

IAPMO IGC 241-2019

Water Flow Shut-Off Devices



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Published by

International Association of Plumbing and Mechanical Officials (IAPMO)

4755 East Philadelphia Street, Ontario, California, 91761, USA

1-800-854-2766 • 1-909-472-4100

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Printed in the United States of America

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Preface

This is the seventh edition of IAPMO IGC 241, Water Flow Shut-Off Devices. This Standard supersedes IAPMO IGC 241-2011a, Water Flow Shut-Off Devices. The previous editions of this standard are: April 2007, May 2008, October 2008, April 2009, January 2011, and June 2011

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 November 18, 2019.

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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;*
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- (12) Proposals for amendments to this Standard will be processed in accordance with the standards-writing procedures of IAPMO industry standards development, Policy S-001, Standards Development Process.*

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IAPMO IGC 241-2019

Water Flow Shut-Off Devices

1 Scope

1.1 General

1.1.1 This Standard covers mechanical water flow shut off devices that are designed to shut off the cold water supply to water heater or the water supply to water closets, shower head, sink or bathtub upon actuation and specifies requirements for materials, physical characteristics, performance testing, and markings.

1.1.2 This standard applies to mechanical automatic water supply shutoff devices and component(s) (see Part IV, Definitions), hereinafter referred to as systems and component(s) constructed entirely of new, unused parts and materials, which is intended for use with water heaters, bathtubs, shower heads, lavatories, sinks, or water closets.

1.1.3 This standard does not cover shut off device installed on water heaters that shall be connected to the thermocouple or gas line within the system.

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 Standards

This Standard refers to the following publications, and where such reference is made, it shall be the current edition of those publications, including all amendments published thereto.

ASME International (The American Society of Mechanical Engineers)

ASME B1.1

Unified Inch Screw Threads, (UN and UNR Thread Form)

ASME B1.13M

Metric Screw Threads:M Profile

ASME B1.20.1

Pipe Threads, General Purpose (Inch)

ASME A112.18.1/CSA B125.1

Plumbing supply fittings

ASME A112.18.6/CSA B125.6

Flexible water connectors

ASSE International

ASSE 1061

Performance Requirements for Push-Fit Fittings

ASTM International

ASTM F877

Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems

IAPMO International

IAPMO/ANSI Z 1157

Ball Valves

3 Definitions

The following definitions shall apply in this Standard:

Mechanical Automatic Water Shut-Off System – Mechanically actuated, as opposed to electrically actuated, mechanisms that act to shut off the water to a water heater or the mechanically actuated mechanism that shuts off the water to a water closet or bathtubs.

Components – Accessories required for connecting the system to either the water heater shutoff ball valve controlling the cold water supply to the heater, closing the valve, actuating the closure mechanism, or accessories included in the shut-off system for connecting that system to the water supply for water closets or bathtubs.

Manually Activated Water Shut-Off System – Electrically actuated mechanisms that acts to shut off the water to a shower head or lavatory/sink faucet when manually activated by end user.

4 General Requirements

4.1 General

Compliance of a valve and component(s) with this standard does not imply that such a valve or component(s) is acceptable for use without supplemental tests with the valve and component(s) applied to the particular appliance design.

4.2 Springs

Springs shall have a minimum operating temperature of 93°C (200°F) or greater and an average design stress of 655 MPa (95,000 psi) or greater. Torque shall be per manufacturer's recommendation.

4.3 Switches

When applicable, each switch shall be capable of operation throughout an ambient temperature of 0°C to 52°C (32°F to 125°F). A higher than 52°C (125°F), lower than 0°C (32°F), or both higher and lower temperature may be specified by the manufacturer.

4.4 Shut-off Devices

Water shut-off valves for the water closet, shower head, lavatory or sink system(s) shall shut off the water when actuated and shall comply with all the applicable requirements in ASME A112.18.1/CSA B125.1. When provided, the ball valve shall comply with IAPMO/ANSI Z 1157 or the applicable MSS standard.

4.5 Electrical Components

All electrical components including the solenoid valve, pressure switch and transformer shall be listed to applicable UL standards.

4.6 Ambient Temperature Range

Each device and component(s) shall be capable of operation throughout an ambient temperature range of 0°C to 52°C (32°F to 125°F). A higher than 52°C (125°F), lower than 0°C (32°F), or both higher and lower temperature may be specified by the manufacturer.

4.7 Materials

The valve body, device body and its operating parts shall be made of compatible corrosion resistant materials. The brass shall contain at least 60% copper. Plastic material shall comply with the applicable ASTM standard.

4.8 Threaded Fasteners

Bolts, nuts, screws and other threaded parts used in covers, housings, casings and external mounting brackets shall have threads conforming to ASME B1.1 or ASME B1.13M. Pipe threads shall conform to ASME B1.20.1.

4.9 Flexible Connectors

Flexible connectors shall comply with ASME A112.18.6/CSA B125.6.

4.10 Push-Fit Fittings

4.10.1 Push-fit fittings shall comply with the applicable requirements of ASSE 1061.

4.10.2 When push-fit fittings are molded as part of the end connections to the shut off device, the end connections shall show compliance with the applicable requirements in ASSE 1061 except Sections 3.1, Hydrostatic Sustained Pressure Test for Fittings with an Elevated Temperature or Pressure Rating and 3.3, Hydrostatic Rupture Test for Fittings with an Elevated Temperature or Pressure Rating, these two tests will be replaced by Sections 5.11 and 5.12.

4.11 PEX

PEX tubing and connections shall comply with applicable ASTM standard requirements.

4.12 Hydrostatic Pressure

Devices that connect to the inlet and outlet lines to a water heater shall be able to withstand a hydrostatic pressure of 1.5 times the manufacturer's stated working pressure without developing any leakage of water and without producing permanent deformation to the device.

5 Testing Requirements

5.1 Test Setup

5.1.1 The system and the component(s), shall be tested with the water heater, lavatory/sink faucet, shower head or fixture or equivalent supplied by the manufacturer, unless otherwise specified herein.

5.1.2 The tests specified in Section 6.2 shall be conducted on two samples of the device. These same two test samples shall also be used for conduct of Section 6.3.

5.1.3 All component(s) used during the tests specified in this standard shall be those supplied by the manufacturer.

5.1.4 Unless otherwise specified herein, performance tests shall be conducted at a room temperature of $77 \pm 10^{\circ}\text{F}$ ($25 \pm 5.5^{\circ}\text{C}$). for tests conducted at other than room temperature, the test temperature shall be within $\pm 3^{\circ}\text{F}$ ($\pm 1.5^{\circ}\text{C}$) of the specified value.

5.2 Water Heater Shut-off Test

5.2.1 Test Specimen

Use two test specimens and use the same specimens for the following test in Section 5.3.

5.2.2 Test Procedure

The water heater shut-off test shall be conducted as follows:

- (a) Install the system in a typical water heater application as specified by the manufacturer;
- (b) Make sure the wick of the water solvent capsule touches the bottom of the drain pan;
- (c) Introduce water from a normal cold water supply to the drain pan to a level of at least 6.35 mm (0.25 in) and record the time elapsed from the moment water was first introduced into the drain pan until the valve actuates; and
- (d) Repeat the test on two additional samples and record the actuation time. Repeat the tests using supply water at 60°C (140°F)

5.2.3 Performance Requirements

The system shall shut off the water supply within 15 min of the introduction of 6.35 mm (0.25 in) of water.

5.2.4 Alternate Test Procedure

When the system is based on pressure loss in the tank, the following test method may be used:

- (a) Install the system in a water heater as specified by the manufacturer;
- (b) Create a leak by draining water from the water heater drain valve or the T&P valve until the pressure in tank drops to 0 psi;
- (c) Open the outlet valve to the hot water line to prove that cold water flow to the tank has stopped;
- (d) A small trickle of water will be observed at the hot water line indicating that their hot water from the tank has been turned off; and
- (e) Record the amount of water captured from the leak and pressure change in the supply line until the valve actuates. Repeat the test on two additional samples and record the actuation time.

5.2.5 Performance Requirements

The system shall shut off the water supply at a maximum of 8 oz water or at a range 103.4 – 206.8 kPa (15-30 psi) change in pressure.

5.3 Air Aging Test for Water Heater Shut-off Device

5.3.1 Test Specimen

Use the same two test specimens after completing the test in Section 5.2.

5.3.2 Test Procedure

The air aging test for water heater shut-off devices shall be conducted as follows:

- (a) Expose the system to a minimum temperature of 0°C (32°F) for 24 h and immediately following to a maximum temperature of 52°C (125°F) for an additional 24 h; and
- (b) Subject the system to the shut off test in Section 5.2, from a normal cold water supply.

5.3.3 Performance Requirements

The system shall shut off the water supply within 15 min of the introduction of 6.35 mm (0.25 in) of water, as determined in Section 5.2.