

IAPMO/ANSI/CAN Z1059-2024



Standard For
**Plastic Wastewater Diverter/Bypass
Valves and Diversion Systems**



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American National Standard

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IAPMO/ANSI/CAN Z1059-2024, Plastic Wastewater Diverter/Bypass Valves and Diversion Systems

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Preface

This is the first edition of IAPMO Z1059, Plastic Wastewater Diverter/Bypass Valves and Diversion Systems. This Standard supersedes IAPMO PS 59, Wastewater Diverter Valves and Diversion Systems.

This Standard is considered suitable for use for conformity assessment within the stated scope of the Standard.

This Standard was developed by the IAPMO Z1059 Technical Subcommittee Standard Committee and approved by the IAPMO Plumbing Standard Committee in accordance with the *ANSI Essential Requirements: Due process requirements for American National Standards, IAPMO Policies and Procedures for Consensus Development of American National Standards, SCC Requirements and Guidance - Accreditation of Standards Development Organizations, and IAPMO Policies and Procedures for Development of National Standards of Canada*. This Standard was approved as an American National Standard on October 17, 2024, and as a National Standard of Canada on November 8, 2024.

Notes:

- (1) *The use of the singular does not exclude the plural (and vice versa) when the sense allows.*
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- (4) *Although the intended primary application of this Standard is stated in its scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*
- (5) *The significant portion of the subject matter in this standard can be grouped in the International Classification for Standards (ICS 23.060.01, Valves in general; 93.025 External water conveyance systems)*
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 - (b) *relevant section, table, or figure number, as applicable;*
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 - (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;*
 - (c) *an explanation of circumstances surrounding the actual field conditions; and*
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IAPMO/ANSI/CAN Z1059-2024

Plastic Wastewater Diverter/Bypass Valves and Diversion Systems

1 Scope

1.1 General

- 1.1.1** This standard covers wastewater diverter/bypass valves and diversion systems ranging from size 50 DN (NPS-2) to 300 DN (NPS-12) and specifies requirements for materials, physical characteristics, performance testing, and markings.
- 1.1.2** Wastewater diverter/bypass valves covered by this Standard can be used in alternate non-potable water source systems (applicable only to downstream of the trap and upstream of sanitary waste or storm water systems) for control, capture, and treatment for onsite reuse or release in residential, commercial, and industrial, indoor, and outdoor applications.
- 1.1.3** This standard covers valves specifically designed to divert and control non-potable water and to address the special need for alternative valves ranging from 50 DN (NPS-2) to 300 DN (NPS-12) for use of rainwater, stormwater, greywater with alternate water source systems, which cannot be practically met by existing valve designs compliant with ASME A112.18.2/CSA B125.2. The valves covered by this standard are either specially designed to fit the application and for use in alternate water source systems or are existing designs conforming to this Standard to fit the application such as gate, globe, angle, and butterfly valves. The latter options are traditionally accepted for use in pressurized systems and municipal stormwater management and do not meet the existing requirements applied to fittings and valves used in sanitary drainage applications. In particular, that waterways should be smooth and free of obstruction and should not restrict the flow or produce excessive turbulence.

1.2 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.

1.3 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 Publications

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

ASTM International

ASTM B117

Standard Practice for Operating Salt Spray (Fog) Apparatus

ASTM C1277

Standard Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings

ASTM C1541

Standard Specification for Shielded Transition Couplings Using Flexible Poly Vinyl Chloride (PVC) Gaskets to Connect Dissimilar DWV Pipe and Fittings

ASTM D1784

Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds

ASTM D2661

Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings

ASTM D2665

Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings

ASTM D2751

Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings

ASTM D3311

Standard Specification for Drain, Waste, and Vent (DWV) Plastic Fittings Patterns

ASTM D3965

Standard Classification System and Basis for Specifications for Rigid Acrylonitrile-Butadiene-Styrene (ABS) Materials for Pipe and Fittings

ASTM F438

Standard Specification for Socket-Type Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40

ASTM F439

Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80

CSA Group (Canadian Standards Association)

CSA B181.1

Acrylonitrile-butadiene-styrene (ABS) drain, waste, and vent pipe and pipe fittings

CSA B181.2

Polyvinylchloride (PVC) and chlorinated polyvinylchloride (CPVC) drain, waste, and vent pipe and pipe fittings

CSA B602

Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe

CSA C22.2 No. 14

Industrial Control Equipment

CSA C22.2 No. 68

Motor-operated appliances (household and commercial)

CSA C22.2 No. 223

Power Supplies with Extra-Low-Voltage Class 2 Outputs

IAPMO (International Association of Plumbing and Mechanical Officials)

IAPMO PS 90

Elastomeric Test Caps/Cleanout Caps, and Combination Test Caps/Shielded Couplings

ULSE (UL Standards & Engagement)

UL 969

Marking and Labeling Systems

UL 1310

Class 2 Power Units

UL 1951

Electric Plumbing Accessories

UL 4200A

Standard For Safety for Products Incorporating Button Batteries or Coin Cell Batteries

3 Definitions and Abbreviations

3.1 Definitions

The following definitions shall apply in this Standard:

Alternate Non-potable Water — Water that has been collected, treated, and intended to be used on-site and is suitable for direct beneficial use or approved disposal. Sources for on-site treated non-potable water include, but are not limited to, gray water; rainwater, stormwater, reclaimed (recycled) water, cooling tower blow-down water, swimming pool backwash, AC condensate, steam system condensate fluid cooler discharge, foods steamer discharge, ice machine discharge, industrial process water, fire pump test water, theme park recreation water discharge, wash down water, and foundation drainage.

3.2 Abbreviations

The following abbreviations shall apply in this Standard:

ABS — acrylonitrile-butadiene-styrene

CPVC — chlorinated polyvinylchloride

DN — diameter nominal

NSP — nominal pipe size

PVC — polyvinylchloride

4 General Requirements

4.1 General

4.1.1 The cross-sectional area of the sanitary outlet shall be equal to or larger than the cross-sectional area of the inlet.

4.1.2 Diverter/Bypass valves shall allow selection of an outlet by hand or by using a tool or a remote control.

4.1.2.1 Diverter/Bypass valves shall have a means to indicate which outlet is selected. When operated by a remote control, the control shall also have a means to indicate which outlet is selected.

4.1.2.2 Diverter/Bypass valves operated by a motor, solenoid, or any other power-actuated mechanism only shall automatically revert to directing the flow through the sanitary drainage outlet in case of a power failure. Diverter/Bypass valves or systems that can be manually operated shall be exempt from this requirement.

4.1.3 Diverter/Bypass valves shall have a minimum excess flow rate of 216 L/min (56 gpm) when tested in accordance with *Section 5.8, Minimum flow rate* of ASME A112.18.2/CSA B125.2.

4.2 Materials

4.2.1 Diverter/Bypass valve bodies shall be made of

- (a) ABS compounds that comply with or exceed the properties of cell classification 32222 specified in ASTM D3965;
- (b) CPVC compounds that comply with or exceed the properties of cell classification 23447 or 23448 specified in ASTM D1784; or,
- (c) PVC compounds that comply with or exceed the properties of cell classification 12454 or 14333 specified in ASTM D1784.

4.3 Inlets and Outlets

4.3.1 Diverter/Bypass valves shall have one inlet and at least two outlets.

4.3.2 Diverter/Bypass valve inlets and outlets shall comply with the dimensional requirements of ASTM D2661, ASTM D2665, ASTM D2751, ASTM D3311, ASTM F438, ASTM F439, CSA B181.1, or CSA B181.2, as applicable.

4.4 Electrical Requirements

4.4.1 Electrical Components

- Diverter/Bypass valves with electrical features shall comply with the applicable CSA or UL standards (e.g., CSA C22.2 No. 14, CSA C22.2 No. 68, or UL 1951) except when powered by a
- (a) direct plug-in Class 2 power supply that complies with the applicable CSA or UL standards (e.g., CSA C22.2 No. 223 or UL 1310);
 - (b) low-voltage circuit (i.e., a circuit involving a peak open-circuit potential of not more than 42.2 V supplied by a battery or by a Class 2 power supply); or
 - (c) battery.

4.4.2 Button or Coin Cell Lithium Batteries

Diverter/Bypass valves incorporating button or coin cell lithium batteries shall comply with the applicable requirements of UL 4200A.

4.5 Other Components

4.5.1 Factory-supplied pipe and fittings shall comply with ASTM D2661, ASTM D2665, CSA B181.1, or CSA B181.2.

4.5.2 Factory-supplied elastomeric couplings shall comply with IAPMO PS 90, ASTM C1277, ASTM C1541, or CSA B602.

4.6 Connections

Diverter/Bypass valves shall comply with the requirements of applicable national Standards for each type of connection and shall be provided with a means to connect to a type of trap or waste system in common use.

4.7 Threaded Connections

Diverter/Bypass valves incorporating threaded unions shall comply with the requirements of *Section 5.9.1, Thread torque strength* of ASME A112.18.2/CSA B125.2.

4.8 Hydrostatic Pressure

Diverter/Bypass valves shall comply with the requirements of *Section 5.9.2, Hydrostatic pressure* of ASME A112.18.2/CSA B125.2.

4.9 Thermal Cycling

Diverter/Bypass valves shall comply with the requirements of *Section 5.3, Thermal Cycling* of ASME A112.18.2/CSA B125.2.

5 Testing Requirements

5.1 Preconditioning

Before testing, specimens shall be conditioned at ambient laboratory conditions for a minimum of 12 hours.

5.2 Life Cycle Test

5.2.1 Test Procedure

The life cycle test shall be conducted as follows:

- (a) Install the test specimen in accordance with the manufacturer's installation instructions.
- (b) Subject moving parts to 10,000 cycles of operation.

5.2.2 Performance Requirements

The test specimen shall not leak, crack, or be permanently deformed and shall continue to operate as intended.

5.3 Diversion Test

5.3.1 Test Procedure

The diversion test shall be conducted as follows:

- (a) Add a standpipe to the inlet of the diverter providing an inlet pressure of 29.85 kPa (4.33 psi)
- (b) Flow water through the test specimen at 7.6 L/min (2.0 gpm).
- (c) Direct the flow of water to the sanitary outlet. The test specimen shall direct the flow of water to the sanitary drainage outlet.
- (d) Maintain flow for 5 seconds.
- (e) Direct the flow of water to the diversion outlet.

5.3.2 Performance Requirements

The test specimen shall operate as intended and there shall be no leakage or permanent deformation.

5.4 Corrosion Resistance Test for Metallic Parts

The specimen selected for the corrosion test shall be tested as received from the manufacturer and shall not have been subjected to any other test.

5.4.1 Test Procedure

The corrosion test for metallic parts shall be conducted in accordance with ASTM B117 and the following procedure:

- (a) Wipe the plated surfaces of the test specimens with a soft cloth and a solvent (e.g., clear naphtha, or clear paint thinner). No abrasive shall be used.
- (b) Hang the test specimens in the test cabinet in a position as similar as possible to the position it would be in when installed. If multiple specimens are being tested, no specimen shall be suspend above another specimen.
- (c) Leave the test specimens in the test cabinet for 96 h.
- (d) Immediately after the conclusion of the 96 hours test period, rinse the test specimens under running deionized water at 38 °C (100°F) or less and dry them. Care shall be taken not to rub the specimens during washing, drying, or before being examined.
Leave the specimen for a minimum of 24 hours at ambient laboratory conditions before inspection or attempts to disassemble.

5.4.2 Performance Requirements

Functional metallic parts shall not exhibit corrosion that would adversely affect the functioning of the fitting or the disassembly and reassembly of the components.

Disassembly and reassembly of the functional metallic parts shall be accomplished without damage to the components or the fitting on completion of the test procedure. The specimen shall be capable of being:

- (a) disassembled with standard tools to enable access to all serviceable parts without damage to the specimen; and
- (b) reassembled with standard tools without damage to the specimen.

6 Markings and Accompanying Literature

6.1 Markings

6.1.1 Diverter/Bypass valves and diversion systems complying with this Standard shall be marked with the:

- (a) manufacturer's recognized name or trademark;
- (b) nominal sizes;
- (c) model number;
- (d) material designation (e.g., ABS, CPVC or PVC);
- (e) inlet, outlet to the sanitary drainage system, and diversion outlet; and
- (f) direction of flow.

6.1.2 In addition to the markings specified in Section 6.1.1, diverter valves for 150 to 300 DN (NPS-6 to NPS-12) alternate water source systems shall be marked or labeled with (e.g. "Alternate water source systems only" or "Upstream of sanitary waste systems only").

6.1.3 Labels shall be in the form of a permanently attached plate or adhesive label in accordance with UL 969.

6.2 Visibility

Markings shall be permanent, legible, and visible after installation.

6.3 Installation Instructions

Diverter/Bypass valves shall be accompanied by instructions for their installation, operation, care, and maintenance. The installation instructions shall specify;

- (a) Use of a filter, screen or settling tank installed upstream of the diverter valve.
- (b) Access for Maintenance, valves shall have a means of access for repair and maintenance.

The size of the access opening(s) shall be adequate for performing repair and maintenance.

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