve

Allow the downstream check to close, and ~~apply the same test to the device by~~ holding the ~~inlet~~ upstream check valve partially open ~~Purge the device of air and open the shut-of cock to the sight glass. With the downstream gate and throttling valve open, pressurize the inlet of the device until there is flow from the outlet of the valve filling the sight glass column to not less than 42.0 inches (1066.8 mm) measured from the center of the pipe line or the center of the check valve disc face (whichever is shortest). Close the filling or supply valve tightly. Hold for five (5) minutes.~~ (fully clear of its seat). Repeat sections 3.6.2.1 through 3.6.2.5.

Section 3.7, Check Valve Operation: Clarified the test procedure as follows:

3.7.2 Procedure

~~Visually examine the movement of~~ Move the first and second check valves individually through the full limit of their travel relative to the main body of the device to determine ~~that it will not effect the~~ whether either check valve affects the operation of the other check valve.

3.7.3 Criteria

One check valve's movement affecting the operation or position of the other check valve assembly or seal shall result in the rejection of the device.

Section 3.8, Dual Check Valve Integrity at Minimum Intermittent Rated Flow: Clarified the test procedure as follows:

3.8.2 Procedure

Install the device as shown in Figure ~~1~~ 2. ~~The supply source shall be capable of supplying a volume of ambient water adequate to meet the flow requirements of the device; and shall be capable of maintaining an inlet pressure equal to 160.0 psi (1103.2 kPa) or the manufacturer's maximum rated working pressure of the device.~~ Purge the system of air. Gradually increase the flow of water through the device until the maximum intermittent flow rate, as indicated in Table 4, is reached for the device, ~~at its maximum~~ or the manufacturer's minimum rated working pressure, or the working pressure per Section 1.2.3, whichever is greater, is reached. Maintain the pressure and flow settings for 5 minutes. Observe for external leaks or other indications of damage.

Section 4.0, Detailed Requirements: Clarified material requirements and added NSF/ANSI 372 as a reference as follows:

4.1 Materials

~~Solder and fluxes containing lead in excess of 0.2% shall not be used in contact with potable water. Metal alloy in contact with potable water shall not exceed 8% lead.~~ Devices intended to convey or dispense water for human consumption through drinking or cooking shall not contain a weighted average lead content in excess of 0.25% when evaluated in accordance with NSF/ANSI 372.