General Information

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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 Product Standards are developed in the interest of consumer safety.

The American Society of Sanitary Engineering is dedicated to the preservation of public health and safety through its guiding principle, “Prevention Rather Than Cure.”

ASSE’s Product Standards Program systematically evaluates new technologies through formal requests and addresses the development and promulgation of performance standards designed to safeguard public health and safety.

Standards for the performance of plumbing system components are considered by the American Society of Sanitary Engineering to be of great value in the development of improved plumbing systems for increased protection of public health and safety.

To accomplish this, ASSE, through its Product Standards Committee, encourages manufacturers to develop performance standards and testing procedures for their products. These standards have the consensus of manufacturers and others who have pertinent interests in plumbing systems and are acceptable to this Society.

ASSE recognized that the common garden or utility hose, when connected to a potable water supply by means of hose threaded outlet, constitutes a potential non-potable cross-connection and that a performance standard for preventive means, the vacuum breaker wall hydrant, was warranted. ASSE Standard #1019, Wall Hydrants Vacuum Breakers Frost Proof Automatic Draining Types, was developed and issued to fulfill this requirement.

Plumbing codes now stipulate that hose connections shall be protected by approved vacuum breakers that conform to the performance requirements of ASSE Standard #1011. Accordingly, hose bibbs, sill cocks, lawn faucets, frost-free wall hydrants and the like must be so equipped.

Frost resistant wall hydrants equipped with hose connection vacuum breakers pose a restriction to the post closure drainage, which is essential for frost prevention. Such vacuum breakers must be manually triggered to permit drainage, thereby, in effect, negating the frost proof feature of these hydrants which relies on automatic drainage. Thus, it becomes readily apparent to manufacturers of frost proof hydrants that resolution of this matter would involve the development of hydrants that incorporate vacuum breakers and retain the automatic draining provisions essential to frost resistant design.
During the 1988 revision of ASSE Standard #1019, the ASSE recognized the need to consider two types of wall hydrants for backflow protection. Specifically, test criteria was developed for frost proof and automatic draining type wall hydrants. In 1995, a request was made to revise the standard to include a third type of wall hydrant for backflow protection, which holds pressure versus relieving pressure.

The life cycle tests contained in this product performance standard represent the average expected life of the product.

Although many of the material specifications are detailed within Section IV of this standard, it is the responsibility of the manufacturer to comply with the requirements of the Safe Drinking Water Act, United States Public Law 93-523.

The 1019 Working Group, which developed this standard revision, was set up within the framework of the Product Standards Committee of the American Society of Sanitary Engineering.

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

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

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

Plumbing codes mandate how and where these devices are installed. However, this standard was promulgated using a specific set of installation requirements and conditions for the purpose of providing reasonable performance requirements and compliance testing.

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

This standard was promulgated in accordance with procedures developed by the American National Standards Institute (ANSI).

This edition was approved by the ASSE Board of Directors on July 7, 2011 as an ASSE standard.
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Wall Hydrant with Backflow Protection and Freeze Resistance

Section I

1.0 General

1.1 Application

The purpose of Wall Hydrant with Backflow Protection and Freeze Resistance (herein referred to as the “device”) is to provide protection of the potable water supply from contamination due to backsiphonage or backpressure and to protect the hydrant from damage due to freezing.

1.2 Scope

1.2.1 Description

These devices shall have a permanent means to protect against backflow due to either backsiphonage or backpressure. The backflow protection shall include a minimum of two (2) mechanisms: an air inlet for preventing backsiphonage and a check valve for preventing backpressure backflow. These devices are terminal fittings that supply potable water to hose connections without danger of freezing.

These devices shall be used on systems where the only source of low head backpressure comes from an elevated hose equal to or less than 10.0 feet (3.0 meters) in height. The outlet of this device shall not be subjected to more than twelve (12) hours of continuous water pressure.

The devices shall be classified as follows:

(a) Type A devices protect against backsiphonage and backpressure. The backflow protection shall include three (3) mechanisms: 1) an air inlet for preventing backsiphonage, 2) a check valve for preventing backpressure backflow and 3) a mechanism that relieves backpressure backflow. The hose shall be removed to prevent damage to the device from freezing.

(b) Type B devices protect against backsiphonage and backpressure. The backflow protection shall include three (3) mechanisms: 1) an air inlet for preventing backsiphonage, 2) a check valve for preventing backpressure backflow and 3) a mechanism that relieves backpressure backflow and a mechanism that drains the water from the hydrant when the hose is attached and the hydrant is manually closed.

The hose need not be removed to protect the device against damage from freezing.

(c) Type C devices protect against backsiphonage and backpressure. The backflow protection shall include two (2) mechanisms; 1) an air inlet for preventing backsiphonage and 2) a check valve for preventing backpressure backflow. The hose shall be removed to protect against damage to the device from freezing.
1.2.2 Sizes
The device size is specified by the inlet connection and the length of the device.

1.2.3 Connections

1.2.3.1 Outlet
The outlet connection shall be a ¾ NH garden hose connection threads complying with ASME B1.20.7.

1.2.3.2 Inlet
Inlet connections shall meet the applicable requirements of the plumbing code.

1.2.4 Pressure
The devices shall be designed for a minimum working pressure range of 25.0 psi to 125.0 psi (172.4 kPa to 861.9 kPa).

1.2.5 Temperature Range
The devices shall be designed for flow temperatures of 33.0 °F to 140.0 °F (0.6 °C to 60.0 °C).

1.2.6 Repairability
Devices shall be designed and constructed such that after installation, repair or replacement of the elastomeric parts shall be accomplished using standard tools. Construction shall permit field service without damaging or marring the surface of the device.

1.2.7 Atmospheric Vent
Atmospheric vent(s) (air inlets) shall be of a nonstandard plumbing connection.

1.3 Reference Standards

- ASME B1.20.7-1991 (R2008), Hose Coupling Screw Threads (Inch)

American Society of Mechanical Engineers
Three Park Avenue
New York, NY 10016-5990
http://www.asme.org
Section II

2.0 Test Specimens

2.1 Samples Submitted for Test

The manufacturer shall submit three (3) devices. Where a manufacturer evaluates a series of devices that are identical, except for the inlet sizes and length, the manufacturer shall furnish three (3) production quality devices having the smallest inlet and longest length.

For Section 3.12, details of the fouling procedure shall be provided by the manufacturer. It shall be permitted for the manufacturer to supply a wire separate for installation by the laboratory.

2.2 Samples Tested

The testing agency shall select one of each type, or model, and inlet/outlet size for full test. The tests shall be run in the order described in the standard on one (1) device.

2.3 Drawings

Assembly and installation drawings and other data needed to enable a testing agency to determine compliance with this standard shall accompany devices when submitted for examination and performance testing under this standard.

2.4 Rejection

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

3.0 Performance Requirements and Compliance Testing

3.1 Hydrostatic Pressure Tests

3.1.1 Purpose
The purpose of this test is to determine if the device withstands a working pressure of 250.0 psi (1723.7 kPa) or two (2) times the manufacturer’s maximum rated working pressure, whichever is greater.

3.1.2 Procedure
Install the device in the open position on a test system with the inlet connected to an ambient water supply with shut-off valves on the inlet and the outlet. Purge the device of air and then close the outlet shut-off valve. Pressurize the device to 250.0 psi (1723.7 kPa) or two (2) times the manufacturer’s maximum rated working pressure, whichever is greater. Hold the pressure for five (5) minutes.

3.1.3 Criteria
Any indication of damage which prevents compliance with the remainder of this standard or external leakage shall result in the rejection of the device.

3.2 Water Flow Capacity

3.2.1 Purpose
The purpose of this test is to determine the device’s flow at a pressure drop of 25.0 psid (172.4 kPa).

3.2.2 Procedure
Install the device in the open position in a test system that is equipped with the means for measuring the rate of ambient water flow and pressure loss across the device and with a throttling valve on the outlet of the device. Purge the system of air and then close the throttling valve. The throttling valve shall then be slowly opened until the 25.0 psi +0.0/-0.5 psi (172.4 kPa +0.0/-3.5 kPa) pressure differential across the device is reached. Flow for one (1) minute. Record the flow.

3.2.3 Criteria
Failure to meet a minimum flow of 6.0 GPM (22.7 L/m) at a pressure differential of 25.0 psi (172.4 kPa) shall result in a rejection of the device.

3.3 Deterioration at Maximum Rated Temperature and Pressure

3.3.1 Purpose
The purpose of this test is to condition the device at the maximum rated temperature and pressure of the device.

3.3.2 Procedure
Install the device in the open position in a test set-up. Circulate water through the device:
   a) At a flow rate of 6.0 GPM ± 0.5 GPM (22.7 L/m ± 1.9 L/m);
   b) At a temperature of 140.0 °F ± 5.0 °F (60.0 °C ± 2.8 °C) or the manufacturer’s maximum rated temperature, whichever is greater; and
c) At a pressure of 125.0 psi ± 2.0 psi (861.8 kPa ± 13.8 kPa) or the manufacturer’s maximum rated pressure, whichever is greater.

Run the test for eight (8) hours per day for a total of ten (10) days, or for eighty (80) continuous hours at the manufacturer’s request.

3.3.3 Criteria
Failure of the device to comply with the remaining sections of this standard shall result in a rejection of the device.

3.4 Life Cycle Evaluation

3.4.1 Purpose
The purpose of this test is to determine at the end of five thousand (5000) cycles if the device continues to meet the requirements of this standard.

3.4.2 Procedure
Devices with a cold water inlet only shall be installed at a source of water at 60.0°F ± 20.0 °F (15.6 °C ± 11.2 °C) which shall provide 125.0 psi (861.8 kPa) static pressure at the inlet when the device shut-off valve is closed. The device shall be provided with a flow restrictor at the outlet limiting the flow to 8.0 GPM (30.3 L/m). Measure the torque or force required to close the device.

Devices with both a cold water inlet and a hot water inlet shall be installed at a source with hot water at 140.0 °F ± 5.0 °F (60.0 °C ± 2.8 °C) or the manufacturer’s maximum rated temperature, whichever is greater, to the hot water inlet and at 60.0 °F ± 20.0 °F (15.6 °C ± 11.2 °C) water to the cold water inlet. Both the hot and ambient water individually shall provide 125.0 psi (861.8 kPa) static pressure at the inlet when the device shut-off valve is closed. The device shall be provided with a flow restrictor at the outlet limiting the flow to 8.0 GPM (30.3 L/m). Measure the torque or force required to close the device.

3.4.2.1 Dwell Time
The dwell time for the device full open and full closed configuration shall range from two to four (2-4) seconds each. The open/close dwell time shall be equal for the five thousand (5000) cycles. Single handle devices with both a hot and cold water inlet shall be cycled closed/full open/closed two thousand five hundred (2500) times for the hot position and two thousand five hundred (2500) times for the cold position. For devices with adjustable stem packing, if stem leakage is noted during or at the end of the test cycling, an adjustment per the manufacturer’s recommendation shall be made immediately to stop the leakage.

3.4.2.2 Test Equipment
The test equipment shall apply a closing torque or force to the device necessary to produce a seal for the shut-off valve plus ten (10) percent.

3.4.3 Criteria
Any leakage from the stem or atmospheric vent port(s) during the test shall result in a rejection of the device. For devices with an adjustable stem packing, stem leakage corrected by a packing adjustment shall not result in rejection, provided that not more than three (3) adjustments to a device are made. More than three (3) adjustments to the stem packing shall result in a rejection of the device. Failure of device to comply with the remaining sections of this standard shall result in a rejection of the device.
3.5 Resistance to Bending

3.5.1 Purpose
The purpose of this test is to determine if the device continues to function without leakage when subjected to a pull of 100.0 pounds (45.4 kg) on a hose applied perpendicular to the device.

3.5.2 Procedure
Install the device per the manufacturer’s installation instructions. Attach an o-ring seal and test mandrel to the outlet of the device. Pressurize the device with ambient water to 125.0 psi ± 2.0 psi (861.8 kPa ± 13.8 kPa). Apply a force of 100.0 pounds (45.4 kg) to the mandrel 1.0 inch (25.4 mm) from the outlet end of the device per Figure 1. Hold for three (3) minutes.

3.5.3 Criteria
Any indication of external leakage shall result in rejection of the device. Any fracture in the sill mounting flange or body of the device shall result in rejection of the device.

3.6 Self-Draining Capabilities

3.6.1 Purpose
The purpose of this test is to determine if the device is capable of discharging water in subfreezing climates.

3.6.2 Procedure
Install the device per the manufacturer’s installation instructions in a cold chamber with a 25.0 psi + 5.0 psi/-0.0 psi (172.4 kPa + 34.5 kPa/-0.0 kPa) water supply per Figure 2. The inlet of the device shall be at ambient room temperature [70.0 °F ± 5.0 °F (21.1 °C ± 2.8 °C)] connected to an ambient water supply, and the outlet within the cold chamber. The surface of the device in the cold chamber shall be maintained at a maximum temperature of 0.0 °F (-17.8 °C) or lower during the test. With an approximately 36.0 inch (914.4 mm) long hose and nozzle attached to the device, the device shall be turned to the full open position and discharge through the hose and nozzle approximately 3.0 gallons (11.4 liters) of water. The valve shall be closed.
hose and nozzle shall be removed from Type A and Type C devices and the hose and nozzle shall remain attached to Type B devices. After sixty (60) minutes or that time period required to lower the device base temperature to a maximum of 0.0 °F (-17.8 °C), remove the hose from the Type B devices.

**Figure 2**

Open the device (all Types), and verify that water flows through the device.

### 3.6.3 Criteria
Failure of the device to flow water shall result in a rejection of the device.

### 3.7 Low Head Backpressure

#### 3.7.1 Purpose
The purpose of this test is to determine if any contaminated water is transmitted back into the potable water system when the device is subjected to backpressure.

#### 3.7.2 Procedure
Install the device in the open position (both valves shall be open on mixing type devices) in its normal operating position except with the body of the device horizontal and with the atmospheric vent(s) and vent port sealed closed, and a transparent hose connected to the outlet. The device and the hose shall be filled with water and the water column raised to an elevation to produce a 6.0 ± 0.1 inch (152.4 ± 2.5 mm) water column measured from the center line of the inlet of the device. Hold the water column for five (5) minutes and observe the inlet of the device for leakage. Continue the test by increasing the water column to the following elevations and holding it for five (5) minutes while observing the inlet for leakage:

(a) 24.0 ± 0.1 inches (609.6 ± 2.5 mm);
(b) 48.0 ± 0.1 inches (1219.2 ± 2.5 mm);
(c) 72.0 ± 0.1 inches (1828.8 ± 2.5 mm);
(d) 96.0 ± 0.1 inches (2438.4 ± 2.5 mm); and
(e) 120.0 ± 0.1 inches (3048.0 ± 2.5 mm).

#### 3.7.3 Criteria
Any leakage of water from the inlet of the device shall result in a rejection of the device.
3.8 Outlet Pressure Release for Type A and Type B Devices

3.8.1 Purpose
The purpose of this test is to determine if the outlet pressure release mechanism relieves the outlet pressure when the supply pressure drops to 0.0 psi (0.0 kPa).

3.8.2 Procedure
Install the device in the open position in its normal operating position in a test system as shown in Figure 3. The hose connected to the outlet of the device shall be ½ NH, 25.0 feet (7.6 meters) in length and having a nozzle on its discharge end. Pressurize the system to 125.0 psi (861.8 kPa) or the manufacturer’s maximum rated working pressure, whichever is greater. The nozzle shall be opened to purge the line of air and then shall be closed slowly. The supply valve shall be closed and then a quick-acting valve shall be opened to drop the pressure in the inlet of the device to 0.0 psi (0.0 kPa).

![Figure 3](image)

3.8.3 Criteria
Failure of the device to discharge the hose to 0.0 psi (0.0 kPa) shall result in the rejection of the device.

3.9 Backflow Prevention for Type C Devices

3.9.1 Purpose
The purpose of this test is to determine if any contaminated water is transmitted back into the potable water system when the device is subjected to backpressure.

3.9.2 Procedure
Install the device in the open position in its normal operating position in a test system as shown in Figure 3. The hose connected to the outlet of the device shall be ½ NH, 25.0 feet (7.6 meters) in length and having a nozzle on its discharge end. Pressurize the system to 125.0 psi (861.8 kPa) or the manufacturer’s maximum rated working pressure, whichever is greater. The nozzle shall be opened to purge the line of air and then shall be closed slowly. The supply valve shall be closed and then a quick-acting valve shall be opened to drop the inlet pressure of the device to 0.0 psi (0.0 kPa). Disconnect the inlet piping and hold for twelve (12) hours observing for leakage at the device inlet.

3.9.3 Criteria
Any leakage through the check valve into the inlet of the device shall result in a rejection of the device.
3.10 Leakage from Vent Ports

3.10.1 Purpose
The purpose of this test is to determine if there is leakage from the atmospheric vents.

3.10.2 Procedure
Install the device in a test system that is equipped with a means for measuring the inlet pressure to the device in a closed position. The test system shall provide 10.0 ± 1.0 psi (68.9 ± 6.9 kPa) to the device with the device in the closed position. The outlet of the device shall be unrestricted. Open the device to full flow, maintaining 10.0 ± 1.0 psi (68.9 ± 6.9 kPa) flowing pressure to the inlet device.

3.10.3 Criteria
Any leakage at the vent ports at full flow shall result in a rejection of the device.

3.11 Cross Flow Test (Mixing Hydrant Only)

3.11.1 Purpose
The purpose of this test is to determine if cross flow leakage occurs when the outlet(s) is blocked.

3.11.2 Procedure
Install the device in the open position in its normal operating position with the mixed water outlet port blocked closed.

(a) Pressurize the cold water port(s) to 5.0 ± 1.0 psi (34.5 ± 6.9 kPa) water. Maintain for one (1) minute. Examine for leakage at the hot port(s).
(b) Pressurize the hot water port(s) to 5.0 ± 1.0 psi (34.5 ± 6.9 kPa) water. Maintain for one (1) minute. Examine for leakage at the cold port(s).

3.11.3 Criteria
Any appearance of leakage in excess of 0.01 GPM (37.8 mL/min) shall result in a rejection of the device.

3.12 Backsiphonage

3.12.1 Purpose
The purpose of this test is to determine the adequacy of the air inlets to prevent contaminated water from siphoning back into the potable water system.

3.12.2 Procedure
Install the device in the open position in its normal operating position, as in Figure 4. A vacuum gauge shall be installed not more than 12.0 inches (304.8 mm) from the inlet of the device on test, between the quick acting valve (one (1) second or less actuation time) and the device on test. Vacuum shall be measured using a gauge. Use of a mercury manometer shall not be allowed. The water rise sight glass shall have a 0.5 inch (12.7 mm) inside diameter. All check valves and checking members in the normal water flow path of the device shall be fouled with a 0.032 inch (0.81 mm) diameter fouling wire (see Figures 5, 6, 7, 8, 9). Checking members associated with the air inlet flow paths shall not be fouled. The equipment shall be capable of developing a vacuum of at least 25.0 inches Hg (84.7 kPa) mercury column. Tests shall be conducted in sequence as follows:

(a) Apply slowly and hold a vacuum of 25.0 inches Hg (84.7 kPa) mercury column for five (5) minutes, then slowly reduce the vacuum from 25.0 to 0.0 inches Hg (84.7 to 0.0 kPa).
(b) By means of a quick-acting valve, create a surge effect by quickly operating the valve from fully closed to fully opened. During this test the vacuum shall range between 0.0 to 25.0 inches Hg (0.0 to 84.7 kPa) mercury column.

**Figure 4**

Note: It is permissible for a shaped fouling wire to be supplied by the manufacturer. (see requirements in Section 2.1)

### 3.12.3 Criteria
A rise of water in the sight glass, including a bowing of the meniscus, exceeding a rise of 3.0 inches (76.2 mm) above the water in the reservoir shall result in a rejection of the device.
4.0 Detailed Requirements

4.1 Materials

4.1.1 Solder and Flux
Solder and fluxes containing lead in excess of 0.2% shall not be used in contact with potable water.

4.1.2 Seating
Metal to metal seating of check valves and relief means venting to atmosphere of the backflow protection components are prohibited. The seat, the valve disc or both shall be of non-metallic materials which shall provide pressure tight seating and reseating.

4.2 Markings

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

(a) Manufacturer's name or trademark;
(b) Model designation; and
(c) “Type A,” “Type B” or “Type C.”

4.2.2 The marking shall be either cast, etched, stamped or engraved on the body of the device or on a brass or stainless steel plate securely attached to the device by a corrosion resistant means.

4.3 Installation Instructions

4.3.1 Complete installation instructions shall be packaged with the device. These instructions shall provide the information necessary to enable correct installation. A warning shall be included stating “this ASSE 1019 device shall not be subjected to more than twelve (12) hours of continuous water pressure.”

4.3.2 Complete detailed instructions shall be furnished with the repair parts.
Section V

5.0 Definitions

Definitions in the standard shall take precedence over any other publication. Definitions not shown are found in the Plumbing Dictionary (Sixth Edition) published by ASSE.

Check (Checking) Member
A component in the normal water flow path from the inlet of the device to the hose connection outlet, that is capable of moving from the position it would take during a static or normal flow condition in the device, to a position that restricts the normal water flow path from the water inlet of the device to the hose connection water outlet during the backsiphonage test of Section 3.12.