ASSE International

Performance Requirements for Backflow Prevention Devices for Hand-held Shower

Public Comment
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Foreword
This foreword shall not be considered a part of the standard; however, it is offered to provide background information.

ASSE standards are developed in the interest of consumer safety.

Hand showers, sometimes identified as “telephone showers”, provide a desirable means for bathing as well as some therapeutic services. The ASSE has recognized that these devices, due to their mobility in service, can create unsanitary conditions in the potable water lines unless preventative means are provided in the installation.

Loss of water supply pressure can create a condition in which contaminated water can be caused to backflow into the potable water lines. This could occur when a hand-held shower is submersed in non-potable water; and therefore it is essential that adequate means to protect against backflow be provided.

Loss of water pressure is not a frequent occurrence, but it is a possibility. Many plumbing codes mandate that all hand-held shower installations be provided with means of protecting against backsiphonage and backpressure conditions.

This performance standard has been developed around well established and extensively field tested principles for backflow prevention devices of this class. The updates included in the 2005 edition of ASSE 1014 are intended to refine the scope and application to backflow prevention devices that are separately attached or integral to hand-held showers, while relying on ASME A112.18.1 Plumbing Fixture Fittings for the remaining performance requirements. Other devices such as those complying with ASSE Standard #1001 and ASSE Standard #1011, when installed in a properly designed system, can provide equivalent protection from backsiphonage and/or backpressure.

Recognition is made of the time volunteered by members of this working group and of the support of manufacturers who also participated in meetings for this standard.

This standard does not imply ASSE International’s endorsement of a product which conforms to these requirements.

Compliance with this standard does not imply acceptance by any code body.

It is recommended that these devices be installed consistent with local codes by qualified and trained professionals.

This standard was promulgated in accordance with the ASSE Procedures for Standards Development as approved by the American National Standards Institute (ANSI).
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Performance Requirements for Backflow Prevention Devices for Hand-held Showers

1. General

1.1 Application
This standard provides performance requirements for backflow prevention device(s) for handheld showers (herein referred to as the “device”) in the interest of health and safety.

1.2 Scope

1.2.1 Description
These devices provide backflow protection against backsiphonage and backpressure in handheld showers. These are separate devices or are integral with handheld showers, tub fillers, flexible hoses, or components that are attached to a shower system. The device shall include two independently acting check valves in series or a check valve in series with a vacuum breaker feature.

1.2.2 General Requirements
The device(s) and associated components shall comply with the requirements of this standard and the applicable requirements of ASME A112.18.1 / CSA B125.1, unless stated otherwise herein.

1.2.3 Minimum Working Pressure
The device shall be designed to withstand an inlet working pressure of a minimum of 125.0 psi (861.9 kPa).

1.2.4 Temperature
   1.2.4.a. Temperature Range
   The device shall be designed to function at temperatures from 40.0 °F to 120.0 °F (4.4 °C to 48.9 °C).
   1.2.4.b. Maximum Temperature Spike
   The device shall withstand temperature spikes up to 150 °F (65.6 °C).

1.2.5 Connections
Connections for non-integral devices shall conform to ASME A112.18.1 / CSA B125.1.

1.2.6 Two Check Valves
Devices with two check valves in series shall comply with ASME A112.18.3 as a fitting with internal backflow prevention device.

1.3 Reference Documents
Referenced industry standards shall be to the revision stated below.

ASSE 1014 – 201x
Performance Requirements for Backflow Prevention Devices for Hand-Held Showers
- ASME A112.18.1-2018 / CSA B125.1-18, Plumbing Supply Fittings
- ASME A112.18.3-2002 (R2017) – Performance Requirements for Backflow Devices and Systems in Plumbing Fixture Fittings
- UL 969-2017, Marking and Labeling Systems
2. Test Specimens and Test Laboratory
Sample plan shall be in accordance with the testing laboratory or certification body. Tests shall be performed in the order listed on 1 sample of each model submitted.
3. Performance Requirements and Compliance Testing

3.1 Deterioration at Extremes of Temperature and Pressure Test

3.1.1 Purpose
The purpose of this test is to demonstrate structural integrity of the device(s) when subjected to an extreme of temperature and pressure.

![Test setup for sections 3.1 and 3.2. Note that for integral devices, V2 is not applicable.](image)

3.1.2 Procedure
a. Connect the device per Figure 1. Fully open valves V1 and V2.
b. Flow water through the device at a pressure of 125.0 psi ± 5.0 psi (861.9 kPa ± 34.5 kPa) as measured at P1, or the manufacturer’s maximum rated pressure, whichever is greater, for the duration of the test.
c. Adjust the inlet water temperature to 120.0 °F ± 2.0 °F (48.9 °C ± 1.1 °C) as measured at T1, and flow for thirty (30) minutes.
d. Increase the water temperature to 150 °F ± 2 °F (65.6 °C ± 1.1 °C), and flow for one (1) minute.
e. Perform the Pressure and Temperature Test for Static and Dynamic Seals in ASME A112.18.1 / CSA B125.1.

3.1.3 Criteria
Any indication of external leakage or non-compliance with the remaining requirements of this standard shall result in a rejection of the device.

3.2 Life Cycle Test

3.2.1 Purpose
The purpose of this test is to determine if there is any deterioration in performance upon completion of the cycles of operation noted below. As an alternative, the device shall show compliance to the durability test of ASME A112.18.3 in lieu of section 3.2.

3.2.2 Procedure
a. Connect the device per Figure 1. For non-integral devices, establish a maximum flow of 2.5 GPM (9.46 L/min) at a flowing pressure of 50.0 psi ± 5.0 psi (344.8 kPa ± 34.5 kPa) by throttling valve V2. For devices integral to a handheld shower assembly, set the flowing pressure at P1 to 50 psi ± 5.0 psi (345 kPa ± 34.5 kPa).

b. Cycle the device at a maximum rate of 1500 cycles per hour. A cycle is defined as an alternating pressure from 0 psi to 50 psi ± 5 psi to 0 psi (0 kPa to 344.8 kPa ± 34.5 kPa to 0 kPa). For every 1,000 cycles, alternate the incoming water temperature from ambient to 115 °F ± 5 °F (46.1 °C ± 3.0 °C) to ambient.

c. Subject the device to 15,000 cycles.

d. Upon completion of the 15,000 cycles, for non-integral devices, flow ambient water at 1.9 GPM ± 0.1 GPM (7.2 L/m ± 0.4 L/m) at a pressure of 125.0 psi ± 5.0 psi (861.9 kPa ± 34.5 kPa) for one minute. For devices integral to a handheld shower assembly, set the flowing pressure at P1 to 125.0 psi ± 5.0 psi (861.9 kPa ± 34.5 kPa) for 1 minute.

e. Close the shut-off valve on the outlet of the device, and maintain a static pressure on the inlet of the device of 125.0 psi ± 5.0 psi (861.9 kPa ± 34.5 kPa) for five (5) minutes.

3.2.3 Criteria
Any indication of external leakage, after the test when the gauge pressure of 125.0 psi (861.9 kPa) is applied with the shut-off valve in a closed position, or non-compliance with the remaining sections of this standard shall result in a rejection of the device.

3.3 Backpressure Test

3.3.1 Purpose
The purpose of this test is to determine if any contaminated water is transmitted into the potable water supply system when backpressure is encountered.

3.3.2 Procedure
a. Install the device in accordance with Figure 2 with a 60 ± 2 inch (1524.0 ± 50.8 mm) hand-held shower hose attached to the outlet of the device.

b. Place a sheet of paper below the inlet of the device.

c. Seal the air ports.

d. Raise the discharge end of the shower hose to 6 ± 0.5 inch (152.4 ± 12.7 mm) above the centerline of the device.

e. Fill the shower hose with colored water. Hold for five (5) minutes, and observe for leakage.

f. Slowly raise the discharge end of the shower hose to its maximum height above the centerline of the device. Hold for five (5) minutes, and observe for leakage.
3.3.3 Criteria
Any indication of leakage shall result in rejection of the device.

3.4 Backsiphonage Test

3.4.1 Purpose
The purpose of this test is to determine if the device provides protection against backsiphonage.

3.4.2 Procedure
a. Install the device in accordance with Figure 3 with the inlet check valve fouled with a 0.032 inch (0.8 mm) diameter wire in accordance with Figure 4.
b. Connect a 0.5 inch (12.7 mm) inside diameter sight glass to the discharge end of the shower hose, and immerse the lower end of the sight glass in a reservoir of colored water.
c. Apply a vacuum of 5 in-Hg (17.0 kPa) to the inlet of the device. Hold for thirty (30) seconds.
d. Increase the vacuum to 25 in-Hg (85.0 kPa) in increments of 5 in-Hg (17.0 kPa) holding the vacuum for thirty (30) seconds at each increment.
e. Apply a vacuum alternating between 25 in-Hg and 0 in-Hg (85.0 kPa and 0 kPa) for five (5) cycles.
3.4.3 Criteria
Any rise in the sight glass in excess of 0.5 inches (12.7 mm) shall result in a rejection of the device.
4. Detailed Requirements

4.1 Materials
Solder and fluxes containing lead in excess of 0.2% shall not be used in contact with potable water. Metal alloys in contact with potable water shall not exceed 8% lead.

4.2 Installation Instructions
Instructions for installation shall be packaged with the device. Instructions for the maintenance of field repairable devices and testing for field testable devices shall be packaged with the device.

The installation instructions shall include the following information:
   a. Inlet and outlet connection sizes.
   b. Manufacturer’s maximum working pressure.
   c. Manufacturer’s stated minimum and maximum flow rate.
   d. Manufacturer’s minimum stated flow.

4.3 Markings

4.3.1 The following information shall be marked:
   (a) The name of manufacturer or trademark shall be marked on the device.
   (b) The type or model number shall be marked on the device or in the installation instructions.

4.3.2 The markings shall be either cast, etched, stamped or engraved on the body of the device, or labels shall comply with UL 969 for permanence.
5. Definitions
Definitions not located in this section are located in the Plumbing Dictionary, Sixth Edition, published by ASSE.