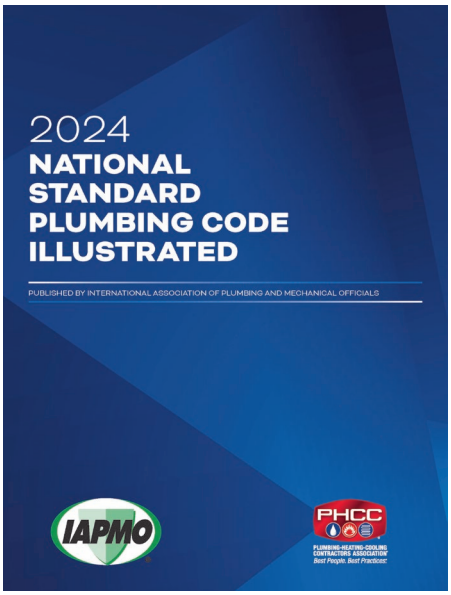
2027 PROPOSED CHANGES

to the

2024 NATIONAL STANDARD PLUMBING CODE



NSPC Public Hearing

August 14, 2025 — 9 a.m.-5 p.m., Palladium B

Caesars Atlantic City Hotel & Casino
2100 Pacific Ave, Atlantic City, NJ 08401

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nspc@iapmo.org, www.iapmo.org/nspc

National Standard Plumbing Code

June 13, 2025

The National Standard Plumbing Code Committee will conduct a Public Hearing on Proposed Changes to the Code. This Hearing will be held August 14, 2025, at the Caesars Casino and Resort in Atlantic City, New Jersey.

The public is invited to attend, and comment will be allowed on the Proposed Changes. Adopted changes will be published in the *2027 National Standard Plumbing Code*.

There will be a 9:00 a.m. start of the Public Hearing in Palladium B. A lunch break will be called at approximately noon and the meeting will reconvene at 1:00 p.m. or as directed by the Chairman.

Hotel accommodations are available through Caesars Atlantic City Hotel & Casino. Attendees can make reservations by calling (888) 516-2215 and referencing Group Code: SC08NP5 (NSPC 2025). The deadline to receive the *NSPC* negotiated room rate is July 22 and is subject to availability.

The Proposed Changes are available to download from the IAPMO website at www.iapmo.org/nspc. No hard copies of the proposed changes will be available at the public hearing; interested parties are encouraged to download the file.

For more information, please contact the IAPMO NSPC staff at nspc@iapmo.org.

Matrix of Changes
2027 National Standard Plumbing Code

August 14, 2025

Matrix: 2027 NSPC Proposed Changes

Item #	Section Number	Person Submitting Change	Committee Action
27-01	1.2 Definitions Standard	Dan O'Gorman	
27-02	1.2 Definitions Vacuum Drainage System	Abraham Murra	
27-03	2.3.1.a.4 Uses for Drainage Fittings	Norm Dobo	
27-04	2.3.1 Uses for Drainage Fittings	NSPC Commmittee	
27-05	2.3.2 Double Pattern Fittings	Saeed Warden	
27-06	2.25.6 Vacuum Condensate Drainage Systems	Abraham Murra	
27-07	3.1.3 Part Ill Table ASTM F3536	Jeff Matson	
27-08	3.1.3 Part X Table Shower Pan Membrane	Chris DeMarco	
27-09	3.1.3 Part XI Table ASTM F3328	Michael Cudahy	
27-10	3.4 Table ASTM F3226 F3536 IAPMO Z1117	Jeff Matson	
27-11	3.13 New Vacuum Drainage Piping	Abraham Murra	
27-12	4.2.6 Press-Connect Fittings	Jeff Matson	
27-13	4.2.14.3 Solvent Cement Joints in CPVC Piping Green	Michael Cudahy	
27-14	4.2.14.8 Threaded Joints in Plastic Piping	Enrique Gonzalez	
27-15	4.3.7 Copper Tube to Threaded Pipe Joints	Jeff Matson	
27-16	6.2.9.b Chemicals - Where Prohibited	Eric Muni	

Item #	Section Number	Person Submitting Change	Committee Action
27-17	7.10.6 Shower Membranes Final	Chris DeMarco	
27-18	7.21.1 Table Notes Delete No. 14	NSPC Commmittee	
27-19	7.21.1 Table Notes Add No. 22	Norm Dobo	
27-20	7.21.2 Occupant load, Table 7.21.1	Enrique Gonzalez	
27-21	7.21.2.f Occupant load	Enrique Gonzalez	
27-22	7.21.4 Separate Facilities	Enrique Gonzalez	
27-23	7.21.6.e Fixture Requirements Special Occupancies	Saeed Warden	
27-24	7.21.10 Adult Changing Station	Enrique Gonzalez	
27-25	7.22.1 Water Treatment Systems	Kristopher Heine	
27-26	7.24 Eyewash and Shower Equipment	Saeed Warden	
27-27	8.2 Vertical Piping Lead	Michael Cudahy	
27-28	8.3 Horizontal Piping Lead	Michael Cudahy	
27-29	9.4.1.a Treatment of Corrosive Wastes	Norm Dobo	
27-30	10.5.6 Backflow Prevention Assemblies	Saeed Warden	
27-31	10.6.2 Water Service Near Sources of Pollution	Donald Jones	
27-32	10.12.2 Building Valve	Kristopher Heine	
27-33	10.14.2.A Table WSFUs and Minimum FSB Pipe Sizes	Lance MacNevin	
27-34	10.14.3 Sizing Water Distribution Piping	Dan O'Gorman	
27-35	10.14.7 Water Hammer	Enrique Gonzalez	
27-36	10.15.1 Hot Water Supply System	Norm Dobo	
27-37	10.15.6.e Mixed Water Temperature Control	Norm Dobo	

Item #	Section Number	Person Submitting Change	Committee Action
27-38	10.15.6.h Mixed Water Temperature Control	Norm Dobo	
27-39	10.15.9.1 Drain Pans	Brian Gumpert	
27-40	10.15.9.2.a Construction Line 5	Kristopher Heine	
27-41	10.16.6 Table Size of Drains or Waste Pipes	Donald Jones	
27-42	10.16.6.c Relief Valve Piping	Kevin Tindall	
27-43	10.16.6 d Relief Valve Piping	Steve Rodzinak	
27-44	10.16.7.a Vacuum Relieve Valves	Kristopher Heine	
27-45	10.18 Drinking Water Treatment Units	Enrique Gonzalez	
27-46	10.20.4 Materials for Combined System Pumps	Jeff Matson	
27-47	11.7.3. Sewage Pumps and Ejectors	Vinny Tinervia	
27-48	11.13(E.5) Vacuum Drainage Systems	Abraham Murra	
27-49	12.10.1.a Single Bathroom Groups	Norm Dobo	
27-50	14.14 Expansion Tanks in Health Care Facilities	Enrique Gonzalez	
27-51	15.4.2.c Finished Plumbing	Jack Bell	
27-52	18.1 Table - Referenced Standards Updates	NSPC Staff	
27-53	18.1 Table ASTM ANSI-AWWA Editorial	Donald Jones	
27-54	18.1 Table ASTM B1029 - 2024	Jeff Matson	
27-55	18.1 Table ASTM F3226	Jeff Matson	
27-56	18.1 Table ASTM F3536	Jeff Matson	
27-57	18.1 Table CSA B45 IAPMO Z170	Abraham Murra	
27-58	Appendix B.5.2 Table B.5.2	Lance MacNevin	

Item #	Section Number	Person Submitting Change	Committee Action
27-59	Appendix B.8.2 Solution	Dan O'Gorman	
27-60	Appendix E.5 Vacuum Drainage Systems	Enrique Gonzalez	
27-61	Appendix E.11 Polypropylene PWPS	Michael Cudahy	
27-62	Appendix G WEStand Excerpts	Enrique Gonzalez	
27-63	Appendix G.2.6 Dead End	Anthony Menafro	
27-64	Appendix G.3.6.4 Drinking Water Treatment Systems	Enrique Gonzalez	
27-65	Appendix P Hydrogen Fuel Gas Piping	Enrique Gonzalez	
27-66	Appendix G WEStand Excerpts	Enrique Gonzalez	
27-67	Appendix G WEStand Excerpts	Enrique Gonzalez	
27-68	Appendix G WEStand Excerpts	Enrique Gonzalez	

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 01

Proponent: Dan O'Gorman

Representing: Dan O'Gorman

Mailing Address: 10 Albany Street

City: Edison State: New Jersey Zip: 08837

Phone: 732-841-5799 E-mail danogorman@verizon.net

Date: 2-27-2025

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Change subsection to read as follows

X Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Chapter 1 Definitions

Standard: A published technical document that represents an industry consensus on how a material or assembly is to be designed, manufactured, tested or installed so that a specific level of performance is obtained.

Basis/Reason for Change:

The new definition clarifies the term referred in Chapter 3 Materials and Chapter 18 Referenced Standards.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 02

Proponent: Abraham I. Murra

Representing: Jets Vacuum AS, Norway

Mailing Address: Radinace Ln, RSM, CA, 92688, United States

Phone: +1 (657) 201-1975 E-mail: abraham.murra@outlook.com

Date: February 24, 2025

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

X Change subsection to read as follows

_____ Add new subsection to read as follows

X Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 1.2 Definition of Terms

Vacuum Drainage System: A system that (1) consists of a vacuum center and vacuum drainage collection piping, along with other equipment such as buffers/accumulators, interface kits, check valves, isolation valves, and related controls; and (2) extracts and transports waste (e.g., wastewater, condensate from refrigerators, sanitary waste, greywater, or grease) to a drainage system.
Comment: The terms “vacuum drainage system”, “vacuum system”, and “vacuum waste-collection system” can be used interchangeably.

Plumbing Fixture, Vacuum: A plumbing device, or a combination of vacuum devices, designed specifically for use in a vacuum system, that (1) is installed in a facility for personal use by the occupants, (2) requires water supply and/or drainage, (3) must be connected to a vacuum drainage system to operate, and (4) is a fixed, functional part of the facility.
Comment: Vacuum plumbing fixtures exclude gravity, pressure assisted, pump assisted, and vacuum assisted water closets.

Push-Fit Fitting: A type of mechanical joint used with copper, CPVC, ~~and~~ PEX, or PP pipe that is either permanent of removable and may be used separately or integrated into plumbing fitting devices used in domestic or commercial applications in potable water distribution or sanitary waste drainage systems.

Basis/Reason for Change:

This code change proposal adds definitions for *Vacuum Drainage Systems* and *Vacuum Plumbing Fixtures*, to complement the change proposal submitted for NSPC *Section E.5, Vacuum Drainage Systems*.

This code change proposal revises the definition of push-fit fittings to recognize that push-fit fittings have a been used for a long time with polypropylene (PP) pipe and have a proven history in vacuum drainage applications. Push-fit fittings also meet the vacuum system specific requirements for drainage piping and have a proven history withstanding negative pressures. The revised *Push-Fit Fitting* definition includes PP material, reflecting its common use and is being expanded to include sanitary waste drainage systems.

This is a joint proposal submitted together with Jets Vacuum AS, Norway.

Vote:

___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 03

Proponent: ___ Norm Dobo _____ Date: 2/26/25

Representing: ___ Myself _____

Mailing Address: __105 Allen Street _____

City: __ Hamilton _____ State: _ NJ _____ Zip: _08620_____

Phone: __606-610-3243_____ E-mail __ nola10044@aol.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

___**X**__ Change subsection to read as follows

____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 2.3.1a.4 Uses for Drainage Fittings

4. Short radius fittings shall not be used at the base of drain ~~stacks~~ **or waste piping more than one story height.**

Basis/Reason for Change:

Limit the velocity in short radius fittings.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 04

Proponent: _NSPC Committee_____ Date: _2/26/2025__

Representing: ___Self_____

Mailing Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ E-mail _____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

__X__ Change subsection to read as follows

_____ Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: __2.3.1. Uses for Drainage Fittings

2.3.1. Uses for Drainage Fittings

b. Short radius drainage fittings are those having radius or centerline dimensions that are approximately equal to or less than their nominal pipe size. ~~The radius or centerline dimensions of long radius drainage fittings are greater than their nominal pipe size.~~

c. Long radius drainage fittings are those having radius or centerline dimensions that are greater than their nominal pipe size. Long radius drainage fittings shall not be used to connect fixture trap arms to vertical drain and vent piping. Connections to fixture vents shall be above the weir of the fixture trap. EXEPTION: Double wyes with 1/8 bends or 45-degree elbows that drain two lavatories into a common drain with a common vent shall be permitted.

Basis/Reason for Change: Over burdensome, no difference between single dwelling units and other than single dwelling units with the same number of plumbing fixtures in a bathroom or toilet room.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 05

Proponent: Saeed Warden Date: 7/8/24

Representing: Princeton Building Department

Mailing Address: 400 Witherspoon St.

City: Princeton State: N.J. Zip: 08540

Phone: 609-455-2199 E-mail swarden@princetonnj.gov and wardenplumbing@gmail.com

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

___V__ Change subsection to read as follows

_____ Add new subsection to read as follows

_V____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 2.3.2 Double Pattern Fittings

2.3.2 Double Pattern Fittings.
The uses for double pattern drainage fittings shall be the same as for single pattern fittings in Table 2.3.1.
Exception: Double sanitary tees and crosses shall not be used to connect lavatories, sinks, blowout fixtures, back-outlet water closets, back-to-back pressure-assisted water closets, and fixtures or appliances having pumped discharge.

Basis/Reason for Change:
Short radius double pattern fittings can create a hardship when cleaning a common drain.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 06

Proponent: Abraham I. Murra

Date: February 24, 2025

Representing: Jets Vacuum AS, Norway

Mailing Address: Radinace Ln, RSM, CA, 92688, United States

Phone: +1 (657) 201-1975

E-mail: abraham.murra@outlook.com

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

X Change subsection to read as follows

_____ Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 2.25.6 Vacuum Condensate Drainage Systems

2.25.6 Vacuum Condensate Drainage Systems

a. Vacuum condensate drainage systems to lift condensate from refrigerated food and drink display cases shall be designed by the manufacturer specifically for supermarkets and similar applications. Systems shall comply with the requirements of this Code and of CSA B45.13/IAPMO Z1700 for protection against backflow, cross connections, and contamination of food and drink products.

b. Systems shall be installed in accordance with CSA B45.13/IAPMO Z1700 and the manufacturer's requirements for piping material, arrangement of the piping and equipment, pipe sizing, and pipe support. Drain pipe connections to display cases shall include swing check valves and isolation valves when recommended by the system manufacturer.

3.13 Vacuum Drainage Piping

Vacuum drainage piping materials, including joints and methods of support, shall be in accordance with CSA B45.13/IAPMO Z1700 or in accordance with the manufacturer's instructions and suitable for vacuum pressure.

Basis/Reason for Change:

This code change proposal adds a reference to CSA B45.13/IAPMO Z1700, a binational consensus standard that specifies requirements for equipment, materials, construction, performance, testing, and markings, to standardize vacuum condensate drainage systems.

It is important to note that both the Uniform Plumbing Code (UPC) and the International Plumbing Code (IPC) recently approved adding references to CSA B45.13/IAPMO Z1700.

This is a joint proposal submitted together with Jets Vacuum AS, Norway.

Vote:

___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 07

Proponent: ____Jeff Matson_____ Date: 11/05/2024

Representing: __Viega LLC_____

Mailing Address: __ 585 Interlocken Blvd _____

City: __Broomfield_____ State: __CO_____ Zip: __80021____

Phone: _978-456-3049_____ E-mail jeff.matson@viega.us _____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

___X_ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: ____Table 3.1.3 - Part III_____

Add a new line to Table 3.1.3 - Part III Non-Metallic Pipe and Fittings:
(I suggest numbering it as new line 34, placed after existing line 33, and renumbering subsequent lines)

34	PE and PP Mechanical Fittings for use on NPS 3 or Smaller Cold-Water Service PE or PEX Pipe and Tubing	ASTM F3536

Basis/Reason for Change:

The intent of this proposal is to add ASTM Standard F3536 for a well established mechanical fitting to Table 3.1.3 – Part III for water service fittings. These fittings have an established track record in industry, and are commonly sold under the Philmac trade name. The Standard for these fittings was developed over a number of years by members of the plastic pipe industry at ASTM, and was published in 2022 just after the last code cycle began and thus was not able to be included in the current Code edition. ASTM F3536 is relevant and including it in this Table would be an improvement to the Code.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 08

Proponent: Chris DeMarco

Date: 1-31-2025

Representing: IAPMO

Mailing Address: 42 Savage Road

City: Kendall Park State: New Jersey Zip: 08824

Phone: 909-234-5387 E-mail chris.demarco@iapmo.org

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

___x__ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: Table 3.1.3 – Part X Miscellaneous Materials

12	Shower Pan Liner / Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramics Tile and Dimension Stone Installations	ANSI A118.10-2014 (R2019)
13	Crack Isolation Membranes for Thin-Set Ceramic Tile and Dimension Stone Installation	ANSI A118.12-2014 (R2019)

Basis/Reason for Change: NSPC currently lacks guidance for installation of certain varieties of Shower Pan Membranes, commonly used in the industry to prevent moisture intrusion, whereas these products are currently addressed in other National Model Codes.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 09

Proponent: ____Michael Cudahy_____ Date: Jan 14th, 2025_

Representing: ____Plastic Pipe and Fittings Association (PPFA)_____

Mailing Address: ___800 Roosevelt Rd, Bldg C Ste 312_____

City: ___Glen Ellyn_____ State: __IL_____ Zip: _60137_____

Phone: __630 363 7933_____ E-mail ___mikec@cmservices.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

____ Amend section with this editorial change

__X__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: _____TABLE 3.1.3_- Part XI_____

Table 3.1.3 – Part XI INSTALLATION PROCEDURES AND PRACTICES

7	Standard Practice for the One-Step (Solvent Cement Only) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets	ASTM F3328

(Renumber subsequent items, remainder of table unchanged)

4.2.14.2 Solvent Cement Joints in PVC Piping
Primers and solvent cements shall be suitable for joints in PVC piping. Primers shall comply with ASTM F656. Solvent cements shall comply with ASTM D2564. Primers shall be purple in color and solvent cements shall not be purple in color. One-step joining method shall be in accordance with ASTM F3328 and the manufacturer's instructions.

4.2.14.3 Solvent Cement Joints in CPVC Piping
Primers (where used) and solvent cements shall be suitable for joints in CPVC piping. CPVC piping includes copper tube size (CTS) piping and iron pipe size (IPS) piping. Primers shall comply with ASTM F656. Solvent cements shall comply with ASTM F493. Primers shall be purple in color and solvent cements for use with primers shall be orange in color. One-step solvent cement for use without a primer on copper tube size (CTS) piping up to 2-inch size shall be yellow in color. One-step joining method shall be in accordance with ASTM F3328 and the manufacturer's instructions.

Also: add standard to Table 18.1 REFERENCED STANDARDS

ASTM F3328	Standard Practice for the One-Step (Solvent Cement Only) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets	Table 3.1.3 – XI

Basis/Reason for Change:

ASTM F3328 applies to one-step PVC and CPVC solvent welding practices. Single step solvent cementing products exist, so strict code guidance should be given where the practice occurs.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 10

Proponent: ____Jeff Matson_____ Date: 11/05/2024

Representing: __Viega LLC_____

Mailing Address: __ 585 Interlocken Blvd _____

City: __Broomfield_____ State: __CO_____ Zip: __80021____

Phone: _978-456-3049_____ E-mail jeff.matson@viega.us _____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

___X_ Change subsection to read as follows

_____ Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: ____Table 3.4 Materials for Potable Water Piping_____

13	Galvanized Steel Pipe and Fittings	X	A	A	ASTM A53	ASME B16.3 (malleable, threaded), ASME B16.4 (gray iron, threaded), ASME B16.5 (cast, forged, flanged), Split couplings per Section 4.2.17, ASTM F3226 (press-connect), IAPMO Z1117 (press-connect)
17	PE Plastic Water Service Pipe & Tubing	A	X	X	AWWA C901	ASTM D3261 (butt heat fusion), ASTM F1055 (electrofusion), ASTM F3536 (plastic mechanical)
22	PEX Crosslinked Water Service Pipe	A	X	X	AWWA C904	ASTM F1807 (crimped metal insert) ASTM F1960 (metal cold expansion insert) ASTM F2080 (metal cold expansion compression) ASTM F2098 (SS clamps for ASTM F1807 fittings) ASTM F3347 (metal press insert) ASTM F3348 (plastic press insert) ASTM F3536 (plastic mechanical)

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
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Basis/Reason for Change:

The first portion of this proposal seeks to add two press-connect Standards for use on galvanized pipe to Table 3.4 for Potable Water Piping Fittings. Press-connect adapters in bronze now are available which simplify transitions from galvanized steel pipe to copper alloy fittings in water systems, for example in repair work. These provide an equally secure (or better) connection between the tubing and pipe while providing improved corrosion resistance compared to cast brass threaded adapters. A separate Proposal to add such adapters to the text of Section 4.3.7. Water Systems and Galvanized Steel Pipe has also been submitted. Documentation has been shared with the Committee showing such a fitting available from one press-connect manufacturer, but nothing prevents any manufacturer of press fittings from producing a design which also functions similarly (this is not proprietary). This change improves the Code by providing additional connection options for plumbers.

A further intent of this proposal is to add ASTM Standard F3536 for a well established mechanical fitting to Table 3.4. These fittings have an established track record in industry, and are commonly sold under the Philmac trade name. The Standard for these fittings was developed over a number of years by members of the plastic pipe industry at ASTM, and was published in 2022 just after the last code cycle began and thus was not able to be included in the current Code edition. ASTM F3536 is relevant and including it in this Table would be an improvement to the Code.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

---

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 11

Proponent: Abraham I. Murra

Date: February 24, 2025

Representing: Jets Vacuum AS, Norway

Mailing Address: Radinace Ln, RSM, CA, 92688, United States

Phone: +1 (657) 201-1975

E-mail: abraham.murra@outlook.com

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Change subsection to read as follows

X Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: New Section **3.13 Vacuum Drainage Piping**

3.13 Vacuum Drainage Piping

Vacuum drainage piping materials, including joints and methods of support, shall be in accordance with CSA B45.13/IAPMO Z1700 or in accordance with the manufacturer's instructions and suitable for vacuum pressure.

Basis/Reason for Change:

This code change proposal adds a new section providing guidance on piing materials for vacuum systems. Such piping materials are different from pressure and gravity piping systems, as they must withstand vacuum pressures and higher wastewater temperatures.

This is a joint proposal submitted together with Jets Vacuum AS, Norway.

Vote:

___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 12

Proponent: ____Jeff Matson_____ Date: 11/04/2024

Representing: __Viega LLC_____

Mailing Address: __ 585 Interlocken Blvd _____

City: __Broomfield_____ State: __CO_____ Zip: __80021____

Phone: _978-456-3049_____ E-mail jeff.matson@viega.us _____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

__X__ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: _____ 4.2.6 Press-Connect Fittings ___

Add new subsection between existing 4.2.6 b and 4.2.6 c (and re-letter following subsections):

4.2.6 c. Press-connect joints for copper tube shall be made in accordance with ASTM B1029.

Basis/Reason for Change:

ASTM B1029 "Standard Practice for Making Press-Connect Joints with Seamless Copper and Copper Alloy Tube and Press Fittings" was published in July 2024, after months of work and voting by a group of industry experts in copper fittings. This Standard Practice is a press-connect equivalent to ASTM B828 which is the Standard Practice for solder joints (referenced in NSPC 4.2.4 c. "Soldered joints shall be made in accordance with ASTM B828.") The new Standard outlines proper procedures to ensure that installers have a set of clear instructions to make secure, reliable press-connect joints and allowing trainers to use a common, proven method. ASTM B1029 was developed through the ASTM and ANSI consensus process and represents an improvement to this Code.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 13

Proponent: ____Michael Cudahy_____ Date: Jan 14th, 2025_

Representing: ____Plastic Pipe and Fittings Association (PPFA)_____

Mailing Address: ___800 Roosevelt Rd, Bldg C Ste 312_____

City: ___Glen Ellyn_____ State: __IL_____ Zip: _60137_____

Phone: __630 363 7933_____ E-mail ___mikec@cmservices.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

____ Amend section with this editorial change

__X__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: _____4.2.14.3_____

4.2.14.3 Solvent Cement Joints in CPVC Piping
Primers (where used) and solvent cements shall be suitable for joints in CPVC piping. CPVC piping includes copper tube size (CTS) piping and iron pipe size (IPS) piping. Primers shall comply with ASTM F656. Solvent cements shall comply with ASTM F493. Primers shall be purple in color and solvent cements for use with primers shall be orange in color. One-step solvent cement for use without a primer on copper tube sized (CTS) piping up to 2-inch size shall be yellow or green in color.

Basis/Reason for Change:

Manufacturers offer a green one-step CPVC cement to improve contrast and visibility against the tan-yellow CPVC piping color.

The ASTM standard ASTM F493-22, Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings – only "*recommends*" a color – orange, in a note.

"Note 1 – It is recommended that CPVC solvent cement be orange in color to facilitate identification and minimize unintentional use of other cements…."

As a result, all of the model plumbing codes, see sections: UPC (605.2.2), IPC (605.14.2), NSPC (4.2.14.3) do call out the permitted colors for the products for the applications, which include yellow and sometimes red (for fire sprinklers).

This is why the new green color needs to be added to the code body of each of the model codes to avoid confusion.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 14

Proponent: Enrique Gonzalez Date: February 28, 2025

Representing: IAPMO

Mailing Address: 4750 East Philadelphia Ave

City: Ontario State: CA Zip: 91761

Phone: 909-230-5535 E-mail: Enrique.gonzalez@iapmo.org

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

___X__ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 4.2.14.8 Threaded Joints in Plastic Piping

4.2.14.8 Threaded Joints in Plastic Piping
a. Tapered pipe threads for leak-tight joints in thermoplastic pipe and fittings shall comply with ASTM F1498.
b. Female plastic screwed fittings shall be used with male plastic fittings and plastic threads. Female plastic tapered National Pipe Thread (NPT) connections shall not be allowed to be used when threaded onto a male metallic connection.
Exception: Female plastic parallel (straight) threaded connections shall be permitted.

Basis/Reason for Change:

There has been a history of plastic female fittings being stresses to the point of leaking when a male thread with a female plastic thread is tightened. This is a concern when tapered threads are present. The exception is for straight parallel threads as the joint outward stress will not increase as the fitting is tightened.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 15

Proponent: ____Jeff Matson_____ Date: 11/05/2024

Representing: __Viega LLC_____

Mailing Address: __ 585 Interlocken Blvd _____

City: __Broomfield_____ State: __CO_____ Zip: __80021____

Phone: _978-456-3049_____ E-mail jeff.matson@viega.us _____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

___X_ Change subsection to read as follows

_____ Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: ____Section 4.3.7 _____

4.3.7 Copper Tube to Threaded Pipe Joints

a. Joints from copper tube to threaded pipe shall be made as follows:

1. DWV Systems: with copper or brass threaded adapters.
2. Water Systems and Galvanized Steel Pipe: cast brass threaded adapters, bronze press-connect adapters, dielectric pipe unions conforming to ASSE 1079, dielectric flanges or dielectric waterway fittings that comply with IAPMO PS 66.
   EXCEPTION: Dielectric pipe unions shall not be installed on connections to water heaters when not recommended by the water heater manufacturer.
3. To any Non-Ferrous Piping: copper or brass threaded adapter.

b. The adapter fitting shall be connected to the tubing by approved methods, and the threaded section assembled with tapered national pipe threads (NPT). Bronze press-connect adapters shall be connected to plain end galvanized pipe only.

Basis/Reason for Change:

Press-connect adapters in bronze are now available which simplify transitions from galvanized steel pipe to copper alloy fittings in water systems, for example in repair work. These provide an equally secure (or better) connection between the tubing and pipe while providing improved corrosion resistance

compared to cast brass threaded adapters. This change improves the Code by providing additional connection options for plumbers. Documentation has been shared with the Committee showing such a fitting available from one press-connect manufacturer, but nothing prevents any manufacturer of press fittings from producing a design which also functions similarly (this is not proprietary).

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

---

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National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 16

Proponent: __Eric Muni_____ Date: 2/28/2025

Representing: ___Self_____

Mailing Address: __172 Line Rd._____

City: _Princeton Junction_____ State: _NJ_____ Zip: _08550_____

Phone: _609 548=2713_____ E-mail emuni@plainsboronj.com _____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

__X___ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: ___6.2.9b Chemicals – Where Prohibited_____

b. Sinks or sink compartments used for sanitizing pots or other ware shall not be drained through a grease interceptor~~.~~ and shall be installed in accordance with Section 9.1.1.

Basis/Reason for Change:

Direction. 6.2.9 b states compartments used for sanitizing shall not go through grease trap. Section 9.1.1 is the only solution. This basically lets designers and other professionals know 2 indirect drains are required for every triple bowl sink.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 17

Proponent: Chris DeMarco Date: 1-31-2025

Representing: IAPMO

Mailing Address: 42 Savage Rd.

City: Kendall Park State: New Jersey Zip: 08824

Phone: 909-234-5387 E-mail: chris.demarco@iapmo.org

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

___x__ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 7.10.6 Shower Floors and Shower Pan Liners

7.10.6 Shower ~~Floors and Shower Pan~~ Receptors and Liners

7.10.6.1 Shower Floors and Receptors

a. Adequate structural support shall be provided under shower floors.

b. Finished shower floor surfaces shall be smooth and waterproof.

EXCEPTION: Grouted shower floors and other shower floors that are not waterproof, but are water-resistant, shall be permitted if the floor has a shower pan liner or a pan, base, or receptor that is waterproof with drainage.

c. Manufactured shower pans, shower bases, and shower receptors shall be installed in accordance with this Code and the manufacturer's instructions.

d. The edges of shower pans, bases, and receptors shall include flanges or other means of making a waterproof joint with the walls of the shower enclosure.

7.10.6.2 Shower Pan Liners

a. Shower pan membranes shall comply with ANSI A118.10, ANSI A118.12, ASTM D4068, or ASTM D4551.

~~e~~ b. Shower pan liners shall be provided beneath shower floors that are water-resistant (not water-proof) and also if required by the manufacturer's installation instructions for prefabricated or prefinished shower pans, bases, or receptors.

EXCEPTION: Shower pan liners shall not be required under water-resistant shower floors if they are installed on shower pans, bases, or receptors that provide for the drainage of water seepage through the floor finish.

~~f~~ c. Shower pan liners shall slope to the shower drain outlet and be sealed to the weep holes in the drain fitting. The liner shall provide a water-tight basin up to the overflow elevation of the shower floor.

~~g~~ d. Shower pan liners shall be tested for leakage. There shall be no leakage indicated on the floor surrounding the shower pan for a period of not less than 15 minutes.
See Figure 7.10.6

710.6.3 Membrane Installation

a. Membranes used for walls to prevent moisture intrusion and protect adjacent building materials shall comply with ANSI A118.10. Where complete waterproofing of walls is required, including treatment at termination points, such membranes shall be installed in accordance with the manufacturer's instructions.
b. The membrane shall indicate compatibility with the application materials, steam, high-temperature, chemical exposure, or exterior use.
c. Where glass tile is used, the membrane shall be installed in accordance with the glass tile manufacturer instructions.

Basis/Reason for Change: NSPC currently lacks guidance for the installation of certain variety of Shower Pan Membranes, commonly used in the industry to prevent moisture intrusion, whereas these products are currently addressed in other National Model Codes.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 18

Proponent: _NSPC Committee_____ Date: _2/26/2025__

Representing: ___Self_____

Mailing Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ E-mail _____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

___X__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: Table 7.21.1 Foot Note (14)

Remove Note (14)

Table 7.21.1 see (1)
MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES

Classification	Occupancy Group see ~~(14)~~	No. of Persons of Each Sex see (4), (~~16~~ 15)	Water Closets see (5) for urinals		Lavatories		Bath or Shower	Drinking Water Facilities	Other
			Male	Female	Male	Female			

Portion of the Table not shown will be updated with new note reference numbers as indicated below.

Notes for Table 7.21.1 (where indicated in the Table):
~~(14) Occupancy groups shall be as described in the local building code.~~

Renumber the remaining notes (14) through (20) and change all reference note numbers in the Table to coincide with the new note numbers.

(~~15~~ 14) See 7.21.4 and 7.21.7 for toilet facilities for occupancies with a total floor area of 1500 square feet or less.
(~~16~~ 15) In determining the number of required fixtures for numbers of persons that fall in the "each additional (xx) over (xx)" listings, the requirement applies to fractions of the listed group (7.21.10).
(~~17~~ 16) Laboratories in higher education facilities shall have safety showers if required by ANSI/ISEA Z358.1 and the facility design.
(~~18~~ 17) Warehouse storage area requirements shall be permitted to be met by providing a facility centrally located within the storage area. The maximum travel distance to the facility shall not exceed 500 feet.
(~~19~~ 18) The requirements for multiple individual self-storage areas shall be permitted to be met by fixtures located in the facility's administration building. The administration office must be accessible during normal business hours.
(~~20~~ 19) Showers may be omitted in recreational facilities without locker rooms when approved by the Authority Having Jurisdiction.
(~~21~~ 20) Service sinks may not be required on floor levels if the AHJ determines that housekeeping is not required (7.21.5.d). Service sinks shall be permitted to serve two adjacent floors (one above and one below) where there is service elevator access.

Basis/Reason for Change:

This note is being removed to prevent conflicts with the building code. When determining the minimum number of plumbing fixtures, the plumbing code describes the occupancy group.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 19

Proponent: ___ Norm Dobo _____ Date: 2/26/25

Representing: ___ Myself _____

Mailing Address: __105 Allen Street _____

City: __ Hamilton _____ State: _ NJ _____ Zip: _08620_____

Phone: __606-610-3243_____ E-mail __ nola10044@aol.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

__**X**__ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: __Notes for Table 7.21.1_____

Add: (22) If the primary use group is (A) Assembly with an occupant load of less than 50 persons or function is changed it shall be classified as (B) Business for plumbing fixture purposes only.

Basis/Reason for Change:

To comply with the requirement of the building code.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 20

Proponent: Enrique Gonzalez

Date: February 28, 2025

Representing: IAPMO

Mailing Address: 4750 East Philadelphia Ave

City: Ontario State: CA Zip: 91761

Phone: 909-230-5535 E-mail: Enrique.gonzalez@iapmo.org

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

___X__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 7.21.2 Occupant Load

7.21.2 Occupant Load

a. The minimum number of plumbing fixtures shall be based on the number of persons to be served by the fixtures, as determined by the person responsible for the design of the plumbing system.

b. Where the occupant load is not established and is based on the egress requirements of a building code, the number of occupants for plumbing purposes shall be permitted to be reduced to two-thirds of that for fire or life safety purposes.

c. Wherever both sexes are present in approximately equal numbers, the total occupant load shall be multiplied by 50 percent to determine the number of persons of each sex to be provided for, unless specific information concerning the percentage of male and female occupants is available.

d. Plans for plumbing systems, where required, shall indicate the maximum number of persons to be served by the facilities.

e. In occupancies having established seating, such as auditoriums and restaurants, the number of occupants for plumbing purposes shall not be less than the number of seats.

f. For all gender toilet facilities, the minimum number of fixtures shall be the aggregate calculated at 50 percent female and 50 percent male in accordance with Table 7.21.1. Where all gender plumbing fixtures are provided in addition to separate men's and women's facilities, those all gender plumbing fixtures shall be included in determining the number of fixtures provided in an occupancy. <u>The substitution of a water closet for each urinal shall be permitted provided the total number of required fixtures complies with Table 7.21.1.</u>

Table 7.21.1 see (1) MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES									
Classification	Occupancy Group see (14)	No. of Persons of Each Sex see (4), (16)	Water Closets see (5) for urinals		Lavatories		Bath or Shower	Drinking Water Facilities	Other
			Male	Female	Male	Female			

(Portions of the table not shown remain unchanged)

Notes for Table 7.21.1 (where indicated in the Table):
(1) – (4) (remaining text unchanged)
(5) Not more than 50% of the required number of water closets for males may be urinals (7.21.5.a). For all gender facilities, the substitution of a water closet for each urinal shall be permitted provided the total number of required fixtures complies with Table 7.21.1.
(6) – (21) (remaining text unchanged)

Basis/Reason for Change:

This proposed change will align with the amendment in CA regarding the one-to-one substitution of a urinal with a water closet. Additionally, the amendments clarify that a separate privacy compartment or separate private area for areas is only needed when/if urinals are installed, as newly proposed Exception 5 allows them to be substituted with an equal number of water closets. The text provides the user with the option to replace the urinal(s) with a water closet. The minimum number of fixtures is not changed. For example, if you have 3 water closets and 2 urinals; you would be permitted to replace the urinal(s) with a water closet and the final count would be 5 water closets (or five total fixtures). In all cases it will allow 5 people access to a facility. This exception is already permitted in California.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 21

Proponent: Enrique Gonzalez

Date: February 28, 2025

Representing: IAPMO

Mailing Address: 4750 East Philadelphia Ave

City: Ontario State: CA Zip: 91761

Phone: 909-230-5535 E-mail: Enrique.gonzalez@iapmo.org

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

___X__ Change subsection to read as follows

____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 7.21.2 Occupant Load

7.21 MINIMUM NUMBER OF REQUIRED FIXTURES

7.21.1 Number of Fixtures

Plumbing fixtures shall be provided for the type of building occupancy and in the numbers not less than those shown in Table 7.21.1.

7.21.2 Occupant Load

a. The minimum number of plumbing fixtures shall be based on the number of persons to be served by the fixtures, as determined by the person responsible for the design of the plumbing system.

b. Where the occupant load is not established and is based on the egress requirements of a building code, the number of occupants for plumbing purposes shall be permitted to be reduced to two-thirds of that for fire or life safety purposes.

c. Wherever both sexes are present in approximately equal numbers, the total occupant load shall be multiplied by 50 percent to determine the number of persons of each sex to be provided for, unless specific information concerning the percentage of male and female occupants is available.

d. Plans for plumbing systems, where required, shall indicate the maximum number of persons to be served by the facilities.

e. In occupancies having established seating, such as auditoriums and restaurants, the number of occupants for plumbing purposes shall not be less than the number of seats.

f. For all gender toilet facilities, the minimum number of fixtures shall be the aggregate calculated at 50 percent female and 50 percent male in accordance with Table 7.21.1. Where all gender plumbing fixtures are provided in addition to separate men's and women's facilities, ~~those all gender plumbing fixtures shall be included in determining the number of fixtures provided~~ the aggregate number of fixtures from the all-gender, men's, and women's facilities shall be not less than the minimum number of fixtures required in an occupancy.

Basis/Reason for Change:

This adds clarity on the intent of the number of minimum fixtures that are required by Table 7.21.1. It adds text to better address when there is mix of an all-gender, men, and women facility. It indicates that the aggregate of the minimum number of fixtures for the given occupancy load and occupancy type.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 22

Proponent: Enrique Gonzalez

Date: February 28, 2025

Representing: IAPMO

Mailing Address: 4750 East Philadelphia Ave

City: Ontario State: CA Zip: 91761

Phone: 909-230-5535 E-mail: Enrique.gonzalez@iapmo.org

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

____X_ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 7.21.4 Separate Facilities

7.21.4 Separate Facilities

a. Separate toilet facilities shall be provided for each sex.

EXCEPTIONS:

(1) Residential installations.

(2) In occupancies serving 15 or fewer people, one toilet facility, designed for use by no more than one person at a time, shall be permitted for use by both sexes.

(3) In business occupancies with a total floor area of 1500 square feet or less, one toilet facility, designed for use by no more than one person at a time, shall satisfy the requirements for serving customers and employees of both sexes.

(4) In mercantile occupancies with a net occupiable floor area of 1500 square feet or less that is accessible to customers, one toilet facility designed for use by no more than one person at a time shall satisfy the requirements for serving customers and employees of both sexes.

(5) Separate facilities shall not be required where rooms have fixtures designed for use by <u>all-gender.</u> ~~both sexes and the water closets are installed in privacy compartments. Urinals shall be located in an area that is visually separated from the remainder of the room or each urinal shall be installed in a privacy compartment.~~

(below shown for informational purposes only)

7.21.11 Water Closet Compartment
Public water closets shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy. Partitions for water closets located in separate gender toilet or bathrooms shall comply with the Type B security requirements of IAPMO/ANSI Z124.10. Partitions for water closets located in all gender toilet or bathrooms shall comply with the Type A security requirements of IAPMO/ANSI Z124.10.
EXCEPTIONS:
(1) Water closet compartments shall not be required in a single-occupant toilet room having a lockable door.
(2) Toilet rooms in day care facilities having more than one water closets shall be permitted to have one water closet without an enclosing compartment.
7.21.12 Urinal Partitions
Each urinal shall be separated with walls or partitions to provide privacy. The horizontal dimension between walls or partitions at each urinal shall comply with Section 7.3.2. Partitions for urinals shall comply with the Type C security requirements of IAPMO/ANSI Z124.10. Urinals located in all gender toilet rooms shall be visually separated from the remainder of the room or each urinal shall be installed in a privacy compartment complying with Type A security requirements of IAPMO/ANSI Z124.10.
EXCEPTION: Urinal partitions shall not be required in a single occupant or family/assisted-use toilet room with a lockable door.

Basis/Reason for Change:

The verbiage in Section 7.21.4(5) is being modified to update the terminology "both sexes" is being updated to "all-gender" to add clarity on intent and to match the term used in other sections of the code related to all-gender facilities.

Additionally, the update removes the text related to water closets and urinals as they relate to privacy compartments. The text related to privacy compartment has nothing to do with the exception to separate facilities. Also, privacy compartments are already addressed in Sections 7.21.11 (Water Closet Compartments) and in Section 7.21.12 (Urinal Partitions).

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

---

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 23

Proponent: Saeed Warden_____ Date: 7/8/24_____

Representing: Princeton Building Department_____

Mailing Address: 400 Witherspoon St._____

City: Princeton _____ State: N.J. Zip: 08540_____

Phone: 609-455-2199_____

E-mail swarden@princetonnj.gov and wardenplumbing@gmail.com _____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

__V___ Amend section with this editorial change

___V__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 7.21.6.e Fixture Requirements for Special Occupancies

e. Hand washing facilities shall be provided in each examination room in a doctor's office or medical office, dental treatment room, massage treatment room, tattoo parlor or any other facility where physical ~~skin-to-skin~~ contact is necessary for performing a service and if required by the use and occupancy regulations for a facility.

Basis/Reason for Change:
Designers are attempting to eliminate the use of hand washing sinks in facilities that normally require them. This will eliminate confusion.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 24

Proponent: Enrique Gonzalez

Date: February 28, 2025

Representing: IAPMO

Mailing Address: 4750 East Philadelphia Ave

City: Ontario State: CA Zip: 91761

Phone: 909-230-5535 E-mail: Enrique.gonzalez@iapmo.org

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

____X_ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 7.21.10 Adult Changing Station

7.21.10 Adult Changing Station

a. Adult changing stations shall comply with IAPMO/ANSI/CAN Z1390.

b. Where adult changing stations are provided for public use, they shall be located in accordance with one of the following:

1. The adult changing station shall be installed in a single-user toilet room or bathroom.
2. The adult changing station shall be installed in a family or assisted-use toilet room or bathroom.
3. The adult changing station shall be installed in a toilet room or bathroom with multiple water closet compartments.

The adult changing station shall be provided with privacy by a curtain or wall or be installed within a privacy compartment. Where separate facilities are provided for each sex, the adult changing station shall be installed in both toilet rooms or bathrooms.

4. The adult changing station shall be installed in a separate room.

Basis/Reason for Change:

Assistive tables, also known as adult changing tables, are required in many jurisdictions and are also included in the IBC Section 1110.4. The IAPMO Z1390 was developed for these products, which is added to ensure the plumbing products meet performance and safety requirements. The IAPMO/ANSI/CAN Z1390 Assistive Tables standard has published as an ANSI standard in July 2024 and as a Canadian standard through the Standards Council of Canada (SCC) in September 2024.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

---

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 25

Proponent: _Kristopher Heine Date: 2/26/25

Representing: Heine Plumbing & Water Treatment, Inc.

Mailing Address: 270 Sparta Ave., Ste 104, PMB 139

City: Sparta State: NJ Zip: 07871

Phone: 973-383-0392 E-mail: kris@heineplumbing.com

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

___X__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 7.22.1 Water Softener and Treatment Units

Where installed, ~~W~~water softeners, reverse osmosis water treatment units, and other drinking water treatment systems shall meet the requirements of the appropriate standards referenced in Section 10.18.1. Waste discharge from such equipment shall enter the drainage system through an air gap. Waste discharge piping shall be of a material approved for potable water, sanitary drainage, or storm drainage.

Basis/Reason for Change:

To state that "where installed", this is the section that must be followed.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 26

Proponent: Saeed Warden_____ Date: 7/9/24_____

Representing: Princeton Building Department_____

Mailing Address: 400 Witherspoon St._____

City: Princeton_____ State: N.J._____ Zip: 08540_____

Phone: 609-455-2199_____ E-mail: swarden@princetonnj.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

__V___ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 7.24 Plumbed Emergency Eyewash and Shower Equipment_____

m. The flushing fluid system shall deliver the temperature of tepid water to within 25' of the mixing valve to the furthest outlet.

Basis/Reason for Change:

The N.S.P.C. or ANSI/ISEAZ358.1 does not address the maximum developed length of tepid water piping to the emergency fixtures. Legionella bacteria can potentially grow in this dead leg piping and I believe it's best to keep these lengths to a minimum. The proposed max. length was referenced from code section 10.15.2.1.a in the 2024 N.S.P.C.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 27

Proponent: ____Michael Cudahy_____ Date: Jan 14th, 2025_

Representing: ____Plastic Pipe and Fittings Association (PPFA)_____

Mailing Address: ___800 Roosevelt Rd, Bldg C Ste 312_____

City: ___Glen Ellyn_____ State: __IL_____ Zip: _60137_____

Phone: __630 363 7933_____ E-mail ___mikec@cmservices.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

__x__ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: __8.2_____

8.2 VERTICAL PIPING

~~4. Lead pipe—four-foot intervals.~~

(remainder of table unchanged)

Basis/Reason for Change:

Lead pipe is not used in construction, we believe the standard was withdrawn and we don't think it is even commercially available, so we are offering the committee the proposal to delete the support for lead piping.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 28

Proponent: ____Michael Cudahy_____ Date: Jan 14th, 2025_

Representing: ____Plastic Pipe and Fittings Association (PPFA)_____

Mailing Address: ___800 Roosevelt Rd, Bldg C Ste 312_____

City: ___Glen Ellyn_____ State: __IL_____ Zip: _60137_____

Phone: __630 363 7933_____ E-mail ___mikec@cmservices.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

__x__ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: __8.3_____

8.3 HORIZONTAL PIPING

~~5. Lead pipe - on continuous metal or wood strips for its entire length.~~

(remainder of table unchanged)

Basis/Reason for Change:

Lead pipe is not used in construction, we believe the standard was withdrawn and we don't think it is even commercially available, so we are offering the committee the proposal to delete the support for lead piping.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 29

Proponent: ___ Norm Dobo _____ Date: 2/26/25

Representing: ___ Myself _____

Mailing Address: __105 Allen Street _____

City: __ Hamilton _____ State: _ NJ _____ Zip: _08620_____

Phone: __606-610-3243_____ E-mail __ nola10044@aol.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

__**X**__ Change subsection to read as follows

_____ Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: ___9.4.1a Treatment of Corrosive Wastes __

a. Corrosive liquids, spent acids, or other harmful chemicals, **including condensate as a byproduct of combustion,** ~~that may damage a drain, sewer, or sanitary drain pipe; create noxious or toxic fumes, or interfere with sewage treatment processes shall not be discharged into the plumbing system without being~~ **shall be** thoroughly neutralized or treated by passing through a properly constructed and approved neutralizing device. Such device shall be provided automatically with a sufficient supply of neutralizing medium, so as to make its contents non-injurious before discharging. ~~into the drainage system.~~ The nature of the corrosive or harmful waste and proposed method of its treatment shall be submitted to ~~and approved~~ the Authority Having Jurisdiction prior to installation.

Basis/Reason for Change:

Corrosive waste is an environmental issue and causes harm to materials, the environment and surrounding area.

___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 30

Proponent: Saeed Warden_____ Date: 7/8/24__

Representing: Princeton Building Department_____

Mailing Address: 400 Witherspoon St._____

City: Princeton_____ State: N.J._____ Zip: 08540_____

Phone: 609-455-2199_____
E-mail swarden@princetonnj.gov and wardenplumbing@gmail.com___

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

__V___ Amend section with this editorial change

___V__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 10.5.6 Testing and Maintenance of Backflow Prevention Assemblies

a. Assemblies that are designed to be field tested shall be tested prior to final inspection of the initial installation and once each year thereafter.
EXCEPTION: Testable backflow preventers not used to isolate a high hazard source of contamination that are installed on water supplies in one-and two-family dwellings.

Basis/Reason for Change:

Implement 5:23-2.23(l)4(i)

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 31

Proponent: Don Jones Date: 08/31/2024

Representing: Self

Mailing Address: 202 W. Summit St

City: Vineland State: NJ Zip: 08360

Phone: 609-517-1473 E-mail: donald_m_jones@att.net

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

X Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 10.6.2 Water Service Near Sources of <u>Contamination</u> ~~Pollution~~

Potable water service piping shall not be located in, under, or above cesspools, septic tanks, septic tank drainage fields, or drainage pits. A separation of ten feet shall be maintained from such systems. **<u>Where</u>** ~~When~~ a water line parallels or crosses over or under a sewer, a minimum clearance of 12 inches in all directions shall be maintained.

Basis/Reason for Change:
The title of the section does not correspond to its definition in the NSPC. A contaminant is a High Hazard; a pollutant is Low Hazard. Cesspools, septic tanks, and drainage fields etc. are sources of Contamination not Pollution as defined in the Code, hence there is a large separation requirement between them and water service piping. "When" should be used to reference time.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 32

Proponent: __Kristopher Heine Date: _2/26/25

Representing: Heine Plumbing & Water Treatment, Inc.

Mailing Address: 270 Sparta Ave., Ste 104, # 139

City: Sparta State: NJ Zip: 07871

Phone: 973-383-0392 E-mail: kris@heineplumbing.com

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

__X___ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: __10.12.2 Building Valve_____

a. NO CHANGE
b. Add: A building water service valve shall be installed immediately downstream from the pressure tank of any private water system.

Change b.to c. and c. to d.

Basis/Reason for Change:
To clarify the location of the building valve on a pressure tank of any private water system.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 33

Proponent: Lance MacNevin _____ Date: Feb. 28, 2025

Representing: The Plastics pipe Institute (PPI)

Mailing Address: 105 Decker Ct. Suite 825 _____

City: Irving State: TX_____ Zip: 75062

Phone: 469-499-1057 ____ E-mail lmacnevin@plasticpipe.org _____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

__X__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: Table 10.14.2A Water Supply Fixture Units (WSFU) and Minimum Fixture Supply Branch Pipe Sizes

In **Table 10.14.2A,** revise the minimum supply branch pipe size from ~~1/2~~ to 3/8 for three fixtures:

- Bidet
- Dishwasher, domestic
- Kitchen sink, domestic

Table 10.14.2A (continued)
WATER SUPPLY FIXTURE UNITS (WSFU) AND MINIMUM FIXTURE SUPPLY BRANCH PIPE SIZES

		HEAVY-USE ASSEMBLY	OTHER THAN DWELLING UNITS	SERVING 3 OR MORE DWELLING UNITS	INDIVIDUAL DWELLING UNITS
	MINIMUM SUPPLY BRANCH PIPE SIZE				
INDIVIDUAL FIXTURES					
Bar Sink	3/8"	1.0	0.5		
Bathtub or Combination Bath/Shower	1/2"	4.0	3.5		
Bidet	~~1/2"~~ 3/8"	1.0	0.5		
Clothes Washer, Domestic	1/2"	4.0	2.5	4.0	
Dishwasher, Domestic	~~1/2"~~ 3/8"	1.5	1.0	1.5	
Drinking Fountain or Water Cooler	3/8"			0.5	0.75
Hose Bibb (first)	1/2"	2.5	2.5	2.5	
Hose Bibb (each additional)	1/2"	1.0	1.0	1.0	
Kitchen Sink, Domestic	~~1/2"~~ 3/8"	1.5	1.0	1.5	

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

Basis/Reason for Change:

This proposal will allow the use of 3/8 tubing for supply of hot- and cold-water to three additional types of fixtures: i) Bidet, ii) Dishwasher, domestic, and iii) Kitchen sink, domestic.

Recent research has been published by multiple organizations, including IAPMO, regarding the issues related to oversizing water distribution pipes when following Hunter's Curve and historical pipe sizing tables. Information found within the WE-Stand indicates that water distribution pipes are often oversized for the flow rates required by modern plumbing fixtures which are subject to water conservation regulations which reduce their WSFU demand, and therefore their required supply pipe sizing.

Oversized water distribution pipes can lead to stagnant water and the potential health risk of *Legionella* growth due to this stagnation. Reducing the size of oversized water distribution pipes (i.e., "right-sizing") can reduce stagnation, improve water quality, and reduce the risk of pathogen growth. 3/8 tubing has approximately 40% less volume than 1/2 tubing, so fixtures piped with 3/8 tubing will have less stagnant water and the potential to improve water quality.

Oversized supply lines can also cause greater water usage when users flush the hot water lines, wasting water and energy. Research has shown that it takes more time and consumes more water to flush a pipe at low velocity as compared with high velocity. 3/8 tubing has approximately 40% less volume than 1/2 tubing, so hot-water fixtures piped with 3/8 tubing will require less flushing of water before hot water arrives.

Therefore, allowing the use of 3/8 tubing for certain fixtures will reduce the volume of stagnant water in branch lines, improving water quality and safety. Allowing the use of 3/8 tubing for fixtures will also provide faster delivery of hot water and reduce the amount of cold water that is wasted for flushing. This will assist with conservation of water, a critical resource.

The increased pressure drop that will result from using 3/8 tubing instead of 1/2 tubing for these three specific fixtures is not significant.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 34

Proponent: Dan O'Gorman Date: 2-28-2025

Representing: Dan O'Gorman

Mailing Address: 10 Albany Street

City: Edison State: New Jersey Zip: 08837

Phone: 732-841-5799 E-mail danogorman@verizon.net

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

___x__ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section 10.14.3 Sizing Water Distribution Piping

a. The supply demand in gallons per minute in the building hot and cold water distribution system shall be determined on the basis of the load in terms of water supply fixture units (WSFU) as shown in Table 10.14.2A and the relationship between the load in WSFU and the supply demand in gallons per minute (GPM) as shown in Table 10.14.2B. Refer to Appendix K for a more detailed table of WSFU and equivalent GPM. For fixtures having both hot water and cold water connections, the separate hot and cold water loads shall be taken as 75% of the listed WSFU value.

b. Where there are more than one hose bibb installed on a single-family dwelling plumbing system, the demand for only one hose bibb shall be added to the total estimated demand for the building supply.

~~b~~ c. Main risers and branches of the water distribution system…(rest of this section remains the same).

Basis/Reason for Change:

This is updating the code for the water demand calculator allowing only one hose bibb for water sizing. Appendix G 8.2.5 Continuous Supply Demand has the same wording.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*

2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 35

Proponent: Enrique Gonzalez

Representing: IAPMO

Mailing Address: 4750 East Philadelphia Ave

City: Ontario State: CA Zip: 91761

Phone: 909-230-5535 E-mail: Enrique.gonzalez@iapmo.org

Date: February 28, 2025

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

___X__ Change subsection to read as follows

_____ Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Code Section: 10.14.7 Water Hammer

10.14.7 Water Hammer

a. Approved water hammer arresters~~, complying~~ shall comply with ASSE 1010 or PDI WH 201. Supply stops with integral water hammer arresters shall comply with IAPMO IGC 168. Water hammer arresters shall be installed on water distribution piping in which quick closing valves are installed.

EXCEPTION: Single lever faucets, domestic clothes washers, and domestic dishwashers.

b. Water hammer arresters shall be placed as close as possible to the quick acting valve, at the end of long piping runs, or near batteries of fixtures.

c. Arresters shall be accessible for replacement.

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
IAPMO IGC 168-2012	Supply Stops with Integral Water Hammer Arresters	10.14.7

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*

2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

Basis/Reason for Change:

This standard covers supply stops with integral water hammer arresters and specifies requirements for materials, physical characteristics, performance testing, and markings. IAPMO IGC 168 contains provisions for the water supply stops in addition to the water hammer arrestors. These devices are already in use throughout the nation. This standard will ensure that these valves meet the minimum health and safety requirements for both portions of the devices. The standard can be reviewed at the following read only link: https://epubs.iapmo.org/IGC/IGC-168-12e1/

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 36

Proponent: ___ Norm Dobo _____ Date: 2/26/25

Representing: ___ Myself _____

Mailing Address: __105 Allen Street _____

City: __ Hamilton _____ State: _ NJ _____ Zip: _08620_____

Phone: __606-610-3243_____ E-mail __ nola10044@aol.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

___**X**_ Change subsection to read as follows

_____ Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: ___10.15.1 Hot Water Supply System_____

a. In residences and buildings intended for human occupancy, hot water shall be supplied to all plumbing fixtures, appliances, and equipment that require hot water for their use. Outlet temperature of hot water from lavatory faucets in public use facility restrooms or public toilet rooms shall be provided with a means to limit the maximum temperature to 110°F.
EXCEPTION: In buildings other than dwelling units, tempered water supply systems shall be permitted to supply fixtures that deliver only tempered water.
b . Hot water temperature shall not be less than 120°F nor more than 140°F unless stated otherwise in Chapter 10.15.6 Mixed Water Temperature Control.
c. Tempered water shall be 95°F to 105°F.
d. Mixed water temperature shall be 106°F to 120°F unless stated otherwise in Chapter 10.15.6 Mixed Water Temperature Control.

Basis/Reason for Change:
Added maximum hot water temperature from lavatory faucets in public use restrooms and toilet rooms. To add the definitions of hot and tempered water to section 10.15.1.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 37

Proponent: ___ Norm Dobo _____ Date: 2/26/25

Representing: ___ Myself _____

Mailing Address: __105 Allen Street _____

City: __ Hamilton _____ State: _ NJ _____ Zip: _08620_____

Phone: __606-610-3243_____ E-mail __ nola10044@aol.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

__**X**__ Change subsection to read as follows

_____ Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: _10.15.6 e. Mixed Water Temperature Control

e. Showers and bath/shower combinations: The water discharged from shower heads, wall or ceiling mounted hand-held showers, body sprays, and tub spouts shall be controlled to a maximum water temperature no higher than 106ºF to 120ºF by a type P, Type T, or Type P/T automatic compensating valve complying with ASSE 1016/ASME A112.1016/CSA Bl25.16. The upper temperature of 106ºF to 120ºF shall be permitted to be controlled by a water heater complying with ASSE 1082 or ASSE 1084.

Basis/Reason for Change:
To add a clearer definition of hot water required to these fixtures.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
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National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 38

Proponent: ___ Norm Dobo _____ Date: 2/26/25

Representing: ___ Myself _____

Mailing Address: __105 Allen Street _____

City: __ Hamilton _____ State: _ NJ _____ Zip: _08620_____

Phone: __606-610-3243_____ E-mail __ nola10044@aol.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

__**X**__ Change subsection to read as follows

_____ Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: _10.15.6 h. Mixed Water Temperature Control

h. Bathtubs and whirlpool baths: The hot water supply to the faucets for bathtubs and whirlpool baths without showers and with or without deck-mounted hand sprays, shall be controlled to a maximum water temperature no higher than of 106ºF to 120ºF by a water temperature limiting device complying with ASSE 1070/ASME A112.1070/CSA B125.70 or a water heater complying with ASSE 1084.

EXCEPTION: A water temperature limiting device shall not be required if the fixture is supplied by an ASSE 1016/ASME A112.1016/CSA B125.16 automatic compensating valve.

Basis/Reason for Change:
To add a clearer definition of hot water required to these fixtures.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
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National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 39

Proponent: Brian F Gumpert Date: 01/21/2025

Representing: Myself

Mailing Address: 24444 Quapaw Trail

City: Moreno Valley State: CA Zip: 92557

Phone: 951-488-8798 E-mail Calbri13@msn.com

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____Amend section with this editorial change

X____Change subsection to read as follows

_____Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 10.15.9.1 Where Required

Where tank-type water heaters or hot water storage tanks, and appliances that use water for their primary function (such as clothes washing machines, ice makers or dish washers) are installed above the first floor or in locations where leakage will cause structural damage to the building, they shall be installed in a drip pan in accordance with Sections 10.15.9.2 and 10.15.9.3.

Basis/Reason for Change:

The code only asks for a drain pan under a water heater and not under other water using appliances that may leak and cause structural damage. Most structures today use laminated wood and small amounts of water can cause great damage. Most builders today use drain pans under washing machines on the second floor as a precaution, but there is no code requirement for this and second floor kitchens generally do not include such protection under these types of appliances.

Vote: ____Accept ___Accept as Amended

___Accept in Part ___Accept in Principle ___Accept in Part and Principle

___Defeated ___Failed Lack of Second ___Tabled ___Withdrawn ___Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 40

Proponent: Kristopher Heine Date: 2/26/25

Representing: Heine Plumbing & Water Treatment, Inc.

Mailing Address: 270 Sparta Ave., Ste 104, #139

City: Sparta State: NJ Zip: 07871

Phone: 973-383-0392 E-mail: kris@heineplumbing.com

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply: ___X__ Amend section with this editorial change

_____ Change subsection to read as follows _____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows _____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: __10.15.9.2 a. Construction (Line 5)_____

a. Drip pans shall be watertight and constructed of corrosion-resistant materials. Galvanized steel pans shall be 24 gauge (0.0276-inch) minimum thickness. Aluminum pans shall be 20 gauge (0.0320-inch) minimum thickness. Non-metallic pans shall be 0.0625-inch minimum thickness. Pans shall be not less than 1-1/2'' deep. ~~but shall not be deeper than the bottom of the water heater tank or hot water storage tank.~~ They shall be of sufficient size to hold the heater or tank without interfering with drain valves, burners, controls, and any required access.

b. NO CHANGE

Basis/Reason for Change:

Clear up confusing language.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 41

Proponent: Don Jones Date: 08/30/2024

Representing: Self

Mailing Address: 202 W. Summit St

City: Vineland State: NJ Zip: 08360

Phone: 609-517-1473 E-mail: donald_m_jones@att.net

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

X Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: Table 10.16.6

Update Table 10.16.6 to include 1-1/4" discharge pipe size

Table 10.16.6 Size of Drains or Waste Pipes Receiving Relief Valve Discharge	
Discharge Pipe Size	**Minimum Drain or Indirect Waste Size**
3/4"	2" *
1"	3"
1-1/4"	**3"**
1-1/2"	4"
2"	4"
2-1/2"	6"
*EXCEPTION: A laundry sink with 1-1/2" waste pipe	

Basis/Reason for Change:

The Code should include all standard discharge pipe sizes from 3/4" to 2-1/2." 1-1/4" is **not** on the list.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

---

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 42

Proponent: _____Kevin Tindall_____ Date: ___1/31/2025_____

Representing: _____Self_____

Mailing Address: ____P.O. Box 304, 55 N. Main St._____

City: ___Windsor_____ State: ___NJ_____ Zip: __08561_____

Phone: __609-924-3434_____ E-mail ____kevin@tindallranson.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

__X___ Change subsection to read as follows

_____ Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: _____10.16.6.c Relief Valve Piping_____

c. Piping from the outlet of a relief valve to the point of disposal shall be of a material suitable for potable water (see Section 3.4). Discharge pipes from temperature relief valves and combination pressure-temperature relief valves shall be listed in Table 3.4 for hot water distribution~~, and shall be suitable for conveying water at 210°F to an open discharge. The pressure rating of the pipe at 210°F is not required to equal or exceed the pressure setting of the relief valve~~.

Basis/Reason for Change:

Confusing to field inspectors when stating a temperature that is not listed on the pipe or fittings but is acceptable according to the manufacturer's material manual.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 43

Proponent: _Steve Rodzinak_____ Date: __2-1-25___

Representing: ___Myself_____

Mailing Address: ___6 Hastings Lane_____

City: ___Flemington_____ State: __NJ_____ Zip: _08822____

Phone: __908-625-6717_____ E-mail __srodzinak@aol.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

__**X**___ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: _10.16.6 d Relief Valve Piping__

d. The discharge pipe shall be no smaller than the outlet size of its relief valve and shall extend to a point of disposal without valves, traps, or rises that would prevent the discharge piping from draining by gravity. The discharge end of the pipe shall not be threaded. Non-Metallic discharge piping shall be secured within 6" of the discharge outlet.

Basis/Reason for Change:

Non-metallic discharge piping upon activation of the relief valve it serves distorts and flex's and swings when not secured potentially causing injury as it sprays.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 44

Proponent: Kristopher Heine Date: 2/26/25

Representing: Heine Plumbing & Water Treatment, Inc.

Mailing Address: 270 Sparta Ave., Ste 104, #139

City: Sparta State: NJ Zip: 07871

Phone: 973-383-0392 E-mail: kris@heineplumbing.com

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

___X_ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: __10.16.7 a. Vacuum Relieve Valves for Water Heaters Subject to Siphonage

~~a.~~ Where water distribution piping can siphon water from a water heater, and where the bottom of a hot water storage tank or indirect water heater is installed above the flood rim of the fixture it serves and/or is installed three or more stories above grade, a vacuum relief valve complying with ANSI Z21.22/CSA 4.4 shall be installed on the storage tank or storage type heater. ~~and cause dry-firing, a vacuum relief valve shall be installed on the cold water inlet piping to the water heater.~~

b. and c. No Change

Basis/Reason for Change:

To make it more clear to determine when a vacuum relief valve is required.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 45

Proponent: Enrique Gonzalez Date: February 28, 2025

Representing: IAPMO

Mailing Address: 4750 East Philadelphia Ave

City: Ontario State: CA Zip: 91761

Phone: 909-230-5535 E-mail: Enrique.gonzalez@iapmo.org

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

___X__ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 10.18 DRINKING WATER TREATMENT UNITS

10.18 DRINKING WATER TREATMENT UNITS

~~**10.18.1 Compliance with Standards**~~

~~Drinking water treatment units shall comply with the appropriate standards listed below.~~

~~a. NSF 42 Drinking Water Treatment Units - Aesthetic Effects~~

~~b. NSF 44 Water Softeners (cation exchange)~~

~~c. NSF 53 Drinking Water Treatment Units - Health Effects~~

~~d. NSF 55 Ultraviolet Microbiological Water Treatment Systems~~

~~e. NSF 58 Reverse Osmosis Drinking Water Systems~~

~~f. CSA B483.1 Drinking Water Treatment Systems~~

~~g. NSF 62 Distillation Water Treatment System~~

~~h. IAPMO IGC 322 Alkaline Water Treatment Units~~

~~i. IAPMO Z601 Scale Reduction Devices~~

~~j. ASSE 1090 Drinking Water Atmospheric Water Generators (AWG)~~

~~k. ASSE LEC 2006 Point of Entry Reverse Osmosis Systems~~

~~l. ASSE LEC 2008 Point of Entry Anion Exchange - Nitrate Reduction~~

~~m. ASSE 1087 Commercial and Food Service Water Treatment Equipment Utilizing Drinking Water~~

10.18.1 Application. Drinking water treatment units shall comply with the applicable referenced standards in Table 10.18.1.

10.18.1.1 Reverse Osmosis Water Treatment. Point-of-use reverse osmosis drinking water treatment units shall comply with CSA B483.1 or NSF 58. Drinking water treatment units shall meet the requirements of CSA B483.1, NSF/ANSI 42, NSF/ANSI 44, NSF/ANSI 53 or NSF/ANSI 62. Commercial and food service water treatment equipment shall comply with ASSE 1087.

10.18.2 Alkaline Water Treatment. Alkaline water treatment devices shall comply with IAPMO IGC 322.

10.18.3 Scale Reduction Devices. Scale reduction devices shall comply with IAPMO/ANSI Z601.

10.18.4 Drinking Water Atmospheric Water Generators (AWG). Drinking water atmospheric water generators (AWG) shall comply with ASSE 1090.

10.18.5 Point of Entry Reverse Osmosis Systems. Point of entry reverse osmosis systems shall comply with ASSE LEC 2006.

10.18.6 Point of Entry Anion Exchange – Nitrate Reduction Systems. Point of Entry Anion Exchange – Nitrate Reduction Systems shall comply with ASSE LEC 2008.

TABLE 10.18.1
DRINKING WATER TREATMENT UNITS

APPLICATION	RESIDENTIAL		COMMERCIAL
	POINT OF USE STANDARDS	POINT OF ENTRY	
Aesthetic Contaminant Reduction (filters)	NSF/ANSI 42 or CSA B483.1	NSF/ANSI 42 or CSA B483.1	ASSE 1087 and NSF/ANSI 42*
Health Related Contaminant Reduction (filters)	NSF/ANSI 53 or CSA B483.1	NSF/ANSI 53 or CSA B483.1	ASSE 1087 and NSF/ANSI 53*
Water Softener	–	</= 1-1/4 inch inlet NSF/ANSI 44 or CSA B483.1 > 1-1/4 inch inlet ASSE 1087	ASSE 1087
Ultraviolet Water Treatment	NSF/ANSI 55 or CSA B483.1	NSF/ANSI 55 or CSA B483.1	ASSE 1087
Reverse Osmosis	NSF/ANSI 58 or CSA B483.1	NSF/ANSI/CAN 61	ASSE 1087
Distillation	NSF/ANSI 62 or CSA B483.1	NSF/ANSI 62 or CSA B483.1	ASSE 1087

* Required for commercial modular systems only.

Basis/Reason for Change:

The proposed sections and table are intended to replace the existing list of standards referencing water treatment devices and applications. This table will match the latest updates for the UPC. Additionally, the line items for “j, k, and l” which are not part of the table were added as new sections 10.18.4 through 10.18.6.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 46

Proponent: ____Jeff Matson_____ Date: 11/04/2024

Representing: __Viega LLC_____

Mailing Address: __ 585 Interlocken Blvd _____

City: __Broomfield_____ State: __CO_____ Zip: __80021____

Phone: _978-456-3049_____ E-mail jeff.matson@viega.us _____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

__X__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: Table 3.1.3 – Part XI and Section 10.20.4 b. Materials for Combined System Piping

Insert a new line 6 into Table 3.1.3 - Part XI (and renumber existing subsequent lines):

6	Press-connect joints in copper tubing	ASTM B1029

Revise Section 10.20.4 b:

b. Copper piping shall be ASTM B88 copper water tube, Type L or K. Fittings shall be the solder joint type or press-connect. Solder joint fittings shall comply with ASME B16.22 wrought or ASME B16.18 cast. ~~Press-connect fittings shall comply with ASTM F3226, IAPMO Z1117, or ASME B16.51.~~ Soldered joints shall comply with ASTM B828. Solder shall comply with ASTM B32. Flux shall comply with ASTM B813. Solder and flux shall contain not more than 0.2% lead. Flux shall be water-flushable and rated for use with “lead-free” solder. Flux residue shall be noncorrosive and non-toxic inside and outside of the joints in accordance with ASTM B813. Press-connect fittings shall comply with ASTM F3226, IAPMO Z1117, or ASME B16.51. Press-connect joints shall comply with ASTM B1029.

Basis/Reason for Change:

ASTM B1029 “Standard Practice for Making Press-Connect Joints with Seamless Copper and Copper Alloy Tube and Press Fittings” was published in July 2024, after months of work and voting by a group of industry experts in copper fittings. This Standard Practice is a press-connect equivalent to ASTM B828 which is the Standard Practice for solder joints, referenced in NSPC Table 3.1.3 - Part XI (5) and this Section 10.20.4. The new Standard outlines proper procedures to ensure that installers have a set of clear instructions to make secure, reliable press-connect joints and allowing trainers to use a common, proven method. ASTM B1029 was developed through the ASTM and ANSI consensus process and represents an improvement to this Code.

ASTM B1029 is being added to Table 3.1.3 Part XI and Section 10.20.4 b to make clear reference to the new Standard Practice.

The list of press-connect standards was moved to the end of Section 10.20.4 b to improve readability (grouping all solder requirements together, and all press-connect requirements together rather than having them intermixed.)

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 47

Proponent: _Vincent Tinervia_____ Date: _2/26/2025__

Representing: ___Self_____

Mailing Address: __1916 Nine Avenue_____

City: __Toms River_____ State: __NJ_____ Zip: _08757___

Phone: __732-904-0111_____ E-mail __plumbervin@aol.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

__X__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: __11.7.3. Sewage Pumps and Ejectors

11.7.3. Sewage Pumps and Ejectors

a. Sewage pumps and ejectors shall:

1. No Change.
2. ~~in single dwelling units, be capable of passing a solid at least 1-1/2 inches in diameter and have a 2" minimum discharge pipe size.~~ have a 2" minimum discharge pipe size and have the capacity to discharge the drainage it receives.
3. ~~in other than single dwelling units, be capable of passing a solid at least 2 inches in diameter and have a 3" minimum discharge pipe size.~~
4. ~~have a minimum capacity of 20 gallons per minute if they receive drainage from a water closet or urinal.~~

EXCEPTION: Individual fixture pumps and ejectors shall comply with 11.7.11. Grinder pumps shall comply with Section 11.7.5. Macerating Toilet Systems shall comply with Section 11.7.6.

b. No Change.

Basis/Reason for Change: Over burdensome, no difference between single dwelling units and other than single dwelling units with the same number of plumbing fixtures in a bathroom or toilet room.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 48

Proponent: Abraham I. Murra Date: February 24, 2025

Representing: Jets Vacuum AS, Norway

Mailing Address: Radinace Ln, RSM, CA, 92688, United States

Phone: +1 (657) 201-1975 E-mail: abraham.murra@outlook.com

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply: X Amend section with this editorial change

X Change subsection to read as follows _____ Delete subsection and substitute as follows

X Add new subsection to read as follows X Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: E.5 VACUUM DRAINAGE SYSTEMS

11.13 ~~E.5~~ VACUUM DRAINAGE SYSTEMS

11.13.1 ~~E.5.1~~ General requirements

11.13.1.1 ~~E.5.1.1~~ System Design
Vacuum drainage systems shall be designed in accordance with CSA B45.13/IAPMO Z1700 and the manufacturer's recommendations. The system layout, including piping layout, tank assemblies, vacuum pump assembly and other components and ~~/~~designs necessary for proper function of the system shall be in accordance with CSA B45.13/IAPMO Z1700 and the ~~per~~ manufacturer's recommendations. Plans and~~,~~ specifications ~~and other data~~ for such systems shall be submitted to the Authority Having Jurisdiction ~~for review and approval prior to installation~~.

11.13.1.2 ~~E.5.1.2~~ Fixtures
Vacuum plumbing fixtures shall comply with CSA B45.13/IAPMO Z1700. Gravity type fixtures used in vacuum drainage systems shall comply with Chapter 7 of this Code.

11.13.1.3 ~~E.5.1.3~~ Drainage Fixture Units (DFU)
Fixture units for gravity drainage systems that discharge into or receive discharge from vacuum drainage systems shall be based upon values in Chapter 11 of this Code.

11.13.1.4 ~~E.5.1.4~~ Water Supply Fixture Units (WSFU)
Water supply fixture units (WSFU) for gravity fixtures shall be based on the values in Chapter 10 of this Code ~~with the addition that the fixture unit of a vacuum type water closet shall be 1.0 WSFU~~.

11.13.1.5 Drainage Pipe Sizing
Drainage pipes for vacuum drainage systems shall be sized in accordance with CSA B45.13/IAPMO Z1700.

11.13.1.6 Wastewater Flow Rate Calculation
Calculation of wastewater flow rates for vacuum fixtures designed specifically for vacuum sanitary drainage systems shall be in accordance with CSA B45.13/IAPMO Z1700.

11.13.1.7 ~~E.5.1.5~~ Traps and Cleanouts
Gravity type fixtures shall be provided with traps and cleanouts per Chapter 5 of this Code.

11.13.1.8 ~~E.5.1.6~~ Materials
Vacuum drainage pipe, fittings and valve materials shall be in accordance with CSA B45.13/IAPMO Z1700, with ~~as recommended by~~ the vacuum drainage system manufacturer's recommendations, and as permitted by this Code.

11.13.2 ~~E.5.2~~ Tests and Demonstrations

11.13.2.1 System Design, Installation and Verification
System design, installation and verification shall be conducted in accordance with CSA B45.13/IAPMO Z1700.

11.13.2.2 Equipment, System and Piping Testing
After completion of the entire system installation, vacuum equipment, vacuum system and piping testing shall be conducted in accordance with CSA B45.13/IAPMO Z1700. ~~the system shall be subjected to a vacuum test of 19 inches of mercury and shall be operated to functions required by the Authority Having Jurisdiction and the manufacturer.~~ Recorded proof of all tests shall be submitted to the Authority Having Jurisdiction.

11.13.3 ~~E.5.3~~ Written Instructions
Written instructions ~~for the operation, maintenance, safety and emergency procedures~~ shall be provided in accordance with CSA B45.13/IAPMO Z1700 ~~to the building owner as verified by the Authority Having Jurisdiction~~.

~~E.5.4 Requirements for Special Design Plumbing Systems~~
~~The requirements of Sections E1, E2, E3, and E4 apply to this special design plumbing system.~~

Basis/Reason for Change:

Currently, the NSPC addresses vacuum drainage only for condensate waste. Expanding its scope to include other waste types and system designs enhances the applicability of the NSPC. Referencing CSA B45.13/IAPMO Z1700 —a binational consensus standard covering equipment, materials, construction, performance, testing, and markings— will help standardize vacuum waste-collection systems and help protect the public. The existing code pertains only to gravity-based fixtures connected to vacuum systems; adding vacuum plumbing fixtures accommodates leading-edge industry standard technology.

Additionally, a major change to the UPC was approved last May, moving vacuum drainage systems to Chapter 7, Sanitary Drainage, from the Alternative Plumbing Systems appendix (Section C 501.0). The International Plumbing Code (IPC) includes vacuum systems in Section 715. Both the UPC and IPC recently approved referencing CSA B45.13/IAPMO Z1700 for vacuum systems.

This is a joint proposal submitted together with Jets Vacuum AS, Norway.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 49

Proponent: ___ Norm Dobo _____ Date: 2/26/25

Representing: ___ Myself _____

Mailing Address: __105 Allen Street _____

City: __ Hamilton _____ State: _ NJ _____ Zip: _08620_____

Phone: __606-610-3243_____ E-mail __ nola10044@aol.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

__**X**__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: ____12.10.1.a. Single Bathroom Groups_____

a. ~~An individually~~ One or two vented lavatory(s) in a single bathroom group shall be permitted to serve as a wet vent for the water closet, the bathtub or shower stall, or the water closet and bathtub/shower if all of the following conditions are met.
   1.-6. No change

Basis/Reason for Change:

The definition of a single bathroom group is one or two lavatories.

Note: Diagrams 12.10.1 A, B, C (exclude back to back) and 12.10.3 C, D, E single lavatory diagram will have to be changed to show two lavatories.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 50

Proponent: Enrique Gonzalez Date: February 28, 2025

Representing: IAPMO

Mailing Address: 4750 East Philadelphia Ave

City: Ontario State: CA Zip: 91761

Phone: 909-230-5535___ E-mail: Enrique.gonzalez@iapmo.org

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

___X__ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 14.14 Expansion Tanks in Health Care Facilities
Add new section:

14.14 Expansion Tanks in Health Care Facilities. Expansion tanks installed in the hot water distribution systems in health care facilities shall be of the flow-through type.

Basis/Reason for Change:

This proposed change came from a *Legionella* Industrial Hygienist for the Wisconsin Department of Health Services. He has conducted *Legionella* environmental assessments and doing sampling since 2017. It was discovered on at least 5 locations that the traditional type of hot water expansion tanks has been the source of the *Legionella* in the buildings. In one case the tank was 20 years old, that meant the water in the tank was 20 years old never being replaced with fresh water. The colony forming units (CFU) count was extremely high seeding the hot water distribution system in the facility with *Legionella* creating an outbreak. With this, it was proposed that this requirement be added to the Wisconsin Uniform Plumbing Code. It was approved and adopted into the Wisconsin plumbing code on October 1, 2023. There have been studies and manufacturers which are now making these flow through expansion tanks based on these known risks created by traditional hot water expansion tanks.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 51

Proponent: Jack Bell Date: 02-28-2025

Representing:

Mailing Address: 49 Carriage Lane

City: Newton State: NJ Zip:

Phone: E-mail: jacplumb@earthlink.net

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Change subsection to read as follows

_X____ Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: 15.4.2 Finished Plumbing

Add: c. Premanufactured housing units shall be permitted to be tested with a smoke or peppermint test for all field-fabricated drain, waste and vent piping installed between sections.

Basis/Reason for Change:
Provides better directions for field inspection.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 52

Proponent: ___NSPC Staff_____ Date: _02-20-2025

Representing: __NSPC Committee_____ _____

Mailing Address: __18927 Hickory Creek Drive, Suite 220_____

City: __Mokena_____ State: __IL_____ Zip: 60448

Phone: __1-909-472-4100_____ E-mail _____nspc@iapmo.org_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply: __X__ Amend section with this editorial change

_____ Change subsection to read as follows _____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows _____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: TABLE 18.1 REFERENCED STANDARDS

UPDATES FOR REFERENCED STANDARDS IN 2027 NSPC TABLE 18.1

See the following pages for changes.

Basis/Reason for Change:
To update, and make current, all of the information in Table 18.1 for the 2027 NSPC.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC.
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

CHAPTER 18
REFERENCED STANDARDS

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
ANSI/AHAM DW 2 - 2020	Household Electric Dishwashers	Table 3.1.3-VII, 7.15.1
AHAM FWD 2 - 2021	Method for Measuring Performance of Household Food Waste Disposers	Table 3.1.3-VII, 7.14.1
AHAM HLW 2 - 2020	Performance Evaluation Procedures for Household Clothes Washers	Table 3.1.3-VII, 7.13.1
ANSI/PSAI Z4.3 - 2016	Non-Sewered Waste-Disposal Systems -Minimum Requirements	2.24, Table 3.1.3-X
ANSI Z21.22 – 2015 (R2020)/CSA 4.4 - 2015 (R2020)	Relief Valves for Hot Water Supply Systems	Table 3.1.3-VIII, 10.16.7
ASHRAE Standard 18 – 2008 (R2013)	Methods of Testing for Rating Drinking-Water Coolers with Self-Contained Mechanical Refrigeration	7.12.1
ASME A13.1 - ~~2020~~2023	Scheme for the Identification of Piping Systems	2.27, 10.21
ASME A112.1.2 - 2012 ~~(R2017)~~ (R2022)	Air Gaps in Plumbing Systems (for Plumbing Fixtures and Water-Connected Receptors)	Table 3.1.3-IX, 7.11.6, 10.5.1, 10.5.3
ASME A112.1.3 - 2000 (R2019)	Air Gap Fittings for Use with Plumbing Fixtures, Appliances, and Appurtenances	Table 3.1.3-IX, 10.5.1, 10.5.3
ASME A112.3.1 – 2007 ~~(R2017)~~(R2022)	Stainless Steel Drainage Systems for Sanitary DWV, Storm, and Vacuum Applications, Above- and Below-Ground	Table 3.1.3-I, Table 3.5, Table 3.6, Table 3.7, Table 3.8, 7.16.1
ASME A112.3.4 – 2018/CSA B45.9-2018 (R2023)	Macerating Toilet Systems and Waste-Pumping Systems for Plumbing Fixtures	Table 3.1.3-V, Table 3.1.3-X, 7.4.8, 11.7.6
ASME A112.4.1 - 2009 ~~(R2019)~~(R2024)	Water Heater Relief Valve Drain Tubes	Table 3.1.3-VIII, 10.16.6
ASME A112.4.2 -2021/CSA B45.16 - 2021	Personal Hygiene Devices for Water Closets	Table 3.1.3-VI, 7.4.1, 7.4.9, 7.4.10
ASME A112.4.3 - 1999 ~~(R2019)~~(R2024)	Plastic Fittings for Connecting Water Closets to the Sanitary Drainage System	Table 3.1.3-IV
ASME A112.4.14-2022/CSA B125.14-~~2017~~2022	Manually or Automatically Operated Valves for Use in Plumbing Systems	Table 3.1.3-VIII
ASME A112.6.1M - 1997 (R2017)	Floor-Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use	Table 3.1.3-VI, 3.3.12, 7.3.5
ASME A112.6.2 – 2017 (R2022)	Framing-Affixed Supports (Carriers) for Off-the-Floor Plumbing Fixtures	Table 3.1.3-VI, 3.3.12, 7.3.5
ASME A112.6.3 – ~~2019~~2022/CSA B79.3-2022	Floor ~~and Trench~~ Drains	Table 3.1.3-V, 5.3.6, 7.11.5, 7.16.1, 7.16.2,
ASME A112.6.4 - ~~2003 (R2012)~~ 2022/CSA B79.4-2022	Roof, Deck, and Balcony Drains	Table 3.1.3-V, 3.3.9, 13.5.1, 13.5.2, 13.5.3

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
ASME A112.6.7 - ~~2010 (R2019)~~ 2022/CSA B79.7-2022	Sanitary Floor Sinks	2.25.5, Table 3.1.3-V, 7.11.5
ASME A112.14.1 - 2003 ~~(R2017)~~(R2022)	Backwater Valves	Table 3.1.3-VIII, 5.5.2
ASME A112.14.3 – ~~2018~~ 2022/CSA B481.1-2022	Hydromechanical Grease Interceptors	Table 3.1.3-X, 6.1.4.2, 6.2.1.1, 6.2.2
ASME A112.14.4 - ~~2001 (R2017)~~ 2022/CSA B481.5-2022	Grease Removal Devices	Table 3.1.3-X, 6.1.4.2, 6.2.1.2, 6.2.2
ASME A112.14.6 - 2010 ~~(R2019)~~(R2024)	FOG (Fats, Oils, and Greases) Disposal Systems	Table 3.1.3-X, 6.2.1.4
ASME A112.18.1-2024/CSA B125.1 - ~~2018~~2024	Plumbing Supply Fittings	Table 3.1.3-VI, 7.6.2, 7.7.1, 7.8.3, 7.10.2, 7.11.1, 7.11.2, 7.11.3
ASME A112.18.2 - 2020/CSA B125.2 - 2020	Plumbing Waste Fittings	Table 3.1.3-VI, 3.2.1, 7.11.1
ASME A112.18.3 - 2002 ~~(R2017)~~(R2022)	Performance Requirements for Backflow Protection Devices and Systems in Plumbing Fixture Fittings	Table 3.1.3-IX
ASME A112.18.6-2017/CSA B125.6 – 2017 (R2021)	Flexible Water Connectors	Table 3.1.3-VI, 10.13
ASME A112.18.9 - 2011 ~~(R2017)~~ (R2022)	Protectors/Insulators for Exposed Waste and Supplies on Accessible Fixtures	Table 3.1.3-VI, 7.2
ASME A112.19.1-2024/CSA B45.2 - ~~2018~~2024	Enameled Cast Iron and Enameled Steel Plumbing Fixtures	Table 3.1.3-V, 7.6.1, 7.8.1, 7.10.1, 7.11.1, 7.12.1
ASME A112.19.2-2024/CSA B45.1 - ~~2018~~2024	Ceramic Plumbing Fixtures	Table 3.1.3-V, 7.4.1, 7.4.2, 7.5.1, 7.5.2, 7.6.1, 7.7.1, 7.8.1, 7.10.1, 7.11.1, 7.12.1
ASME A112.19.3-2022/CSA B45.4 – ~~2017~~ 2022	Stainless Steel Plumbing Fixtures	Table 3.1.3-V, 7.4.1, 7.6.1, 7.7.1, 7.8.1, 7.10.1, 7.11.1, 7.12.1
ASME A112.19.5-2022/CSA B45.15 – ~~2017~~ 2022	Flush Valves and Spuds for Water Closets, Urinals, and Tanks	Table 3.1.3-VI
ASME A112.19.7 - 2020/CSA B45.10 - 2020	Hydromassage Bathtub Systems	Table 3.1.3-V, 7.9.2
ASME A112.19.10 – 2017 (R2024)	Retrofit Dual Flush Devices for Water Closets	Table 3.1.3-VI
ASME A112.19.12 - 2014 ~~(R2019)~~(R2024)	Wall Mounted, Pedestal Mounted, Adjustable, Elevating, Tilting, and Pivoting Lavatory, Sink, and Shampoo Bowl Carrier Systems and Drain Waste Systems	Table 3.1.3-VI, 3.3.12, 7.2
ASME A112.19.14 - 2013 (R2018)	Six-Liter Water Closets Equipped with a Dual Flushing Device	Table 3.1.3-V, 7.4.1, 7.4.2
ASME A112.19.15 - 2012 ~~(R2017)~~(R2022)	Bathtubs/Whirlpool Bathtubs with Pressure Sealed Doors	Table 3.1.3-V, 7.8.1
ASME A112.19.17 - 2010 (R2018)	Manufactured Safety Vacuum Release Systems (SVRS) for Residential and Commercial Swimming Pool, Spa, Hot Tub, and Wading Pool Suction Systems	Table 3.1.3-VI
ASME A112.19.19 - 2016 (R2021)	Vitreous China Nonwater Urinals	Table 3.1.3-V, 7.5.1

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
ASME A112.36.2M - ~~1991 (R2017)~~ 2022/CSA B79.2-2022	Cleanouts	Table 3.1.3-VIII
ASME B1.20.1 - 2013 (R2018)	Pipe Threads, General Purpose (Inch)	Table 3.1.3-IV, 4.2.2
ASME B16.3 - ~~2016~~2021	Malleable Iron Threaded Fittings Classes 150 and 300	Table 3.1.3-I, Table 3.4
ASME B16.4 - ~~2016~~2021	Gray Iron Threaded Fittings Classes 125 and 250	Table 3.1.3-I, Table 3.4
ASME B16.5 - 2020	Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard	Table 3.1.3-I, Table 3.4
ASME B16.12 - 2019	Cast Iron Threaded Drainage Fittings	Table 3.1.3-I Table 3.5, Table 3.6, Table 3.7
ASME B16.14 - 2018	Ferrous Pipe Plugs, Bushings, and Locknuts with Pipe Threads	Table 3.1.3-I
ASME B16.15 - ~~2018~~2024	Cast Copper Alloy Threaded Fittings: Classes 125 and 250	Table 3.1.3-II, Table 3.4
ASME B16.18 - ~~2018~~2021	Cast Copper Alloy Solder Joint Pressure Fittings	Table 3.1.3-II, Table 3.4, 4.2.6, 10.20.4
ASME B16.22 - ~~2018~~2021	Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings	Table 3.1.3-II, Table 3.4, 4.2.6, 4.2.8.2, 10.20.4
ASME B16.23 - ~~2016~~2021	Cast Copper Alloy Solder Joint Drainage Fittings: DWV	Table 3.1.3-II, Table 3.5, Table 3.6, Table 3.7, 4.2.4
ASME B16.24 - ~~2016~~2021	Cast Copper Alloy Pipe Flanges, Flanged Fittings, and Valves: Classes 150, 300, 600, 900, 1500, and 2500	Table 3.1.3-II, Table 3.4, 4.2.4
ASME B16.26 - 2018	Cast Copper Alloy Fittings for Flared Copper Tubes	Table 3.1.3-II, Table 3.4, 4.2.5
ASME B16.29 - ~~2017~~2022	Wrought Copper and Wrought Copper Alloy Solder-Joint Drainage Fittings - DWV	Table 3.1.3-II, Table 3.5, Table 3.6, Table 3.7, 4.2.4
ASME B16.50 - ~~2018~~2021	Wrought Copper and Copper Alloy Braze-Joint Pressure Fittings	Table 3.1.3-II, Table 3.4, 4.2.4, 4.2.8.2
ASME B16.51 - 2018	Copper and Copper Alloy Press-Connect Pressure Fittings	Table 3.1.3-II, Table 3.4, 10.20.4
ASME BPVC Section–IV - ~~2021~~2023	Rules for Construction of Heating Boilers	3.3.8, 10.15.11
ASME BPVC Section–VIII.1 - ~~2021~~2023	Rules for Construction of Pressure Vessels Division 1	3.3.8, 10.15.7
ASME CSD-1 - 2018	Controls and Safety Devices for Automatically Fired Boilers	10.15.11
ASSE 1001 – ~~2017~~ 2021	Performance Requirements for Atmospheric Type Vacuum Breakers	Table 3.1.3-IX, 7.4.9, 7.4.10, 7.7.2, 7.8.4, 10.5.3, 10.5.10
ASSE 1002 - 2020/ASME A112.1002 - 2020/CSA B125.12 - 2020	Anti-Siphon Fill Valves for Water Closet Tanks	Table 3.1.3-VI, 7.19.3, 10.5.3
~~ASSE 1003 - 2020[e2]~~ ASSE 1003-2023/CSA B356-2023	Performance Requirements for Water Pressure Reducing Valves for Potable Water Distribution Systems	Table 3.1.3-VIII, 10.14.6
ASSE 1004 – ~~2017~~ 2024	Performance Requirements for Backflow Prevention Requirements for Commercial Dishwashing Machines	Table 3.1.3-IX, 7.15.1
ASSE 1008 - 2020	Performance Requirements for Plumbing Aspects of Residential Food Waste Disposer Units	Table 3.1.3-VII, 7.14.1
ASSE 1010 – ~~2004~~ 2021	Performance Requirements for Water Hammer Arresters	Table 3.1.3-VIII, 10.14.7
ASSE 1011 – ~~2017~~ 2023	Performance Requirements for Hose Connection Vacuum Breakers	Table 3.1.3-IX, 10.5.3
ASSE 1012 – ~~2009~~ 2021	Performance Requirements for Backflow Preventers with an Intermediate Atmospheric Vent	Table 3.1.3-IX, 10.5.3, 10.5.8

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
ASSE 1013 - 2021	Performance Requirements for Reduced Pressure Principle Backflow Prevention Assemblies	Table 3.1.3-IX, 2.30, 10.5.3, 10.5.6, 10.5.9, 10.5.10, 10.5.13
ASSE 1014 - 2020	Performance Requirements for Backflow Prevention Devices for Hand-held Showers	Table 3.1.3-IX, 10.5.3
ASSE 1015 - 2021	Performance Requirements for Double Check Backflow Prevention Assemblies	Table 3.1.3-IX, 10.5.3, 10.5.6, 10.5.9
ASSE 1016 - 2017/ASME A112.1016 - 2017/CSA B125.16 – 2017 (R2021)	Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations	Table 3.1.3-VI, Table 3.1.3-VIII, 10.15.6
ASSE 1017 – ~~2009~~ 2023	Performance Requirements for Temperature Actuated Mixing Valves for Hot Water Distribution Systems	Table 3.1.3-VIII, 10.15.6, 10.15.11
ASSE 1018 - ~~2001 (R2021)~~ 2023	Performance Requirements for Trap Seal Primer Valves - Potable Water Supplied	Table 3.1.3-VIII, 5.3.6, 7.16.2
ASSE 1019 - ~~2011 (R2016)~~ 2023	Performance Requirements for Wall Hydrants with Backflow Protection and Freeze Resistance	Table 3.1.3-IX, 10.5.3
ASSE 1020 - 2020	Performance Requirements for Pressure Vacuum Breaker Assemblies	Table 3.1.3-IX, 10.5.3, 10.5.5, 10.5.6, 10.5.10
ASSE 1021 - 2001	Performance Requirements for Drain Air Gaps for Domestic Dishwasher Applications (with Errata dated January 2, 2003)	Table 3.1.3-IX, 7.15.1, 10.5.3
ASSE 1022 – ~~2021~~ 2023	Performance Requirements for Backflow Preventer for Beverage Dispensing Equipment (for Carbonated and Non-Carbonated)	Table 3.1.3-IX, 10.5.3, 10.5.8
ASSE 1023 - 2020	Performance Requirements for Electrically Heated or Cooled Water Dispensers	Table 3.1.3-VII, 7.11.2
ASSE 1024 - ~~2017 (R2021)~~ 2023	Performance Requirements for Dual Check Backflow Preventers	Table 3.1.3-IX, 10.5.3, 10.5.9
ASSE 1032 - ~~2004 (R2021)~~ 2023	Performance Requirements for Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers - Post Mix Type	Table 3.1.3-IX, 10.5.3, 10.5.8
ASSE 1035 - 2020	Performance Requirements for Laboratory Faucet Backflow Pre- venters	Table 3.1.3-IX, 10.5.3, 10.5.13
ASSE 1037 - 2020/ASME A112.1037 - 2020/CSA B125.37 - 2020	Performance Requirements for Pressurized Flushing Devices for Plumbing Fixtures	Table 3.1.3-VI, 7.19.4, 7.19.5
ASSE 1044 - ~~2015 (R2020)~~ 2023	Performance Requirements for Trap Seal Primer - Drainage Types and Electric Design Types	Table 3.1.3-VIII, 5.3.6, 7.16.2
ASSE 1047 - 2021	Performance Requirements for Reduced Pressure Detector Backflow Prevention Assemblies	Table 3.1.3-IX, 10.5.3, 10.5.6, 10.5.9
ASSE 1048 – 2021[e1]	Performance Requirements for Double Check Detector Backflow Prevention Assemblies	Table 3.1.3-IX, 10.5.3, 10.5.6, 10.5.9
ASSE 1049 - 2021	Performance Requirements for Individual and Branch Type Air Admittance Valves for Chemical Waste Systems	12.20.1, 12.20.2
ASSE 1050 - 2021	Performance Requirements for Stack Air Admittance Valves for Sanitary Drainage Systems	12.20.1, 12.20.2
ASSE 1051 - 2021	Performance Requirements for Individual and Branch Type Air Admittance Valves for Sanitary Drainage Systems	12.20.1, 12.20.2
ASSE 1052 – ~~2016~~ 2023	Performance Requirements for Hose Connection Backflow Preventers	Table 3.1.3-IX, 10.5.3
ASSE 1053 – 2019 (R2023)	Performance Requirements for Dual Check Backflow Preventer Wall Hydrants - Freeze Resistant Type	Table 3.1.3-IX, 10.5.3

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
~~ANSI/CAN/ASSE/IAPMO 1055 – 2020~~ ASSE/IAPMO/ANSI/CAN 1055-2023	Performance Requirements for Chemical Dispensers with Integral Backflow Protection	Table 3.1.3-IX, 10.5.3, 10.5.13
ASSE 1056 - 2013 (R2021)	Performance Requirements for Spill Resistant Vacuum Breaker Assemblies	Table 3.1.3-IX, 10.5.3, 10.5.5, 10.5.6, 10.5.10
ASSE 1057 – ~~2012~~ 2023	Performance Requirements for Freeze Resistant Sanitary Yard Hydrants with Backflow Protection	Table 3.1.3-IX, 10.5.3
ASSE 1060 – 2017 (R2021)	Performance Requirements for Outdoor Enclosures for Fluid Conveying Components (with Errata dated February 1, 2019)	Table 3.1.3-IX, 10.5.5
ASSE 1061 - 2020	Performance Requirements for Push-Fit Fittings	Table 3.1.3-II, Table 3.1.3-III, Table 3.1.3-IV, Table 3.4, 4.2.7
ASSE 1062 - 2017 (R2021)	Performance Requirements for Temperature Actuated Flow Reduction (TAFR) Valves for Individual Supply Fittings	Table 3.1.3-VI, 10.15.6
ASSE 1066 – ~~1997~~ 2023	Performance Requirements for Individual Pressure Balancing In-Line Valves for Individual Fixture Fittings	Table 3.1.3-VIII, 10.15.6
ASSE 1069 - 2020	Performance Requirements for Automatic Temperature Control Mixing Valves	Table 3.1.3-VIII, 10.15.6
ASSE 1070 - 2020/ASME A112.1070 - 2020/CSA B125.70 - 2020	Performance Requirements for Water Temperature Limiting Devices	Table 3.1.3-VIII, 10.15.6
ASSE 1071 - 2012 (R2021)	Performance Requirements for Temperature Actuated Mixing Valves for Plumbed Emergency Equipment	Table 3.1.3-VIII, 7.24
ASSE 1072 - 2020	Performance Requirements for Barrier Type Trap Seal Protection for Floor Drains	Table 3.1.3-VIII, 5.3.6, 7.16.2
~~ASSE 1079 - 2012 (R2021)~~ ASSE/IAPMO/ANSI/CAN 1079-2024	Performance Requirements for Dielectric Pipe Unions	Table 3.1.3-IV, 4.3.7
ASSE 1086 - 2022	Performance Requirements for Reverse Osmosis Water Efficiency – Drinking Water	Table 3.1.3 VII
ASSE 1087 – ~~2018~~ 2022	Performance Requirements for Commercial and Food Service Water Treatment Equipment Utilizing Drinking Water	Table 3.1.3 VII, 10.18.1
ASSE 1090 – 2020[e1]	Performance Requirements for Drinking Water Atmospheric Water Generators (AWG)	Table 3.1.3 VII, 10.18.1
ASSE LEC #2006 - 2019	Point of Entry Reverse Osmosis Systems	Table 3.1.3 VII, 10.18.1
ASSE LEC #2008 - 2021	Point of Entry Anion Exchange – Nitrate Reduction	Table 3.1.3 VII, 10.18.1
ASSE/IAPMO/ANSI Series 5000 – ~~2015~~ 2022[e1]	Cross-Connection Control Professional Qualifications Standard	10.5.6
ASSE/IAPMO/ANSI Series 6000 – ~~2021~~ 2024	Professional Qualifications Standard for Medical Gas Systems Personnel	14.3.2
ASTM A53/A53M – ~~2020~~ 2024	Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless	Table 3.1.3-I, Table 3.4, Table 3.5, Table 3.6, Table 3.7, 11.7.8
ASTM A74 - 2021	Standard Specification for Cast Iron Soil Pipe and Fittings	Table 3.1.3-I, Table 3.5, Table 3.6, Table 3.7
ASTM A269 - ~~15a (2019)~~ 2024	Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service	Table 3.1.3-I, Table 3.4, 3.4.1.2, 4.2.6
ASTM A312/A312M – ~~2021~~ 2024b	Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes	Table 3.1.3-I, 3.4.1.2, 4.2.6
ASTM A377 - 2018 (2022)[e1]	Standard Index of Specifications for Ductile-Iron Pressure Pipe	Table 3.1.3-I

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
ASTM A554 - 2021	Standard Specification for Welded Stainless Steel Mechanical Tubing	Table 3.1.3-I, Table 3.4
ASTM A716 – 2018 (R2022)	Standard Specification for Ductile Iron Culvert Pipe	Table 3.1.3-I, Table 3.5, Table 3.7
ASTM A746 - 2018 (R2022)	Standard Specification for Ductile Iron Gravity Sewer Pipe	Table 3.1.3-I, Table 3.5, Table 3.7
ASTM A778/A778M - ~~2016 (R2021)~~ 2024a	Standard Specification for Welded, Unannealed Austenitic Stainless Steel Tubular Products	Table 3.1.3-I, Table 3.4, 4.2.6
ASTM A888 - ~~2021a~~ 2024	Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications	Table 3.1.3-I, Table 3.5, Table 3.6, Table 3.7
ASTM A1056 - 2020	Standard Specification for Cast Iron Couplings Used for Joining Hubless Cast Iron Soil Pipe and Fittings	Table 3.1.3-IV, 4.3.8
ASTM B29 - 2019	Standard Specification for Refined Lead	Table 3.1.3-IV
ASTM B32 - 2020	Standard Specification for Solder Metal	Table 3.1.3-IV, 4.2.4, 10.20.4
ASTM B43 - 2020	Standard Specification for Seamless Red Brass Pipe, Standard Sizes	Table 3.1.3-II, Table 3.4
ASTM B75/B75M - 2020	Seamless Copper Tube	Table 3.4, 4.2.6
ASTM B88 – ~~2020~~ 2022	Standard Specification for Seamless Copper Water Tube	Table 3.1.3-II, Table 3.4, Table 3.5, Table 3.6, Table 3.7, 4.2.6, 10.20.4, 11.7.8
ASTM B302 - 2017	Standard Specification for Threadless Copper Pipe, Standard Sizes	Table 3.1.3-II
ASTM B306 - 2020	Standard Specification for Copper Drainage Tube (DWV)	Table 3.1.3-II, Table 3.5, Table 3.6, Table 3.7
ASTM B813 – ~~2016~~ 2024	Standard Specification for Water Flushable Liquid and Paste Fluxes for Soldering of Copper and Copper Alloy Tube	Table 3.1.3-IV, 4.2.4, 10.20.4
ASTM B828 – ~~2016~~ 2023	Standard Practice for Making Capillary Joints by Soldering of Copper and Copper Alloy Tube and Fittings	Table 3.1.3-XI, 4.2.4, 10.20.4
ASTM C4 - 2004 ~~(R2018)~~ (R2023)	Standard Specification for Clay Drain Tile and Perforated Clay Drain Tile	Table 3.1.3-III, Table 3.8
ASTM C12 – ~~2021~~ 2024	Standard Practice for Installing Vitrified Clay Pipe Lines	Table 3.1.3-XI
ASTM C14 - 2020 (R2025)	Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe	Table 3.1.3-III, Table 3.5, Table 3.7
ASTM C76 – ~~2020~~ 2022a	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe	Table 3.1.3-III, Table 3.5, Table 3.7
ASTM C412 - 2019 (R2025)	Standard Specification for Concrete Drain Tile	Table 3.1.3-III, Table 3.8
ASTM C425 – ~~2021~~ 2022	Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings	Table 3.1.3-IV
ASTM C443 – ~~2020~~ 2021	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets	Table 3.1.3-IV
ASTM C444/C444M - 2021	Standard Specification for Perforated Concrete Pipe	Table 3.1.3-III, Table 3.8
ASTM C564 - 2020a	Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings	Table 3.1.3-IV
ASTM C700 – 2018 (R2022)	Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated	Table 3.1.3-III, Table 3.5, Table 3.6, Table 3.7, Table 3.8
ASTM C1173 – ~~2018~~ 2022	Standard Specification for Flexible Transition Couplings for Underground Piping Systems	Table 3.1.3-IV, 4.2.11.6, 4.3.8
ASTM C1277 - 2020	Standard Specification for Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings	Table 3.1.3-IV, 4.3.8

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
ASTM C1460 - 2021	Standard Specification for Shielded Transition Couplings for Use With Dissimilar DWV Pipe and Fittings Above Ground	Table 3.1.3-IV, 4.3.8
ASTM C1461 - 2021	Standard Specification for Mechanical Couplings Using Thermoplastic Elastomeric (TPE) Gaskets for Joining Drain, Waste, and Vent (DWV), Sewer, Sanitary, and Storm Plumbing Systems for Above and Below Ground Use	Table 3.1.3-IV, 4.3.8
ASTM C1540 - 2020	Standard Specification for Heavy-Duty Shielded Couplings Joining Hubless Cast Iron Soil Pipe and Fittings	Table 3.1.3-IV, 4.3.8
ASTM C1822 - 2021	Standard Specification for Insulating Covers on Accessible Lavatory Piping	7.2
ASTM D1330 - 2004 ~~(R2015)^{e1}~~ (R2022)	Standard Specification for Rubber Sheet Gaskets	Table 3.1.3-IV
ASTM D1785 - 2021a	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120	Table 3.1.3-III, Table 3.4, Table 3.4.2, 11.7.8
ASTM D2235 - ~~2004 (R2016)~~ 2022	Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings	Table 3.1.3-IV
ASTM D2239 – ~~2021~~ 2022	Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter	Table 3.1.3-III, Table 3.4, Table 3.4.2
ASTM D2241 – ~~2020~~ 2024	Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)	Table 3.1.3-III, Table 3.4, Table 3.4.2
ASTM D2321 - 2020	Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications	2.6.6, Table 3.1.3-XI
ASTM D2464 – ~~2015~~ 2023	Standard Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80	Table 3.1.3-III, Table 3.4
ASTM D2466 – ~~2021~~ 2024	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40	Table 3.1.3-III, Table 3.4, Table 3.5, Table 3.6, Table 3.7
ASTM D2467 – ~~2020~~ 2024	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80	Table 3.1.3-III, Table 3.4
ASTM D2564 – 2020 (R2024)	Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems	Table 3.1.3-IV
ASTM D2609 – ~~2021~~ 2024	Standard Specification for Plastic Insert Fittings for Polyethylene (PE) Plastic Pipe	Table 3.1.3-III, Table 3.4
ASTM D2657 - 2007 ~~(R2015)~~ (R2023)	Standard Practice for Heat Fusion Joining of Polyolefin Pipe and Fittings	4.2.18
ASTM D2661 - ~~2014^{e1}~~ 2024	Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings	Table 3.1.3-III, Table 3.5, Table 3.6, Table 3.7
ASTM D2665 – ~~2020~~ 2024	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings	Table 3.1.3-III, Table 3.5, Table 3.6, Table 3.7
ASTM D2672 - 2020^{e1}	Standard Specification for Joints for IPS PVC Pipe Using Solvent Cement	Table 3.1.3-IV
ASTM D2680 - 2020	Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping	Table 3.1.3-III, Table 3.5, Table 3.7
ASTM D2683 - 2020	Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing	Table 3.1.3-III, Table 3.4
ASTM D2729 – ~~2017~~ 2021	Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings	Table 3.1.3-III, Table 3.8
ASTM D2737 – ~~2021~~ 2022	Standard Specification for Polyethylene (PE) Plastic Tubing	Table 3.1.3-III, Table 3.4, Table 3.4.2
ASTM D2774 - 2021a	Standard Practice for Underground Installation of Thermoplastic Pressure Piping	2.6.6, Table 3.1.3-XI

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
ASTM D2846/D2846M - ~~2019a~~ 2024	Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Hot- and Cold-Water Distribution Systems	Table 3.1.3-III, Table 3.4, Table 3.4.2, Table 3.4.3, 4.2.14.3, 11.7.8
ASTM D2852 - 2016	Standard Specification for Styrene-Rubber (SR) Plastic Drain Pipe and Fittings (WITHDRAWN)	Table 3.1.3-III, Table 3.8
ASTM D2855 – 2020 (R2024)	Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly(Vinyl Chloride) (PVC) or Chlorinated Poly(Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets	Table 3.1.3-XI
ASTM D2949 – ~~2018~~ 2024	Standard Specification for 3.25-in. Outside Diameter Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings	Table 3.1.3-III, Table 3.5, Table 3.6, Table 3.7
ASTM D3034 – ~~2016~~ 2024	Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings	Table 3.1.3-III, Table 3.5, Table 3.7
ASTM D3035 – ~~2021~~ 2022	Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter	Table 3.1.3-III, Table 3.4, Table 3.4.2, 4.2.14.5
ASTM D3122 – ~~2015~~ 2021	Standard Specification for Solvent Cements for Styrene-Rubber (SR) Plastic Pipe and Fittings	Table 3.1.3-IV
ASTM D3138 - ~~2004 (R2016)~~ 2021	Standard Specification for Solvent Cements for Transition Joints Between Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Non-Pressure Piping Components	Table 3.1.3-IV, 4.3.9
ASTM D3139 - 2019	Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals	Table 3.1.3-IV
ASTM D3212 – ~~2020~~ 2021	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals	Table 3.1.3-IV, 4.2.11.6
ASTM D3261 – ~~2016~~ 2024	Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing	Table 3.1.3-III, Table 3.4, 4.2.18
ASTM D3262 - 2020	Standard Specification for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Sewer Pipe	Table 3.1.3-III, Table 3.5, Table 3.7
ASTM D3311 – ~~2017~~ 2022	Standard Specification for Drain, Waste, and Vent (DWV) Plastic Fittings Patterns	Table 3.1.3-III
ASTM D3517 – ~~2019~~ 2024	Standard Specification for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pressure Pipe	Table 3.1.3-III, Table 3.4
ASTM D3840 – ~~2019~~ 2024	Standard Specification for “Fiberglass” (Glass-Fiber-Reinforced Thermosetting-Resin) Pipe Fittings for ~~Non-Pressure~~ Nonpressure Applications	Table 3.1.3-III, Table 3.5, Table 3.7
ASTM D4068 – 2017 (R2022)	Standard Specification for Chlorinated Polyethylene (CPE) Sheeting for Concealed Water-Containment Membrane	Table 3.1.3-X
ASTM D4551 – ~~2017~~ 2022	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Flexible Concealed Water-Containment Membrane	Table 3.1.3-X
ASTM F402 - 2018	Standard Practice for Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings	Table 3.1.3-XI
ASTM F409 – ~~2017~~ 2022	Standard Specification for Thermoplastic Accessible and Replaceable Plastic Tube and Tubular Fittings	Table 3.1.3-VI
ASTM F437 – ~~2021~~ 2024	Standard Specification for Threaded Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80	Table 3.1.3-III, Table 3.4
ASTM F438 – ~~2017~~ 2023	Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40	Table 3.1.3-III, Table 3.4
ASTM F439 – ~~2019~~ 2024	Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80	Table 3.1.3-III, Table 3.4

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
ASTM F441/F441M – ~~2020~~ 2023	Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe, Schedules 40 and 80	Table 3.1.3-III, Table 3.4, Table 3.4.2, Table 3.4.3, 11.7.8
ASTM F442/F422M – ~~2020~~ 2023	Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR)	Table 3.1.3-III, Table 3.4, Table 3.4.2, Table 3.4.3, 4.2.14.3, 11.7.8
ASTM F477 - 2014 (R2021)	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe	Table 3.1.3-IV
ASTM F481 - 1997 (R2019)	Standard Practice for Installation of Thermoplastic Pipe and Corrugated Pipe in Septic Tank Leach Fields	Table 3.1.3-XI
ASTM F493 – ~~2020~~ 2022	Standard Specification for Solvent Cements for Chlorinated Poly(Vinyl Chloride) (CPVC) Plastic Pipe and Fittings	Table 3.1.3-IV
ASTM F628 – ~~2022~~ 2023	Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe with a Cellular Core	Table 3.1.3-III, Table 3.5, Table 3.6, Table 3.7
ASTM F656 - 2021	Standard Specification for Primers for Use in Solvent Cement Joints of Poly(Vinyl Chloride) (PVC) Plastic Pipe and Fittings	Table 3.1.3-IV
ASTM F667/F667M - 2016 (R2021)	Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings	Table 3.1.3-III, Table 3.8
ASTM F714 - ~~2021a~~ 2024	Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Outside Diameter	Table 3.1.3-III, Table 3.4, Table 3.4.2, Table 3.5, Table 3.7, 4.2.14.5, 4.2.18
ASTM F810 - 2012 ~~(R2018)~~ (R2024)	Standard Specification for Smoothwall Polyethylene (PE) Pipe for Use in Drainage and Waste Disposal Absorption Fields	Table 3.1.3-III
ASTM F876 - ~~2020b~~ 2024	Standard Specification for Crosslinked Polyethylene (PEX) Tubing	Table 3.1.3-III, Table 3.4, Table 3.4.2, Table 3.4.3
ASTM F877 – ~~2020~~ 2024	Standard Specification for Crosslinked Polyethylene (PEX) Hot- and Cold-Water Distribution Systems	Table 3.1.3-III, Table 3.4, Table 3.4.2, Table 3.4.3
ASTM F891 – ~~2016~~ 2024	Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Plastic Pipe with a Cellular Core	Table 3.1.3-III, Table 3.5, Table 3.6, Table 3.7
ASTM F1055 - 2016a (R2022)	Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and Tubing	Table 3.1.3-III, Table 3.1.3-IV, Table 3.4
ASTM F1281 - ~~2017 (R2021)^{e1}~~ 2024	Standard Specification for Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Pressure Pipe	Table 3.1.3-III, Table 3.4, Table 3.4.2, Table 3.4.3
ASTM F1282 – ~~2017~~ 2023	Standard Specification for Polyethylene/Aluminum /Polyethylene (PE-AL-PE) Composite Pressure Pipe	Table 3.1.3-III, Table 3.4, Table 3.4.2, Table 3.4.3
ASTM F1290 - 2019	Standard Practice for Electrofusion Joining Polyolefin Pipe and Fittings	Table 3.1.3-XI
ASTM F1336 - 2020	Standard Specification for Poly(Vinyl Chloride) (PVC) Gasketed Sewer Fittings	Table 3.1.3-III, Table 3.5, Table 3.7
ASTM F1476 - 2007 ~~(R2019)~~ (R2024)	Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications	Table 3.1.3-IV, 4.2.13
ASTM F1498 - 2008 (R2020)	Standard Specification for Taper Pipe Threads 60º for Thermoplastic Pipe and Fittings	4.2.14.6
ASTM F1548 - 2001 ~~(R2018)~~ (R2023)	Standard Specification for Performance of Fittings for Use with Gasketed Mechanical Couplings Used in Piping Applications	4.2.13

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
ASTM F1760 - 2016 (R2020)	Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content	Table 3.1.3-III, Table 3.5, Table 3.6, Table 3.7
ASTM F1807 - ~~2019b~~ 2023	Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring, or Alternate Stainless Steel Clamps, for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing	Table 3.1.3-III, Table 3.4
ASTM F1866 – ~~2018~~ 2023	Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Schedule 40 Drainage and DWV Fabricated Fittings	Table 3.5, Table 3.6, Table 3.7
ASTM F1960 – ~~2021~~ 2024	Standard Specification for Cold Expansion Fittings with PEX Reinforcing Rings for Use with Cross-linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing	Table 3.1.3-III, Table 3.4
ASTM F1970 – ~~2019~~ 2023	Standard Specification for Special Engineered Fittings, Appurtenances or Valves for use in Poly(Vinyl Chloride) (PVC) or Chlorinated Poly(Vinyl Chloride) (CPVC) Systems	Table 3.4
ASTM F1974 - ~~2009 (R2020)~~ 2023	Standard Specification for Metal Insert Fittings for Polyethylene/ Aluminum/Polyethylene and Crosslinked Polyethylene/Aluminum/ Crosslinked Polyethylene Composite Pressure Pipe	Table 3.1.3-III, Table 3.4
ASTM F2014 - 2000 ~~(R2019)~~ (R2024)	Standard Specification for Non-Reinforced Extruded Tee Connections for Piping Applications	Table 3.1.3-IV, 4.2.8.3
ASTM F2080 – ~~2019~~ 2023	Standard Specification for Cold-Expansion Fittings with Metal Compression-Sleeves for Crosslinked Polyethylene (PEX) Pipe and SDR9 Polyethylene of Raised Temperature (PE-RT) Pipe	Table 3.1.3-III, Table 3.4
ASTM F2098 – ~~2018~~ 2024	Standard Specification for Stainless Steel Clamps for Securing SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) to Metal Insert and Plastic Insert Fittings	Table 3.1.3-III, Table 3.4
ASTM F2159 – ~~2021~~ 2023a	Standard Specification for Plastic Insert Fittings Utilizing a Copper Crimp Ring, or Alternate Stainless Steel Clamps for SDR9 Cross- linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing	Table 3.1.3-III, Table 3.4
ASTM F2165 – ~~2019~~ 2024	Standard Specification for Flexible Pre-Insulated Piping	Table 3.1.3-III, Table 3.4
ASTM F2389 - ~~2021~~ 2024	Standard Specification for Pressure-Rated Polypropylene (PP) Piping Systems	Table 3.1.3-III, Table 3.4, Table 3.4.2, 11.7.8
ASTM F2434 - 2019	Standard Specification for Metal Insert Fittings Utilizing a Copper Crimp Ring for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Cross-linked Polyethylene/Aluminum/Cross-linked Polyethylene (PEX-AL-PEX) Tubing	Table 3.1.3-III, Table 3.4
ASTM F2618 – ~~2021~~ 2024	Standard Specification for Chlorinated Poly(Vinyl Chloride) (CPVC) Pipe and Fittings for Chemical Waste Drainage Systems	Table 3.1.3-III, Table 3.5, Table 3.6
ASTM F2620 - ~~2020ae1~~ 2024	Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings	Table 3.1.3-XI, 4.2.14.5, 4.2.18
ASTM F2735 – ~~2021~~ 2023	Standard Specification for Plastic Insert Fittings for SDR9 Cross- linked Polyethylene (PEX) and Polyethylene of Raised Temperature (PE-RT) Tubing	Table 3.1.3-III, Table 3.4
ASTM F2769 – ~~2018~~ 2024	Standard Specification for Polyethylene of Raised Temperature (PE-RT) Plastic Hot and Cold-Water Tubing and Distribution Systems	Table 3.1.3-III, Table 3.4, Table 3.4.2, Table 3.4.3

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
ASTM F2788/F2788M – ~~2021~~ 2024	Standard Specification for Metric and Inch-Sized Crosslinked Polyethylene (PEX) Pipe	Table 3.1.3-III
ASTM F2855 – 2019 (R2024)	Standard Specification for Chlorinated Poly(Vinyl Chloride)/ Aluminum/Chlorinated Poly(Vinyl Chloride) (CPVC-AL-CPVC) Composite Pressure Tubing	Table 3.1.3-III, Table 3.4, Table 3.4.2, Table 3.4.3
ASTM F3226/F3226M – 2019 (R2024)	Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems	Table 3.1.3-I, Table 3.1.3-II, Table 3.4, 10.20.4
ASTM F3347-~~2021~~ 2023	Standard Specification for Metal Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PE-RT) Tubing	Table 3.1.3-III, Table 3.4, Table 3.4.3
ASTM F3348-~~2022~~ 2023a	Standard Specification for Plastic Press Insert Fittings with Factory Assembled Stainless Steel Press Sleeve for SDR9 Cross-linked Polyethylene (PEX) Tubing and SDR9 Polyethylene of Raised Temperature (PERT) Tubing	Table 3.1.3-III, Table 3.4, Table 3.4.3
AWS A5.8/A5.8M - 2019	Specification for Filler Metals for Brazing and Braze Welding	Table 3.1.3-IV
ANSI/AWWA C104/A21.4 – ~~2016~~ 2022	Cement-Mortar Lining for Ductile-Iron Pipe and Fittings	Table 3.1.3-I
ANSI/AWWA C110/A21.10 – ~~2012~~ 2021	Ductile-Iron and Gray-Iron Fittings	Table 3.1.3-I, Table 3.4, Table 3.5, Table 3.7
ANSI/AWWA C111/A21.11 – ~~2017~~ 2023	Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings	Table 3.1.3-IV
ANSI/AWWA C151/A21.51 – ~~2017~~ 2023	Ductile-Iron Pipe, Centrifugally Cast	Table 3.1.3-I, Table 3.4
ANSI/AWWA C153/A21.53 - 2019	Ductile-Iron Compact Fittings	Table 3.1.3-I, Table 3.4, Table 3.5, Table 3.7
ANSI/AWWA C500 - 2019	Metal-Seated Gate Valves for Water Supply Service	Table 3.1.3-VIII
ANSI/AWWA C510 - 2017	Double Check Valve Backflow Prevention Assembly	10.5.3
ANSI/AWWA C511 - 2017	Reduced Pressure Principle Backflow Prevention Assembly	10.5.3
AWWA C530 – ~~2017~~ 2022	Pilot-Operated Control Valves	Table 3.1.3-VIII, 10.14.6
ANSI/AWWA C600 – ~~2017~~ 2023	Installation of Ductile-Iron ~~Water~~ Mains and Their Appurtenances	Table 3.1.3-XI
ANSI/AWWA C606 – ~~2015~~ 2022	Grooved and Shouldered Joints	Table 3.1.3-IV
ANSI/AWWA C800 - 2021	Underground Service Line Valves and Fittings	Table 3.4
ANSI/AWWA C900 – ~~2016~~ 2022	Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In. (100 mm Through 1,500 mm)	Table 3.1.3-III, Table 3.4, Table 3.4.2
ANSI/AWWA C901 - 2020	Polyethylene (PE) Pressure Pipe and Tubing, 3/4 In. Through 3 In. for Water Service	Table 3.1.3-III, Table 3.4, Table 3.4.2, 4.2.14.5
ANSI/AWWA C903 – ~~2016~~ 2021	Polyethylene-Aluminum-Polyethylene (PE-AL-PE) Composite Pressure Pipe~~, 1/2 In. through 2 In.~~ 12 mm (½ In.) Through 51 mm (2 In.), for Water Service	Table 3.1.3-III, Table 3.4, Table 3.4.2
ANSI/AWWA C904 – ~~2016~~ 2022	~~Cross-linked~~ Crosslinked Polyethylene (PEX) Pressure Tubing, ~~1/2~~ ½ In. through 3 In., for Water Service	Table 3.1.3-III, Table 3.4, Table 3.4.2
ANSI/AWWA C906 – 2021	Polyethylene (PE) Pressure Pipe and Fittings, 4 In. through 65 In., for Waterworks	4.2.14.5
ANSI/AWWA C950 - 2020	Fiberglass Pressure Pipe	Table 3.1.3-III, Table 3.4
CISPI 301 - 2021	Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications	Table 3.1.3-I, Table 3.5, Table 3.6, Table 3.7

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
CISPI 310 - 2020	Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications	Table 3.1.3-IV, 4.3.8
CSA B45.5 – ~~2017~~ 2022/IAPMO Z124 - ~~2017~~ 2022	Plastic Plumbing Fixtures	Table 3.1.3-V, 7.4.1, 7.4.2, 7.5.1, 7.5.2, 7.6.1, 7.8.1, 7.10.1, 7.11.1
CSA B45.8 – ~~2018~~ 2023/IAPMO Z403 - ~~2018~~ 2023	Terrazzo, concrete, composite stone, and natural stone plumbing fixtures	7.6.1, 7.8.1, 7.10.1, 7.11.1
CSA B45.11 - 2017/IAPMO Z401 - 2017	Glass plumbing fixtures	7.6.1, 7.11.1
CSA B45.12 – ~~2013~~ 2023/IAPMO Z402 - ~~2013 (R2018)~~ 2023	Aluminum and copper plumbing fixtures	7.6.1, 7.8.1, 7.10.1, 7.11.1
CSA B64 Series - 2021	Backflow Preventers and Vacuum Breakers	10.5.3
~~CSA B79 - 2008 (R2018)~~	~~Commercial and Residential Drains and Cleanouts~~	~~Table 3.1.3-V, 7.7.2, 7.16.1, 7.16.2, 13.5.1, 13.5.2, 13.5.3~~
CSA B125.3 – ~~2018~~ 2022	Plumbing Fittings	Table 3.1.3-VI, Table 3.1.3-VIII, 10.15.3
CSA B137.6 – ~~2020~~ 2023	Chlorinated Polyvinylchloride (CPVC) Pipe, Tubing, and Fittings for Hot- and Cold-Water Distribution Systems	Table 3.1.3-III, Table 3.4, Table 3.4.3, 11.7.8
CSA B137.9 – ~~2020~~ 2023	Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure-Pipe Systems	Table 3.1.3-III
CSA B137.10 – ~~2020~~ 2023	Crosslinked Polyethylene/Aluminum/Crosslinked Polyethylene (PEX-AL-PEX) Composite Pressure-Pipe Systems	Table 3.1.3-III
CSA B137.18 – ~~2020~~ 2023	Polyethylene of Raised Temperature Resistance (PE-RT) Tubing Systems for Pressure Applications	Table 3.1.3-III, Table 3.4, Table 3.4.2, Table 3.4.3
CSA B181.1 – ~~2021~~ 2024	Acrylonitrile-Butadiene-Styrene (ABS) Drain, Waste, and Vent Pipe and Pipe Fittings (Contained in CSA B1800-2021)	Table 3.1.3-III, Table 3.1.3-VIII
CSA B181.2 – ~~2021~~ 2024	Polyvinylchloride (PVC) and Chlorinated Polyvinylchloride (CPVC) Drain, Waste, and Vent Pipe and Pipe Fittings (Contained in CSA B1800-2021)	Table 3.1.3-III, Table 3.1.3-VIII
ASME A112.14.3-2022/CSA B481 ~~Series~~ - ~~2012 (R2021)~~ 2022	Grease ~~Interceptors~~ Removal Devices	6.2.1.1, 6.2.1.2
CSA B483.1 - 2021	Drinking Water Treatment Systems	Table 3.1.3-VII, 10.18.1
CSA B602 - 2020	Mechanical Couplings for Drain, Waste, and Vent Pipe and Sewer Pipe	Table 3.1.3-IV, 4.2.11.6
CSA/ANSI Z21.10.1 – 2019 (R2024)/ CSA 4.1 – 2019 (R2024)	Gas Water Heaters, - Volume I, Storage Water Heaters with Input Ratings of 75,000 Btu per Hour or Less	Table 3.1.3-VII, 10.15.10, 10.15.11
CSA/ANSI Z21.10.3 – 2019 (R2024)/ CSA 4.3 – 2019 (R2024)	Gas-Fired Water Heaters, - Volume III, Storage Water Heaters with Input Ratings above 75,000 Btu Per Hour, Circulating and Instantaneous	Table 3.1.3-VII, 10.15.10, 10.15.11
FM 1680 – ~~1989~~ 2025	~~Approval~~ Examination Standard for Couplings Used in Hubless Cast Iron Systems for Drain, Waste or Vent, Sewer, Rainwater or Storm Drain Systems Above and Below Ground, Industrial/Commercial and Residential	Table 3.1.3-IV, 4.3.8
~~IAPMO IGC 115 - 2013e1~~	~~Automatic Water Leak Detection Devices~~	~~10.12.10~~
IAPMO IGC 127 – ~~2018~~ 2022	Combined Hand-Washing Systems	7.6.1, 7.11.1

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
IAPMO IGC 154 - 2019	Shower and Tub/Shower Enclosures, Bathtubs with Glass Pressure- Sealed Doors, and Shower/Steam Panels	7.10.8
~~IAPMO IGC 167 - 2011a[e2] (R021)~~	~~Solid Waste Containment Interceptors~~	~~6.5, 6.7.1~~
IAPMO IGC 322 – ~~2018~~ 2021	Alkaline Water – Drinking Water Treatment Units	Table 3.1.3-VII, 7.22.2, 10.18.1
~~IAPMO IGC 349 - 2018[e1]~~	~~Electronic Plumbing Supply System Integrity Protection Devices~~	~~10.12.10~~
IAPMO PS 42 – ~~2022~~ 2024	Pipe and Tubing Alignment and Secondary Support Systems with or without Pipe and Tubing Safety or Protection	Table 3.1.3-X
IAPMO PS 66 – ~~2015~~ 2023	Dielectric Fittings	4.3.7
IAPMO PS 72 - 2019	Valves with Atmospheric Vacuum Breakers	10.5.10
IAPMO PS 94 - 2012[e1]	Insulated Protectors for P-Traps, Supply Stops, and Risers	7.2
IAPMO PS 95 - 2018[e3]	Pipe Support Hangers and Hooks	Table 3.1.3-X
IAPMO PS 106 - 2015[e1]	Tileable Shower Receptors and Shower Kits	7.10.1
IAPMO/ANSI Z601 – 2018 (R2023)	Scale Reduction Devices	Table 3.1.3-VII, 7.22.3, 10.18.1
IAPMO/ANSI/CAN Z1000 – 2019 (R2023)	Prefabricated Septic Tanks	Table 3.1.3-X, 3.3.11, 16.4.4.3
ANSI/CAN/IAPMO Z1001 - 2021	Prefabricated Gravity Grease Interceptors	Table 3.1.3-X, 6.2.1.3
IAPMO/ANSI/CAN Z1117 - 2022	Press Connections	Table 3.1.3-I, Table 3.1.3-II, Table 3.4, 4.2.6, 10.20.4
IAPMO/ANSI Z124.5 - 2013[e1] ~~(R2018)~~ (R2023)	Plastic Toilet Seats	Table 3.1.3-VI, 7.4.5
IAPMO/ANSI Z124.7 - 2013 ~~(R2018)~~ (R2023)	Prefabricated Plastic Spa Shells	Table 3.1.3-V
IAPMO/ANSI Z124.8 - 2013[e2] ~~(R2018)~~ (R2023)	Plastic Liners for Bathtubs and Shower Receptors	Table 3.1.3-VI
IAPMO/ANSI Z124.10 - 2022	Water Closet and Urinal Partitions	7.21.11, 7.21.12
IAPMO/ANSI Z1088 - 2019[e1] (R2023)	Pre-Pressurized Water Expansion Tanks	Table 3.1.3-VIII
IAPMO Z1157 - 2014[e1] ~~(R2019)~~ (R2024)	Ball Valves	Table 3.1.3-VIII
IAPMO Z1167-2023	Solid Waste Containment Interceptors	6.5, 6.7.1
IAPMO Z1349 - 2021	Devices for Detection, Monitoring or Control of Plumbing Systems	Table 3.1.3-V, 10.12.10
ICC A117.1 - 2017	Accessible and Usable Buildings and Facilities	7.21.10.1
ANSI/ISEA Z358.1 – 2014 (R2020)	American National Standard for Emergency Eyewash and Shower Equipment	Table 3.1.3-V, Table 7.21.1 Note (17), 7.24
MSS SP-58 - 2018	Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation (with Amendment 1)	Table 3.1.3-X, 8.10
MSS SP-70 - 2011	Gray Iron Gate Valves, Flanged and Threaded Ends	Table 3.1.3-VIII
MSS SP-71 - 2018	Gray Iron Swing Check Valves, Flanged and Threaded Ends	Table 3.1.3-VIII
MSS SP-80 - 2019	Bronze Gate, Globe, Angle and Check Valves	Table 3.1.3-VIII

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
MSS SP-110 - 2010	Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends (with Errata)	Table 3.1.3-VIII
NFPA 13 – ~~2022~~ 2025	Standard for the Installation of Sprinkler Systems	10.5.9
NFPA 13D - ~~2022~~ 2025	Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes	2.28, 10.5.9, 10.20.1, 10.20.2, 10.20.3, 10.20.4, 10.20.5, 10.20.7
NFPA 13R - ~~2022~~ 2025	Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies	10.5.9
NFPA 99 - ~~2021~~ 2024	Health Care Facilities Code	4.2.8.1, 4.2.8.2, 14.3.1, 14.12.1, 14.12.2
NSF/ANSI 3 – ~~2019~~ 2023	Commercial Warewashing Equipment	Table 3.1.3-VII, 7.15.1
NSF/ANSI 14 - ~~2020~~ 2023	Plastics Piping System Components and Related Materials	3.1.3, Table 3.1.3-III, Table 3.4 Note (3), 3.4.1.1
NSF/ANSI 42 - ~~2021~~ 2023	Drinking Water Treatment Units - Aesthetic Effects	Table 3.1.3-VII, 10.18.1
NSF 44 - ~~2018~~ 2024	Residential Cation Exchange Water Softeners	Table 3.1.3-VII, 10.18.1
NSF/ANSI 53 - ~~2020~~ 2023	Drinking Water Treatment Units - Health Effects	Table 3.1.3-VII, 10.18.1
NSF/ANSI 55 - ~~2020~~ 2024	Ultraviolet Microbiological Water Treatment Systems	Table 3.1.3-VII, 10.18.1
NSF/ANSI 58 - ~~2020~~ 2023	Reverse Osmosis Drinking Water Treatment Systems	Table 3.1.3-VII, 10.18.1
NSF/ANSI/CAN 61 - ~~2020~~ 2023	Drinking Water System Components - Health Effects	3.1.5, 3.3.6, 3.4.2, 3.4.3, 3.4.6, 3.4.7, Table 3.4 Note (3), 4.2.6, 7.1
NSF/ANSI/CAN 372 - ~~2020~~ 2022	Drinking Water System Components - Lead Content	3.4.6
PDI G101 - 2017	Testing and Rating Procedure for Hydro Mechanical Grease Interceptors with Appendix of Installation and Maintenance	Table 3.1.3-X, 6.1.4.2, 6.2.1.1, 6.2.2, 6.2.10
PDI G102 - 2009	Testing and Certification for Grease Interceptors with FOG Sensing and Alarm Devices	6.2.1.1
PDI WH 201 - 2017	Water Hammer Arrestors	Table 3.1.3-VIII, 10.14.7
UL - 70 - 2001	Standard for Septic Tanks, Bituminous-Coated Metal	Table 3.1.3-X
UL 174 - 2004	Standard for Safety Household Electric Storage Tank Water Heaters (with revisions through ~~October 14, 2021~~ November 1, 2024)	Table 3.1.3-VII, 10.15.10, 10.15.11
UL 399 - 2017	Standard for Safety Drinking-Water Coolers (with revisions through ~~July 31, 2020~~ February 28, 2024)	Table 3.1.3-V, 7.12.1
UL 430 - 2015	Standard for Safety Waste Disposers (with revisions through September 14, 2021)	Table 3.1.3-VII, 7.14.1
UL 499 - 2014	Standard for Safety Electric Heating Appliances (with revisions through ~~October 22, 2021~~ February 4, 2025)	Table 3.1.3-VII, 10.15.10, 10.15.11
UL 726 - 1995	Standard for Safety Oil-Fired Boiler Assemblies (with revisions through ~~October 09, 2013~~ September 24, 2024)	Table 3.1.3-VII, 10.15.11
UL 732 – ~~2018~~ 2023	Standard for Safety Oil-Fired Storage Tank Water Heaters ~~(with revisions through August 09, 2018)~~	Table 3.1.3-VII, 10.15.10, 10.15.11
UL 749 – ~~2018~~ 2023	Standard for Safety Household Dishwashers ~~(with revisions through November 30, 2018)~~	Table 3.1.3-VII, 7.15.1
UL 834 – 2004	Standard for Safety Heating, Water Supply, and Power Boilers – Electric (with revisions through ~~July 17, 2019~~ July 8, 2024)	Table 3.1.3-VII, 10.15.11
UL 921 - 2020	Standard for Safety Commercial Dishwashers (with revisions through December 17, 2024)	Table 3.1.3-VII, 7.15.1

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
UL 1206 - 2003	Standard for Safety Electric Commercial Clothes-Washing Equipment (with revisions through June 14, 2021)	Table 3.1.3-VII, 7.13.1
UL 1453 - 2016	Standard for Safety Electric Booster and Commercial Storage Tank Water Heaters (with revisions through ~~May 18, 2018~~ February 4, 2025)	Table 3.1.3-VII, 10.15.10, 10.15.11
UL 2157 – ~~2018~~ 2024	Standard for Safety Electric Clothes Washing Machines and Extractors ~~(with revisions through September 20, 2019)~~	Table 3.1.3-VII, 7.13.1
UL 60335-2-40 – ~~2019~~ 2022	Standard for Safety Household and Similar Electrical Appliances Safety Part 2-40: Particular Requirements for Electrical Heat Pumps, Air Conditioners, and Dehumidifiers	10.15.10

Basis/Reason for Change:

To update, and make current, all of the information in Table 18.1 for the 2027 NSPC. Please note CSA B79 - 2008 (R2018) is being replaced by several standards:

ASME A112.6.3-2022/CSA B79.3-2022 ASME A112.6.4-2022/CSA B79.4-2022

ASME A112.6.7-2022/CSA B79.7-2022 ASME A112.36.2-2022/CSA B79.2-2022

These standards will be included in the appropriate Code sections indicated in the last column of this Table.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 53

Proponent: Don Jones Date: 08/31/2024

Representing: Self

Mailing Address: 202 W. Summit St

City: Vineland State: NJ Zip: 08360

Phone: 609-517-1473 E-mail: donald_m_jones@att.net

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

X Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: **Table 18.1 Referenced Standards**

Correct the Table as follows leaving the balance as written:

ASTM F 2389	**4.2.14.7**		
ASTM D 2657	**4.2.14.7**	~~4.2.18~~	
ASTM F 1498	**4.2.14.8**	~~4.2.14.6~~	
ASTM F 714	**4.2.14.6**	~~4.2.14.5~~	~~4.2.18~~
ASTM F 2620	**4.2.14.6**	~~4.2.14.5~~	~~4.2.18~~
ASTM D 3035	**4.2.14.6**	~~4.2.14.5~~	
ANSI/AWWA C 901	**4.2.14.6**	~~4.2.14.5~~	
ANSI/AWWA C 906	**4.2.14.6**	~~4.2.14.5~~	

Basis/Reason for Change:

Editorial Changes to match Table 18.1 with appropriate sections

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*

2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 54

Proponent: ____Jeff Matson_____ Date: 11/04/2024

Representing: __Viega LLC_____

Mailing Address: __ 585 Interlocken Blvd _____

City: __Broomfield_____ State: __CO_____ Zip: __80021____

Phone: _978-456-3049_____ E-mail jeff.matson@viega.us _____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

__X__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: ___NSPC Table 18.1 Referenced Standards__

Add new line to Table 18.1:

ASTM B1029 – 2024	Standard Practice for Making Press-Connect Joints with Seamless Copper and Copper Alloy Tube and Press Fittings	Table 3.1.3-Part XI, Section 4.2.6 c, 10.20.4

Basis/Reason for Change:

If the earlier Proposals to add a new Section 4.2.6 c. and/or amend Table 3.1.3 – Part XI referencing ASTM B1029 are Approved, it is necessary to also add that Standard to Table 18.1 of the NSPC.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 55

Proponent: ____Jeff Matson_____ Date: 1/7/2025

Representing: __Viega LLC_____

Mailing Address: __ 585 Interlocken Blvd _____

City: __Broomfield_____ State: __CO_____ Zip: __80021____

Phone: _978-456-3049_____ E-mail jeff.matson@viega.us _____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

__X__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: ___NSPC Table 18.1 Referenced Standards_____

ASTM F3226/F3226M – 2019 (R2024)	Standard Specification for Metallic Press-Connect Fittings for Piping and Tubing Systems	Table 3.1.3-Part I, Table 3.1.3-Part II, Table 3.4, 10.20.4

Basis/Reason for Change:

ASTM F3226 was reapproved and republished in 2024 with an updated edition date, and reflecting this in the Code will keep this reference up to date. No changes were made to this Standard during the reapproval.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 56

Proponent: ____Jeff Matson_____ Date: 11/05/2024

Representing: __Viega LLC_____

Mailing Address: __ 585 Interlocken Blvd _____

City: __Broomfield_____ State: __CO_____ Zip: __80021____

Phone: _978-456-3049_____ E-mail jeff.matson@viega.us _____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

___X_ Change subsection to read as follows

_____ Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: ____ NSPC Table 18.1 Referenced Standards _____

Add new line to Table 18.1:

ASTM F3536 - 2022	Standard Specification for PE and PP Mechanical Fittings for use on NPS 3 or Smaller Cold-water Service Polyethylene (PE) or Crosslinked Polyethylene (PEX) Pipe or Tubing	Table 3.1.3 - Part III Table 3.4

Basis/Reason for Change:

If the earlier Proposals to ASTM F3536 to Tables 3.1.3 Part III and/or Table 3.4 are Approved, it is necessary to also add that Standard to Table 18.1 of the NSPC.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 57

Proponent: Abraham I. Murra Date: February 24, 2025

Representing: Jets Vacuum AS, Norway

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Phone: +1 (657) 201-1975 E-mail: abraham.murra@outlook.com

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply: X Amend section with this editorial change

_____ Change subsection to read as follows _____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows _____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: CHAPTER 18, REFERENCED STANDARDS

Table 18.1 REFERENCED STANDARDS		
Standard Number	**Standard Title**	**2024 NSPC**
CSA B45.13:19/IAPMO Z1700-2019	Vacuum waste-collection systems	2.25.6, 3.12, 11.13

Basis/Reason for Change

This code change proposal complements the change proposals submitted for NSPC *Section E.5, Vacuum Drainage Systems* and *Section 2.25.6, Vacuum Condensate Drainage Systems*.

This is a joint proposal submitted together with Jets Vacuum AS, Norway.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 58

Proponent: Lance MacNevin Date: Feb. 28, 2025

Representing: The Plastics pipe Institute (PPI)

Mailing Address: 105 Decker Ct. Suite 825 _____

City: Irving State: TX_____ Zip: 75062

Phone: 469-499-1057 ____ E-mail lmacnevin@plasticpipe.org _____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

__X__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: **Table B.5.2** _____

In **Table B.5.2,** revise the minimum supply branch pipe size from ~~1/2"~~ to 3/8 for three fixtures:

- Bidet
- Dishwasher, domestic
- Kitchen sink, domestic

TABLE B.5.2
WATER SUPPLY FIXTURE UNITS (WSFU) AND MINIMUM FIXTURE BRANCH PIPE SIZE FOR INDIVIDUAL FIXTURES

	Minimum Branch Pipe Size	
INDIVIDUAL FIXTURES	**Cold**	**Hot**
Bar Sink	3/8"	3/8"
Bathtub or Combination Bath/ Shower	1/2"	1/2"
Bidet	~~1/2"~~ 3/8"	~~1/2"~~ 3/8"
Clothes Washer, Domestic	1/2"	1/2"
Dishwasher, Domestic		~~1/2"~~ 3/8"
Drinking Fountain or Water Cooler	3/8"	
Hose Bibb (first)	1/2"	
Hose Bibb (each additional)	1/2"	
Kitchen Sink, Domestic	~~1/2"~~ 3/8"	~~1/2"~~ 3/8"

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

Basis/Reason for Change:

This proposal will allow the use of 3/8 tubing for supply of hot- and cold-water to three additional types of fixtures: i) Bidet, ii) Dishwasher, domestic, and iii) Kitchen sink, domestic.

Recent research has been published by multiple organizations, including IAPMO, regarding the issues related to oversizing water distribution pipes when following Hunter's Curve and historical pipe sizing tables. Information found within the WE-Stand indicates that water distribution pipes are often oversized for the flow rates required by modern plumbing fixtures which are subject to water conservation regulations which reduce their WSFU demand, and therefore their required supply pipe sizing.

Oversized water distribution pipes can lead to stagnant water and the potential health risk of *Legionella* growth due to this stagnation. Reducing the size of oversized water distribution pipes (i.e., "right-sizing") can reduce stagnation, improve water quality, and reduce the risk of pathogen growth. 3/8 tubing has approximately 40% less volume than 1/2 tubing, so fixtures piped with 3/8 tubing will have less stagnant water and the potential to improve water quality.

Oversized supply lines can also cause greater water usage when users flush the hot water lines, wasting water and energy. Research has shown that it takes more time and consumes more water to flush a pipe at low velocity as compared with high velocity. 3/8 tubing has approximately 40% less volume than 1/2 tubing, so hot-water fixtures piped with 3/8 tubing will require less flushing of water before hot water arrives.

Therefore, allowing the use of 3/8 tubing for certain fixtures will reduce the volume of stagnant water in branch lines, improving water quality and safety. Allowing the use of 3/8 tubing for fixtures will also provide faster delivery of hot water and reduce the amount of cold water that is wasted for flushing. This will assist with conservation of water, a critical resource.

The increased pressure drop that will result from using 3/8 tubing instead of 1/2 tubing for these three specific fixtures is not significant.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 59

Proponent: Dan O'Gorman

Representing: Dan O'Gorman

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City: Edison State: New Jersey Zip: 08837

Phone: 732-841-5799 E-mail danogorman@verizon.net

Date: 2-28-2025

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

X Amend section with this editorial change

Change subsection to read as follows

_____ Delete subsection and substitute as follows

____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section **B.8.2 Solution**

Where a section of piping serves a single hose bibb, it adds a demand of 2.5 WSFU. Where sections of the piping serve more than one hose bibb, each additional hose bibb adds a demand of 1.0 WSFU to those sections of the piping.
Exception: Where there are more than one hose bibb installed on a single-family dwelling plumbing system, the demand for only one hose bibb shall be added to the total estimated demand for the building supply

Basis/Reason for Change:

This is updating the code for the water demand calculator allowing only one hose bibb for water sizing. Appendix G 8.2.5 Continuous Supply Demand has the same wording.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 60

Proponent: Enrique Gonzalez

Date: February 28, 2025

Representing: IAPMO

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City: Ontario State: CA Zip: 91761

Phone: 909-230-5535 E-mail: Enrique.gonzalez@iapmo.org

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

___X__ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: E.5 VACUUM DRAINAGE SYSTEMS

E.5 VACUUM DRAINAGE SYSTEMS
E.5.1 General Requirements
E.5.1.1 System Design
Vacuum drainage systems shall be designed in accordance with CSA B45.13/IAPMO Z1700 manufacturer's recommendations. The system layout, including piping layout, tank assemblies, vacuum pump assembly and other components/designs necessary for proper function of the system shall be per manufacturer's recommendations. Plans, specifications and other data for such systems shall be submitted to the Authority Having Jurisdiction for review and approval prior to installation.

Basis/Reason for Change:
The CSA B45.13/IAPMO Z1700 (Vacuum Waste-Collection Systems) covers vacuum waste collection systems intended to extract and transport water, condensate from refrigerators, sanitary waste, greywater, or grease and specifies requirements for materials, construction, performance testing, and markings related to such systems. You can review a read only version of the standard at the following link: https://epubs.iapmo.org/IAPMO-Z-Standards/CSA-B45.13-IAPMO-Z1700-2019/

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 61

Proponent: ____Michael Cudahy_____ Date: __Jan. 14, 2025

Representing: ____Plastic Pipe and Fittings Association (PPFA)_____

Mailing Address: ___800 Roosevelt Rd, Bldg C Ste 312_____

City: ___Glen Ellyn_____ State: __IL_____ Zip: _60137_____

Phone: __630 363 7933_____ E-mail ___mikec@cmservices.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

____ Amend section with this editorial change

____ Change subsection to read as follows

__x___ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Delete section in entirety:

Code Section: ____E.11_____

~~E.11 PP-R and PP-RCT POLYPROPYLENE POTABLE WATER PIPING SYSTEMS~~

~~E.11.1 General~~
~~Polypropylene pressure piping systems for water service and water distribution shall comply with the following requirements of this Appendix.~~

~~E.11.2 Materials~~
~~Pipe and fittings shall comply with ASTM F2389 for PP-R or PP-RCT resin material as required herein. Piping shall comply with NSF 14, NSF 61, and NSF 372.~~

~~E.11.3 Pipe Joints~~
~~Pipe joints by heat fusion shall be the socket fusion, butt fusion, or saddle fusion type in accordance with ASTM D2657. Pipe joints by electrofusion, fusion outlets, flanges, or IPS metal threads shall comply with applicable industry standards and the manufacturer's requirements.~~

~~E.11.4 Water Service Piping~~
~~Piping for potable water service shall be rated for not less than 160 psi at 73 deg F. PP-R and PP-RCT piping shall have a dimension ratio DR 11 or lower.~~

~~E.11.5 Hot and Cold Water Distribution~~
~~Piping for potable hot and cold water distribution shall be rated for not less than 100 psi at 180 deg F and 160 psi at 73 deg~~

~~F. PP-R and PP-RCT piping shall have a dimension ratio of DR 7.4 or lower.~~

~~E.11.6 Sizing and Installation~~
~~Piping shall be sized and installed in accordance with the requirements, instructions, recommendations, and limitations of the manufacturer and the applicable requirements of this Code.~~

~~E.11.7 Requirements for Special Design Plumbing Systems~~
~~The requirements of Sections E.1, E.2, E.3, and E.4 apply to this special design plumbing system.~~

Delete Figures:

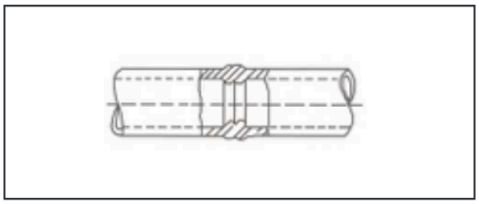

Figure E.11.5.1
Butt Fused Joint

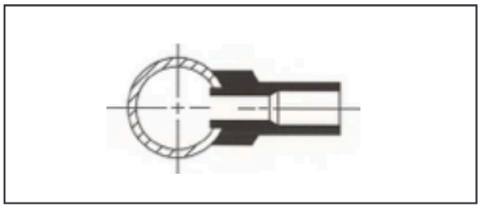

Figure E.11.5.2
Fusion Outlet Joint

Change Tables as follows:

Table 3.4 MATERIALS FOR POTABLE WATER PIPING

27	PP Plastic Piping, ~~IPS schedule 80~~	A (6)	~~X~~ A (7)	~~X~~ A (7)	ASTM F2389	ASTM F2389 (socket fused, electrofusion)

Notes for Table 3.4
(1) through (5) remain the same
(6) IPS schedule 80 or DR 11 or lower.
(7) IPS schedule 80 or DR 7.4 or lower.

Table 3.4.2 PLASTIC WATER SERVICE PIPING (1) (2) (3) (4)
(water pressure rated for not less than 160 psi at 73 deg F)

PP (ASTM F2389) IPS	PP-R	Schedule 80 or DR 11 or lower	not threaded	up through 3”

(rest of table unchanged)

Basis/Reason for Change:

Polypropylene piping is covered in two different places in the NSPC - the code body and an appendix. I propose to combine the sizing systems in the body of the code and delete appendix E.11 to accomplish this.

The proposal would be to delete appendix **E.11 PP-R and PP-RCT Polypropylene potable water piping systems information** and modify the code body with the sizing systems mentioned in the E.11 appendix to cover all types of Polypropylene piping directly in the body of the code in one place.

ASTM F2389 (Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems) already appears in the code, as does PP sizing IPS Sch 80.

It seems the code only needs the limitations on the DR for the service line and hot- and cold-water columns added to the body get rid of the appendix E.11.

PP-R is becoming a more common material and should be treated as any other approved piping material. This helps to clean up the code.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

---

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 62

Proponent: Enrique Gonzalez _____ Date: February 28, 2025

Representing: IAPMO

Mailing Address: 4750 East Philadelphia Ave

City: Ontario _____ State: CA Zip: 91761

Phone: 909-230-5535___ E-mail: Enrique.gonzalez@iapmo.org

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_X___ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: Appendix G WE-Stand Excerpts _____

Update Appendix G to sections from 2023 WE-Stand. Sections not shown remain unchanged.

Basis/Reason for Change:

Appendix G 2020 WEStand excerpts are being updated to correlate with the 2023 WeStand. Appendix G contains excerpts of the 2020 WEStand and does not include all the chapters published in WEStand. Only the 2020 WEStand excerpts are being updated.

Two additional 2023 WEStand excerpts are proposed to be included in Appendix G. Section G.3.19 introduces Non-Sewered Sanitation Systems, which are prefabricated integrated sewage treatment units that does not connect to a public sewer or private sewage disposal system. Section G. 9.0 introduces Onsite Wastewater Treatment for Direct Potable Water Use. This section addresses design and installation of onsite wastewater treatment systems for direct potable water reuse in one- and two-unit residential buildings. There is an increasing demand for water treatment and reuse systems in residential applications, and the proposed language offers an innovative and beneficial approach which is effective at reducing water consumption.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

---

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

Water Efficiency and Sanitation Standard for the Built Environment (WEStand — Excerpts)

UPDATES TO THE NSPC APPENDIX G TO THE 2023 WE-Stand

G.1 FOREWORD

Appendix G serves as a resource for code officials, plumbers, contractors, engineers, and manufacturers in designing, installing, inspecting and maintaining sustainable plumbing systems. Appendix G is intended to provide a comprehensive set of technically sound provisions that encourage sustainable practices and works towards enhancing the design of plumbing systems that result in a positive long-term environmental impact. Appendix G consists of excerpts from the ~~2020~~2023 WE•Stand copyrighted by the International Association of Plumbing and Mechanical Officials (IAPMO). No part of this Appendix may be reproduced without the permission of IAPMO.

G.2 DEFINITIONS

G.2.1 ~~General~~Applicability

For the purpose of this standard, the following terms have the meanings indicated in this chapter. No attempt is made to define ordinary words, which are used in accordance with their established dictionary meanings, except where a word has been used loosely and it is necessary to define its meaning as used in this standard to avoid misunderstanding.

~~The definitions of terms are arranged alphabetically according to the first word of the term.~~

G.2.2 Definition of Terms.

G.2.3 –A–

Agricultural Amendment. A synthetic chemical, natural, or manufactured substance or by-product, or a combination of those substances or by-products, intended to induce crop yields, plant growth or to produce any physical, microbial, or chemical change in the soil.

Air Gap, Drainage. The unobstructed vertical distance through the free atmosphere between the lowest opening from a pipe, plumbing fixture, appliance, or appurtenance conveying waste to the flood-level rim of the receptor.

Air Gap, Water Distribution. The unobstructed vertical distance through the free atmosphere between the lowest opening from a pipe or faucet conveying potable water to the flood-level rim of a tank, vat, or fixture.

G.2.4 –B–

Backflow. The flow of water or other liquids, mixtures, or substances into the distributing pipes of a potable supply of water from sources other than the intended source.

Backflow Preventer. A backflow prevention device, an assembly, or another method to prevent backflow into the potable water system.

Backwater Valve. A device installed in a drainage system to prevent reverse flow.

Biosolid. A semisolid, nutrient-rich product of the sewage wastewater treatment process. (Also known as sewage sludge).

Blackwater. Waste water containing bodily or other biological wastes discharged from toilets and kitchen sink waste.

Bottle Filling Station: A plumbing fixture that is connected to the potable water distribution and building drainage system that is designed and intended for filling personal use drinking water bottles or containers not less than 10 inches (~~250~~254 mm) in height. Such fixtures can be separate from or integral to a drinking fountain and can incorporate a water filter and a cooling system for chilling the drinking water.

Building Drain. That part of the lowest piping of a drainage system that receives the discharge from soil, waste, and other drainage pipes inside the walls of the building and conveys it to the building sewer beginning 2 feet (610 mm) outside the building wall.

Building Sewer. That part of the horizontal piping of a drainage system that extends from the end of the building drain and that receives the discharge of the building drain and conveys it to a public sewer, private sewer, private sewage disposal system, or another point of disposal.

Building Supply. The pipe carrying potable water from the water meter or another source of water supply to a building or other point of use or distribution onsite.

G.2.5 –C–

Challenge Test. The evaluation of a unit treatment process for pathogen log_{10} reduction performance using selected surrogate or indigenous constituents. This includes a detailed technology evaluation study conducted to challenge the treatment technology over a wide range of operational conditions.

~~Commode: The composting toilet fixture for collecting, containing, or transporting excreta to the compost processor.~~

Commissioning. The activities associated with bringing a new process into normal working condition.

Compost Additives: Any material such as sawdust, wood shavings, and other compostable material added to the ~~commode~~dry toilet or compost processor to maintain operational conditions within the composting toilet system.

Conditioned Space. An area, room, or space normally occupied and being heated or cooled for human habitation by any equipment.

Construction Documents. Plans, specifications, written, graphic, and pictorial documents prepared or assembled for describing the design, location, and physical characteristics of the elements of a project necessary for obtaining a permit.

Cross-Connection. A connection or arrangement, physical or otherwise, between a potable water supply system and a plumbing fixture or a tank, receptor, equipment, or device, through which it may be possible for nonpotable, used, unclean, polluted, and contaminated water, or other substances to enter into a part of such potable water system under any condition.

G.2.6 –D–

Disposal Field: An intended destination for gray water, including but not limited to, a mulch basin or receiving ~~land- scape~~landscape feature, gray water leach field, or other approved method of disposal.

Diverted Urine: Urine that is collected and has not made contact with feces.

Drainage System. Includes all the piping within public or private premises that conveys sewage, storm water, or other liquid wastes to a legal point of disposal, but does not include the mains of a public sewer system or a public sewage treatment or disposal plant.

Dry Toilet. A fixture for collecting, containing, or transporting excreta without the use of water to move contents to the compost processor. (Also known as commode, site-built toilet, or foam flush toilet.)

Dwelling Unit Footprint. The area within the inside perimeter of the exterior walls of a dwelling unit.

G.2.7 –E–

Effluent. Treated wastewater discharged from an onsite wastewater treatment system. Such wastewater may contain various pollutants depending on the level of treatment and type of source water.

Evapotranspiration (ET): The water transpired from vegetation, evaporated from the soil, water, and plant surfaces. Evapotranspiration rates are values expressed in inches per unit of time (day, week, month, or year). Evapotranspiration rates vary by components of weather conditions, including insolation, humidity, temperatures and wind, and time of year.

ETc. Evapotranspiration rate (in/hr) of the plants derived by multiplying ETo by the appropriate plant factor or coefficient.

ETo. Reference evapotranspiration rate (in/hr) for a cool-season grass as calculated by the standardized Penman-Monteith equation based on weather-station data. Common sources for obtaining local reference evapotranspiration rates are local agriculture extension services, state departments of agriculture, water agencies, irrigation professionals, the United States Geological Survey, and internet websites.

G.2.8 –F–

Fertilizer. A synthetic chemical, natural, or manufactured substance or by-product or a combination of those substances or by-products, intended to induce crop yields, plant growth or to produce any physical, microbial, or chemical change in the soil. Such substances or by-products contain five percent or more of total nitrogen (N), available phosphate (P_2O_5), or soluble potash (K_2O), singly, collectively, or in combination.

Field Verification. Performance confirmation study conducted using challenge testing, including surrogate microorganisms and/or other non-biological surrogates, usually during startup and commissioning.

G.2.9 –G–

Grade. A reference plane representing the average of finished ground level.

Gradient. The degree of inclination, or slope, of installed piping.

Groundwater. Water that exists in saturated zones beneath the land surface.

G.2.10 –H–

Heat Exchanger. A device that transfers heat from one medium to another.

Hot Water System Ratio. The ratio of the hot water system rectangle to the floor area of a dwelling unit.

Hot Water System Rectangle. The region of a dwelling that bounds the water heater, plumbing fixture fittings that supply hot water, and appliances that use hot water.

G.2.14 –L–

Landscape. That portion of a lot not covered by the footprint of a building or any hardscape including driveways, sidewalks, decks, patios, swimming pools, or spas.

Landscape, Vegetated. That portion of a landscape in which living plant material, porous landscape elements, and water features are installed or maintained, or is prepared for the installation of such material, not including vegetated roofs or undisturbed native vegetation maintained without supplemental irrigation.

Listed (Third-~~p~~Party Certified): Equipment or materials included in a list published by a listing agency (accredited conformity assessment body) that maintains periodic inspection on current production of listed equipment or materials and whose listing states either that the equipment or material complies with approved standards or has been tested and found suitable for use in a specified manner. [UPC:214.0]

Log_{10} Reduction. The removal of a pathogen or surrogate in a unit process expressed in log_{10} units of the effluent concentration over the influent concentration.

Note: A 1-log reduction equates to 90% removal, 2-log reduction to 99% removal, 3-log reduction to 99.9% removal, and so on.

Log_{10} Reduction Target (LRT). The log_{10} reduction target for the specified pathogen group (e.g., viruses, bacteria, or protozoa) to achieve the identified level of risk to individuals (e.g., 10^{-4} infection per year).

Low Flow Emitter: Low flow irrigation emission device designed to dissipate water pressure and discharge a small uniform flow or trickle of water at a constant flow rate not exceeding 6.3 gallons (24 L) per hour when operating at 30 psi (207 kPa).

G.2.16 –N–
~~No Definitions.~~

Nonwater Urinal with Drain Cleansing Action. A nonwater urinal that conveys waste into the drainage system without the use of water for flushing and automatically performs a drain-cleansing action after a predetermined amount of time.

Non-Sewered Sanitation System. A prefabricated integrated sewage treatment unit that is not connected to a public sewer or private sewage disposal system.

G.2.17 –O–
Ozonation. The process of treating water with ozone.

Ozone (Activated Oxygen, O_3). A gaseous disinfectant-oxidant (generated on-site) which produces a broad spectrum biocide used to kill bacteria, viruses, and cysts.

G.2.18 –P–
Plumbing Fixture. An approved type installed receptacle, device or appliance that is supplied with water or that receives liquid or liquid-borne wastes and discharges such wastes into the drainage system to which it may be directly or indirectly connected. Industrial or commercial tanks, vats, and similar processing equipment are not plumbing fixtures, but may be connected to or discharged into approved traps or plumbing fixtures where and as otherwise provided for elsewhere in the plumbing code.

Plumbing System. Includes all potable water, alternate water sources, building supply, and distribution pipes; all plumbing fixtures and traps; all drainage and vent pipes; and all building drains and building sewers, including their respective joints and connections, devices, receptors, and appurtenances within the property lines of the premises.

G.2.20 –R–
Rainwater: Natural precipitation that lands on a man-made, ~~impervious~~ above ground surface and can be collected on-site for beneficial uses.

Rainwater Storage Tank. A component of a rainwater catchment system used to store collected rainwater for future beneficial use. (Also known as a cistern or rain barrel.)

Raw Urine. Urine which has minimal contact with biofilms, feces, or similarly contaminated materials. Fresh urine is subject to biochemical reactions which are difficult to control.

~~Reference Evapotranspiration (ETo): Numeric value, expressed in inches/hr., calculated as the water necessary to produce maximum biomass based upon a cool-season turf grass 4-6 inches tall. Common sources for obtaining local reference evapotranspiration rates are local agriculture extension services, state departments of agriculture, water agencies, irrigation professionals, the United States Geological Survey, and internet websites.~~

G.2.21 –S–
Sanitized Urine. Raw urine which has been treated and is therefore classified as a fertilizer and/or an agricultural amendment. Leachate of less than 3 percent solids which has been treated and is therefore classified as a fertilizer and/or an agricultural amendment.

Septic Tank. A watertight receptacle that receives the discharge of a drainage system or part thereof, designed and constructed so as to retain solids, digest organic matter through a period of detention, and allow the liquids to discharge into the soil outside of the tank through a system of open joint piping or a seepage pit.

Sewage. Liquid waste containing animal or vegetable matter in suspension or solution and that may include liquids containing chemicals in solution.

Shall. Indicates a mandatory requirement.

Should. Indicates a recommendation or that which is advised but not required.

Sprinkler Body. The exterior case or shell of a landscape irrigation sprinkler that connects to the piping system and conveys water to a nozzle or orifice.

Sprinkler Head: Landscape irrigation emission device consisting of a sprinkler body and a nozzle discharging water in the form of sprays or rotating streams, not including Low Flow Emitters.

Stored Urine. Raw urine which is collected for beneficial use, is biologically active, and is not a biosolid or part of a private sewage treatment system.

Sump. A tank or pit located below the normal grade of the gravity system and receives groundwater, rainwater, stormwater, sewage, or liquid waste which is emptied by mechanical means.

Surrogate. A biological, chemical, or physical parameter used to verify pathogen reductions performances.

G.2.22 –T–
Transfer: The controlled transfer of excreta or partially processed humus between ~~commode~~dry toilet and composting processor or between multi-stage composting processors.

G.2.23 –U–
Urine Diversion: Separation of urine from other excreta that occurs at the ~~commode~~dry toilet.

Urine Diverting Dry Toilet (UDDT). A fixture for collecting, containing, or transporting urine and feces separately without the use of water through independent piping.

Urine Diverting Toilet. A fixture for collecting, containing, or transporting urine and feces separately through independent piping.

G.2.24 –V–
Validation Report. Report documenting the results of a challenge test conducted during field verification.

G.2.25 –W–
~~WaterSense: A voluntary program of the U.S. Environmental Protection Agency designed to identify and promote water-efficient products and practices.~~

Water Feature. An element, built primarily for ornamental purposes, and supplied with water. Such elements may include, but are not limited to, ponds, reflection pools, streams, waterfalls, and water fountains. Water features may be installed indoors or outdoors.

WaterSense. A voluntary program of the U.S. Environmental Protection Agency designed to identify and promote water-efficient products and practices.

G.3.2 Water-Conserving Plumbing Fixtures and Fittings

G.3.2.1 General

The maximum water consumption of fixtures and fixture fittings shall comply with the flow rates specified in Table G.3.2.1 and Section G.3.2.2 through Section G.3.2.10.

G.3.2.2 Water Closets

~~No water closet~~Water closets shall ~~have an effective flush volume exceeding 1.28 gallons (4.8 Lpf) per flush (gpf).~~be in accordance with Section G.3.2.2.1 and Section G.3.2.2.2.

TABLE G.3.2.1
MAXIMUM ~~FIXTURE AND~~FLOW RATES FOR FIXTURE FITTINGS ~~FLOW RATES~~

FIXTURE TYPE	MAXIMUM FLOW RATE[1]
RESIDENTIAL	
Kitchen faucets[2]	1.8 gpm at 60 psi
Lavatory faucets[3]	1.5 gpm at 60 psi
NON-RESIDENTIAL	
Lavatory faucets (metering)[4]	0.25 gallon/cycle
Lavatory faucets (non-metering)[4]	0.5 gpm at 60 psi
Pre-rinse spray valves	1.0 gpm for Product Class 1 (</= 5.0 ozf)[5] 1.2 gpm for Product Class 2 (> 5.0 ozf and </= 8.0 ozf) 1.28 gpm for Product Class 3 (> 8.0 ozf)
Wash fountains (metering)	0.25 gallon/cycle
Wash fountains (non-metering)	2.2 gpm at 60 psi
BOTH RESIDENTIAL AND NON-RESIDENTIAL	
Showerheads[6]	2.0 gpm at 80 psi
Water closets	1.28 gpf
Urinals	0.5 gpf

For SI units: 1 gallon = 3.785 L, 1 gallon per minute = 0.06 L/s, 1 pound-force per square inch = 6.8947 kPa, 1 ounce-force = 0.278 N, 1 ounce-force = 28.3495 grams- force

~~1 For multiple showerheads serving one shower compartment see Section G.3.2.6.1~~
~~2 Shall also be listed to EPA WaterSense Tank-Type High Efficiency Toilet Specification.~~
~~3 Shall also be listed to EPA WaterSense Flushing Urinal Specification. Nonwater urinals shall meet the specifications listed in Section G.3.2.3.1.~~
~~4 See Section G.3.2.4.~~

Notes:

[1] Maximum flow rate per fixture fitting.
[2] For temporary increased flow above the maximum rate, see Section G.3.2.4.
[3] For lavatory faucets installed in residences, apartments, and private bathrooms in lodging, hospitals, and patient care facilities (including skilled nursing and long-term care facilities).
[4] For occupancies other than those specified in Note (3).
[5] Where pre-rinse spray valves with maximum flow rates of 1.0 gpm (3.8 L/m) or less are installed, the static pressure shall be not less than 30 psi (207 kPa).
[6] For multiple showerheads serving a single shower compartment, the total allowable flow rate shall be in accordance with Section G.3.2.6.1.

G.3.2.2.1 Gravity, Pressure Assisted and Electro-Hydraulic Tank Type Water Closets

Gravity, pressure assisted, and electro-hydraulic tank type water closets shall ~~have a maximum effective flush volume of not more than 1.28 gallons (4.8 Lpf) of water per flush in accordance~~comply with ASME A112.19.2/CSA B45.1 or ASME A112.19.14 and shall also be listed to the EPA WaterSense Specification for Tank-Type Toilets. The effective flush volume for dual-flush toilets is defined as the composite, average flush volume of two reduced flushes and one full flush.

G.3.2.2.2 Flushometer-Valve Activated Water Closets
Flushometer-valve activated water closets shall ~~have a maximum flush volume of not more than 1.28 gallons (4.8 L) of water per flush in accordance~~comply with ASME A112.19.2/CSA B45.1 and shall be listed to the EPA WaterSense Specification for Flushometer-Valve Water Closets.

G.3.2.3 Urinals
Urinals shall ~~have a maximum flush volume of not more than 0.50 gallons (1.9 L) of water per flush in accordance~~comply with ASME A112.19.2/CSA B45.1 or CSA B45.5/IAPMO Z124. Flushing urinals shall be listed to the EPA WaterSense Specification for Flushing Urinals.

G.3.2.3.1 Nonwater Urinals
Nonwater urinals shall comply with ASME A112.19.3/CSA B45.4, ASME A112.19.19 or CSA B45.5/IAPMO Z124. Non-water urinals shall be cleaned and maintained in accordance with the manufacturer's instructions after installation. Where nonwater urinals are installed they shall have a water distribution line roughed-in to the urinal location at a height not less than 56 inches (1422 mm) above finished floor to allow for the installation of an approved backflow prevention device in the event of a retrofit. Such water distribution lines shall be installed with shutoff valves located as close as possible to the distributing main to prevent the creation of dead ends. Where nonwater urinals are installed, not less than one water supplied fixture rated at not less than 1 drainage fixture unit (DFU) shall be installed upstream on the same drain line to facilitate drain line flow and rinsing.
EXCEPTION: Nonwater urinals used as part of a composting toilet system.

G.3.2.3.2 Nonwater Urinals with Drain Cleansing Action
Nonwater urinals with drain cleansing action shall comply with ASME A112.19.19 and shall be cleaned, maintained and installed in accordance with the manufacturer's installation instructions.

G.3.2.4 Residential Kitchen Faucets
~~The maximum flow rate of residential kitchen faucets shall not exceed 1.8 gallons per minute (gpm) (6.8 L/m) at 60 pounds-force per square inch (psi) (414 kPa).~~ Kitchen faucets ~~are~~shall be permitted to temporarily increase the flow above the maximum rate~~, but~~ not to exceed 2.2 gpm (8.3 L/~~m~~min) at 60 psi (414 kPa), and ~~must~~shall revert to a maximum flow rate ~~of 1.8 gpm (6.8 L/m) at 60 psi (414 kPa)~~in accordance with Table G.3.2.1 upon valve closure.

G.3.2.5 Lavatory Faucets
~~The maximum water flow rate of~~ Lavatory faucets shall be in accordance with Section G.3.2.5.1 and Section G.3.2.5.2.

G.3.2.5.1 Lavatory Faucets in Residences, Apartments, and Private Bathrooms in Lodging Facilities, Hospitals, and Patient Care Facilities
~~The flow rate for lavatory~~Lavatory faucets installed in residences, apartments, and private bathrooms in lodging, hospitals, and patient care facilities (including skilled nursing and long-term care facilities) shall ~~not exceed 1.5 gpm (5.7 L/m) at 60 psi (414 kPa) in accordance~~comply with ASME A112.18.1/CSA B125.1 and shall be listed to the ~~U.S.~~ EPA WaterSense High-Efficiency Lavatory Faucet Specification.

G.3.2.5.2 Lavatory Faucets in Other Than Residences, Apartments, and Private Bathrooms in Lodging Facilities
Lavatory faucets installed in bathrooms of buildings or occupancies other than those specified in Section G.3.2.5.1 shall ~~be in accordance~~comply with ~~Section G.3.2.5.2~~ASME A112.18.1 ~~or Section G.3.2.5.2.2~~/CSA B125.1.
~~G.3.2.5.2.1 Maximum Flow Rate~~
~~The flow rate shall not exceed 0.5 gpm (1.9 L/m) at 60 psi (414 kPa) in accordance with ASME A112.18.1/CSA B125.1.~~
~~G.3.2.5.2.2 Metering Faucets~~
~~Metering faucets shall deliver not more than 0.25 gallons (1.0 L) of water per cycle.~~

G.3.2.6 Showerheads
Showerheads shall ~~not exceed a flow rate of 2.0 gpm (7.6 L/m) at 80 psi (552 kPa) and shall be listed to~~ comply with ASME A112.18.1/CSA B125.1 and shall be listed to the EPA WaterSense Specification for Showerheads.

G.3.2.6.1 Multiple Showerheads Serving One Shower Compartment
The total allowable flow rate of water from multiple showerheads flowing at any given time, with or without a diverter, including rain systems, waterfalls, bodysprays, and jets, shall not exceed 2~~.0~~ gpm (7.6 L/~~m~~min) per shower compartment, where the floor area of the shower compartment is less than 1800 square inches (1.161 m^2). For each increment of 1800 square inches (1.161 m2) of floor area thereafter or part thereof, additional showerheads are allowed, provided the total flow rate of water from all flowing devices shall not exceed 2~~.0~~ gpm (7.6 L/~~m~~min) for each such increment.
EXCEPTIONS:
(1) For ~~G~~gang showers in non-residential ~~occupancies. Singular~~buildings, singular showerheads or multiple shower outlets serving one showering position ~~in gang showers~~ shall not ~~have more than~~exceed 2~~.0~~ gpm (7.6 L/~~m~~)min) in total flow.
(2) ~~Where provided, shower~~Shower compartments ~~required~~ for persons with disabilities in accordance with ~~Table 1201~~CSA B651 or ICC A117.1 ~~of the WE-Stand~~ shall not ~~have more than~~exceed 4~~.0~~ gpm (15~~.0~~ L/~~m~~)min) in total flow, where one outlet is the hand shower.

G.3.2.7 Bath and Shower Diverters
Tub spout bath and shower diverters, while operating in the shower mode, shall perform with zero leakage.

G.3.2.8 Shower Valves
Shower valves shall meet the temperature control performance requirements of ASSE 1016/ASME A112.1016/CSA B125.16 when tested for the rated flow rate of the installed showerhead.

G.3.2.8.1 Marking. Control valves for showers and tub shower combinations shall be tagged, labeled, or marked with the manufacturer's minimum rated flow and such marking shall be visible after installation.

G.3.2.9 Recirculating Shower Systems
Recirculating shower systems shall comply with IAPMO IGC 330.

G.3.2.10 Bath and Shower Flow-Reduction Devices
Bath and shower flow-reduction devices shall comply with IAPMO IGC 244.

~~G.3.2.9~~**G.3.2.11 Commercial Pre-Rinse Spray Valves**
The flow rate for a pre-rinse spray valve installed in a commercial kitchen to remove food waste from cookware and dishes prior to cleaning shall not be more than ~~1.28 gpm (4.8 L/m) at 60 psi (414 kPa). Where pre-rinse spray valves with~~ the maximum flow ~~rates of 1.0 gpm (3.8 L/m) or less are installed, the static pressure shall be not less than 30 psi (207 kPa)~~rate, as specified in Table G.3.2.1. Commercial kitchen pre-rinse spray valves shall be equipped with an integral automatic shutoff.

G.3.2.12 Wash Fountains
Wash fountains shall be installed with not less than one fixture fitting per 20 inches (508 mm) of rim space.

~~G.3.2.10~~**G.3.2.13 Emergency Safety Showers and Eye Wash Stations**
Emergency safety showers and emergency eye wash stations shall not be limited in their water supply flow rates.

~~G.3.2.11~~**G.3.2.14 Drinking Fountains and Bottle Filling Stations**
Bottle filling stations shall be included on or used as a substitute to meet the requirements of drinking fountains in at least 50 percent of the requirements for drinking fountains. Bottle filling stations and drinking fountains shall be self closing.

~~G.3.2.12~~**G.3.2.15 Installation**
Water-conserving fixtures and fixture fittings shall be installed in accordance with the ~~manufacturer's~~ manufacturers' instructions to maintain their rated performance.

G.3.3 Composting Toilet and Urine Diversion Systems

G.3.3.1 ~~General~~Applicability
The provisions of this section shall apply to the design, construction, performance, alteration, and repair of composting toilet and urine diversion systems.

G.3.3.2 Design and Construction Requirements
Composting toilets, composting toilet systems, and urine diversion systems shall meet the design, construction, and performance requirements of Section G.3.3.2.1 or Section G.3.3.2.2.

G.3.3.2.1 Listed Composting Toilets and Composting Toilet Systems
Composting toilets and composting toilet systems shall be listed to NSF/ANSI 41 or approved by the Authority Having Jurisdiction.

G.3.3.2.2 Alternative Design Systems
Where approved by the Authority Having Jurisdiction, composting toilets, urine diverting toilets, urine diverting dry toilets (UDDTs), and urine diversion systems for residential and commercial applications shall comply with the provisions of Section G.3.3.3 through Section G.3.3.9.

G.3.3.5 Permit
It shall be unlawful for any person to construct, install, alter, or cause to be constructed, installed, or altered any composting toilet and urine diversion system in a building or on a premise without first obtaining a permit to do such work from the Authority Having Jurisdiction.
EXCEPTION: A urine reuse system that meets the following criteria:
(1) Volume does not exceed 16 ounces (473 mL) per day;
(2) Originates from a private residence;
(3) Is used by the occupants of that residence for gardening, composting, or landscaping at the residence;
(4) Does not discharge to surface waters of the state, a municipal separate storm sewer system, an industrial stormwater system or a stormwater management structure;
(5) Provides groundwater and wellhead protection as regulated by the Authority Having Jurisdiction; and
(6) Is not subject to flooding or high-water table conditions.

G.3.3.5.1 Urine Diversion Systems. No permit for any urine diversion system shall be issued until the following information is provided to the Authority Having Jurisdiction:
(1) Name of property owner
(2) Address
(3) Date of application
(4) Parcel number and size, where applicable
(5) Identification of the public sewer system or documentation for the onsite sewage system serving the property
(6) System design information:
(a) Location
(b) Type
(c) Flow rate (gpm) (L/min)
(d) Application rate (in/h) (mm/h)
(e) Design operating pressure (psi) (kPa)
(f) Manufacturer(s) of urine reuse fixtures
(g) Location of diversion valve(s)
(7) Other information required by the Authority Having Jurisdiction

G.3.3.7 Composting Toilet; Operation and Maintenance Manual
An owner's manual shall present clear instructions for maintenance and be transferred to the new owner upon transfer of property or tenancy. The owner's manual shall include:
(1) Schedule for addition of necessary compost additives.
(2) Source or provider of necessary compost additives. Source may be on-site.
(3) Schedule and instructions for all regular maintenance tasks.

(4) Expected input of and capacity for excreta and compost additives to compost toilet system specifying loading of ~~commode~~dry toilet(s) and compost processor(s).
(5) Plan for container transfer and cleaning where transfer is used.
(6) Expected schedule for removing humus from composting processors and where used secondary composting bins.
(7) Plan for on-site disposal of humus or professional removal.
(8) Plan for managing leachate.
(9) Plan for microbial testing in accordance with Section G.3.3.8.5.2.

G.3.3.8 Urine Diversion; Operation and Maintenance Manual
An owner's manual shall contain instructions for maintenance and shall be transferred to the new owner upon transfer of property or tenancy. The owner's manual shall include:
(1) Expected input of and capacity for urine storage and urine treatment additives.
(2) Nutrient management plan (sample plan).
    (a) Expected schedule for application.
    (b) Plan for application.
    (c) Source of additional additives (including onsite materials).
(3) Schedule and instructions for all regular maintenance tasks.
(4) Plan for container transfer and cleaning where transfer is used.
(5) Plan for testing in accordance with the following:
    (a) Nutrient management plan.
    (b) Certification of commercial product such as fertilizers and agricultural amendments.

(Renumber the remaining sections)

G.3.3.9 Composting Toilet System Design Requirements
The design and installation of composting toilet systems shall be in accordance with Section ~~G.3.3.8.1~~ G.3.3.9.1 through Section ~~G.3.3.8.6~~G.3.3.9.6.

G.3.3.9.1 Corrosion Resistance
All components expected to contact excreta or leachate shall be constructed of corrosion-resistant material such as stainless steel or durable polymers. Concrete in contact with excreta or leachate shall meet requirements of Section ~~G.3.3.8.2~~G.3.3.9.2.

G.3.3.9.2 Concrete Construction
Concrete construction shall be reinforced, watertight and able to withstand loading weight. Where drainage is required, the processor floor shall be sloped not less than ¼-inch per foot (20.8 mm/m) or ~~(~~2~~.0~~ percent slope~~)~~. The flange of each sub-drain shall be set level.

G.3.3.9.3 ~~Commodes~~Dry Toilets
Dry toilets shall comply with Section G.3.3.9.3.1 through Section G.3.3.9.3.2.

G.3.3.9.3.1 Odor
~~Commode~~Dry toilet design or use shall mitigate the infiltration of odors into the building during normal operation and in the event of temporary power failure.

G.3.3.9.3.2 Contact
~~Commodes~~Dry toilets shall transport excreta into the compost processor or contain excreta for transfer as designed according to the owner's manual.

G.3.3.9.3.3 Vectors
~~Commodes~~Dry toilets shall limit vectors and prevent human contact except for regular maintenance as designed according to the owner's manual.

G.3.3.9.4 Compost Processors

G.3.3.9.4.1.1 Venting
Leachate storage tanks shall be vented as required for pressure equalization. When required, vents shall be installed on leachate storage tanks and shall extend from the top of the tank. The connection of storage tank vents to the plumbing venting system shall be six inches above the flood level rim of the highest fixture. Vents extending to the outdoor shall terminate no less than 12 inches (305 mm) above grade. The vent terminal shall be directed downward and covered with a 3/32 of an inch (2.4 mm) mesh screen to prevent the entry of vermin and insects.

G.3.3.9.4.1.3 Construction
Leachate storage tanks shall be constructed of polyethylene terephthalate (PET), polyethylene ~~napthalate~~naphthalate (PEN), polyamide (Nylon) or a blend of PET, PEN, ethyl vinyl alcohol (EVOH), Nylon, HDPE, or other tanks listed or certified to US 49 CFR Section 178.274 Specifications for UN Portable Tanks.

G.3.3.9.4.1.4 Above Grade
Above grade storage tanks are prohibited where subject to freezing conditions, or shall be provided with an adequate means of freeze protection. The above grade leachate storage tank shall be provided with an audible and ~~visible~~visual high-water alarm.

G.3.3.9.4.1.5 Below Grade
Leachate storage tanks installed below grade shall be structurally designed to withstand all anticipated earth or other loads. Tank covers shall be capable of supporting an earth load of not less than 300 pounds-force per square foot (~~lb~~lbf/ft^2) (~~1465 kg/m2~~14.4 kPa) when the tank is designed for underground installation. Below grade leachate tanks installed underground shall be provided with manholes. The manhole opening shall be a minimum diameter of 20 inches (508 mm) and located a minimum of 4 inches (102 mm) above the surrounding grade. The surrounding grade shall be sloped away from the manhole. Underground tanks shall be ballasted, anchored, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold down system should meet or exceed the buoyancy force of the tank. The below grade leachate storage tank level shall be provided with an audible and ~~visible~~visual high-water alarm.

G.3.3.9.4.3 Transfer
Where unfinished excreta or diverted urine is transferred between processors or from ~~commode~~dry toilet to processor, transfer and cleaning of containers and provisions for limiting user exposure shall be according to the owner's manual.

G.3.3.9.4.5 ~~Rodentproofing~~Vermin (Rodent) Proofing
The compost processor shall be protected to prevent the entrance of rodents, vermin, and insects. No unsecured opening other than vents, drainage, or ~~commode~~dry toilet may exceed ½ inch (12.7 mm) in the least dimension.

G.3.3.9.4.6 Active Conditions
The compost processor or processors shall be sized to compost excreta for a minimum of one year of biologically active conditions. Biologically active conditions are at or above a daily average of 42°F (5.6°C).
EXCEPTION: Systems with shorter retention shall be permitted where either~~,~~:
(a) humus from the compost processor has been tested according to Section G.3.3.8.5.2 and there is either a secondary composting stage where humus is retained in a well maintained compost bin or other facility designated for the exclusive purpose of containing humus removed from the compost processor, or
(b) humus is removed off site for processing or disposal at an approved facility.

G.3.3.9.4.8 Ventilation
Negative ventilation between the ~~commode~~dry toilet and compost processor shall be provided when the compost processor is connected directly to the ~~commode~~dry toilet without a trap. ~~Commodes~~Dry toilets that are not connected to the compost processor do not require a vent.

G.3.3.9.4.9 Sizing
The compost processor shall be sized to accommodate the maximum daily adult usage as specified by the ~~manufactures~~manufacturer's published ratings. Site built compost processors shall be sized to hold a minimum

of 10 gallons of material per person per year while allowing for the removal of the humus, or as specified by the system designer.

G.3.3.9.5.2 Humus
The owner or owner's agent of the composting toilet system shall verify user's compliance with the manufacturer's maintenance and operation manual in accordance with Section G.3.3.7 by submitting a sample of the humus from the first treatment period after a minimum of one year of biologically active conditions to a certified laboratory before removal of humus from the composting processor. Where multiple compost processors are used, the humus sample shall be removed from the last compost processor. The sample collection shall be tested in accordance with EPA/625/R-92/013, Appendix F, Section 1.2. Humus shall not have a moisture content exceeding 75 percent by weight, and shall not exceed 200 fecal coliforms~~/~~ per gram (CFU/g).

G.3.3.10.1 Purpose
The purpose of this section is to enable the installation of urine ~~diversion and collection~~reuse systems ~~to improve the function of composting toilet systems and~~for beneficial use and to prevent nutrient pollution of ground and surface waters.

G.3.3.10.2 Material Requirements
Material used ~~for~~in urine ~~diversion~~reuse systems shall be impermeable and ~~resistant to~~ corrosion ~~from urine~~resistant.

G.3.3.10.5 Pipe Sizing
Pipe sizes shall be in accordance with the plumbing code. Each urine diversion fixture shall be rated as one drainage fixture unit. Piping or tubing for urine diversion that is less than the minimum pipe diameter required in the plumbing code shall be approved by the Authority Having Jurisdiction.

G.3.3.10.6 Traps
Fixtures discharging into urine diversion piping connected to the plumbing drainage system shall be trapped and vented according to the plumbing code.

G.3.3.10.6.1 Vapor Backflow Protection. Where the urine diversion system is not connected to the plumbing drainage system, urine diversion fixtures discharging into piping shall be protected with a vapor backflow seal.

G.3.3.10.7 ~~Grade~~Gradient of Horizontal Piping
Urine diversion piping shall be installed at a minimum ~~grade~~gradient of ½ inch per foot~~,~~ (in/ft) (41.7 mm/m), or 4 percent toward the point of disposal or storage.

G.3.3.10.8 Cleanouts
A cleanout shall be provided at the upper terminal of each drain line, every 50 feet (~~15 m~~15 240 mm) and at an aggregate horizontal change of direction exceeding 135 degrees (2.36 rad).

G.3.3.10.9 Venting
~~Commode~~Dry toilet fixtures without traps that require ventilation shall be connected to either a dry toilet ventilation stack or a urine diversion ventilation stack. Nonwater urinals used as urine diversion systems shall be connected to a dry toilet ventilation stack or a urine diversion ventilation stack.

G.3.3.10.11 Urine Storage Tanks
Urine storage tanks greater than 55 gallons (208 L) and having an application area of not less than 1150 square feet (106.8 m^2) shall be constructed and installed in accordance with Section G.3.3.9.11.1 through Section G.3.3.9.11.8.

G.3.3.10.11.1 Total Storage Volume. The total required storage volume (V) for a urine diversion system shall be determined in accordance with Equation G.3.3.9.11.1. The use of multiple storage tanks to meet the required total storage volume shall be permitted.

$V = A \times N \times t \times \frac{h}{24}$ (Equation G.3.3.9.11.1)

Where:
A = 0.4
h = number of hours where the system is accessible to users, hours per day
N = number of expected users
t = duration of storage time, days
V = total required volume, gallons
For SI units: 1 gallon = 3.785 L, *A* = 1.5

G.3.3.10.11.2 Venting
Urine storage tanks shall be vented as required for pressure equalization. When required, vents shall be installed on urine storage tanks and shall extend from the top of the tank. The connection of storage tank vents to the plumbing venting system shall be six inches above the flood level rim of the highest fixture. Vents extending to the outdoor shall terminate no less than 12 inches (305 mm) above grade. The vent terminal shall be directed downward and covered with a 3/32 of an inch (2.4 mm) mesh screen to prevent the entry of vermin and insects.

G.3.3.10.11.4.1 Backwater Valve
Storage tank overflows subject to backflow shall be provided with a backwater valve at the point of connection to the plumbing drainage system when connected to a public sewer system or on-site wastewater system. The backwater valve shall be accessible for inspections and maintenance.

G.3.3.10.11.4.2 Alarms
Storage tanks shall be equipped with a visible and audible alarm to indicate when the tank has reached 80 percent capacity.
EXCEPTION: Urine storage tanks utilized for sterilization or other approved treatment methods in accordance with Section G.3.3.9.14.

G.3.3.10.11.5 Construction
Urine storage tanks shall be constructed of polyethylene terephthalate (PET), polyethylene ~~napthalate~~naphthalate (PEN), polyamide (Nylon) or a blend of PET, PEN, ethyl vinyl alcohol (EVOH), Nylon, HDPE, or other tanks listed or certified to US 49 CFR Section 178.274 Specifications for UN Portable Tanks.

G.3.3.10.11.6 Above Grade
Above grade storage tanks shall be prohibited where subject to freezing conditions, or shall be provided with an adequate means of freeze protection. ~~The above grade urine storage tank shall be provided with an audible and visual high-water alarm.~~

G.3.3.10.11.7 Below Grade
Urine storage tanks installed below grade shall be structurally designed to withstand all anticipated earth or other loads. Tank covers shall be capable of supporting an earth load of not less than 300 pounds-force per square foot (~~lb~~lbf/ft^2) (~~1465 kg/m^2~~14.4 kPa) when the tank is designed for underground installation. Below grade urine tanks installed underground shall be provided with manholes. The manhole opening shall be a minimum diameter of 20 inches (508 mm) and located a minimum of 4 inches (102 mm) above the surrounding grade. The surrounding grade shall be sloped away from the manhole. Underground tanks shall be ballasted, anchored, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold down system ~~should~~shall meet or exceed the buoyancy force of the tank. ~~The below grade urine storage tank level shall be provided with an audible and visual high-water alarm.~~

G.3.3.10.11.9 Openings
All openings shall be covered and secured to prevent tampering. Openings shall be screened or covered to prevent rodent infiltration and be protected against unauthorized human entry.
Exception: Where tanks have a volume not exceeding 5 gallons (19 L) and comply with one of the following:
(1) Are connected to a fixture(s) with active ventilation, or

(2) Have an integrated seal.

G.3.3.10.12 Maintenance Plan

Every urine diversion system shall have a maintenance plan ~~that includes both a pumpout schedule and contract, or an onsite discharge plan. The maintenance plan shall also include a pipe cleaning schedule~~ supplied to the building owner.

G.3.3.10.13 ~~Treatment, Reuse, and Disposal~~ Contents of Maintenance Plan

~~Where urine is to be reused onsite, a treatment method for sanitization shall be included in the owner's manual. Approved methods of treatment shall include:~~

~~Retention without addition for six months before usage.~~

~~Two or more holding tanks shall be required for retention,~~

~~(2) Application to the compost processor,~~

~~(3) Pasteurization to 158° F. (70°C) for thirty minutes, or~~

~~(4) Other method approved by the Authority Having Jurisdiction.~~

The maintenance plan shall include the following information:

(1) Either a pumpout schedule and a contract, or an onsite discharge plan;

(2) A pipe cleaning schedule; and

(3) Designation of one or more of the following agents used for pipe cleaning:

(a) Acetic acid,

(b) Citric acid,

(c) Sodium hydroxide,

(d) Suitable biodegradable surfactant, or

(e) Other cleaning agents approved by the Authority Having Jurisdiction.

G.3.3.10.14 Treatment and Application

Where stored urine is to be reused onsite, a treatment method for achieving sanitized urine shall be included in the owner's manual. Approved methods of treatment shall include:

(1) Retention of stored urine without addition for six months before usage. Two or more holding tanks shall be required for retention,

(2) Direct application to the compost processor, or through an approved nutrient management plan (NMP) meeting fecal coliforms not exceeding 2.2 Colony Forming Units (CFU) per 100 millimeters (mL), or as determined by the Authority Having Jurisdiction,

(3) Alkaline treatment, or

(4) Where urine is heated for at least 15 seconds and not more than 30 minutes, Equation G.3.3.9.14 (1) shall be used to determine the required duration of treatment (D). Where urine is heated for at least 30 minutes at a temperature of not less than 122°F (50°C), Equation G.3.3.9.14 (2) shall be used to determine the required duration of treatment (D).

$$D = \frac{131\,700\,000}{10^{0.14T}}$$ [Equation G.3.3.9.14 (1)]

$$D = \frac{50\,070\,000}{10^{0.14T}}$$ [Equation G.3.3.9.14 (2)]

Where:

D = duration of treatment, days

T = temperature, °C

G.3.6 Water Softeners and Treatment Devices

G.3.6.1 Water Softeners
Water softeners shall be listed to NSF/ANSI 44. Water softeners shall have a rated salt efficiency exceeding 3400 grains (gr) (~~0.2200 kg~~220.3 g) of total hardness exchange per pound (lb) (0.5 kg) of salt, based on sodium chloride (NaCl) equivalency, and shall not generate more than 4 gallons (15~~.1~~ L) of water per 1000 grains (~~0.0647 kg~~64.8 g) of hardness removed during the service cycle.

G.3.6.3 Point-of-Use Reverse Osmosis Water Treatment Systems
Reverse osmosis (RO) water treatment systems shall comply with NSF/ANSI 58 and shall be equipped with automatic shutoff valves to prevent discharge when there is no call for producing treated water. ~~Reverse osmosis water treatment~~Residential RO systems shall also comply with ~~NSF58~~ASSE 1086.

G.3.7 Commercial Food Service

G.3.7.1 Ice Makers
Ice makers shall be air cooled and shall be in accordance with Energy Star for energy use for commercial ice machines. Ice makers producing cubed-type ice shall not exceed 20 gallons (76 L) of water per 100 pounds (45.4 kg) of ice produced. Ice makers producing nugget and flake ice shall not exceed 14 gallons (53 L) of water per 100 pound (45.4 kg) of ice produced.

G.3.7.2 Food Steamers
Boilerless type steamers shall not consume more than 2~~.0~~ gallons (7.6 L) per compartment. Boiler type steamers shall not consume more than 1.5 gallons (5.7 L) per pan per hour.

G.3.7.3 Combination Ovens
Combination ovens shall not use water in the convection mode except when utilizing a moisture nozzle for food products in the oven. ~~The total amount of~~ In accordance with the Energy Star program requirements, the water ~~used by the moisture nozzle~~consumption rate shall not exceed 0.4 gallons (1.5 L) per pan when in ~~the~~ convection mode and shall not exceed ~~a half a gallon per hour~~0.5 gallons (1.9 L) per ~~oven cavity. When operating~~pan when in ~~the~~ steamer mode~~, combination ovens shall not use more than 1.5 gallons (5.7 L) per hour per pan~~. The pan capacity shall be in accordance with ASTM F1495.

G.3.7.4.1 **Temperature**
Grease Interceptors shall be designed and installed to maintain a mean temperature not exceeding 95°F (35°C). FOG (fats, oils, and greases) disposal systems in compliance with ASME A112.14.6 using biological cultures shall not exceed 104°F (40°C). Passive or active cooling and heat recovery to be employed where applicable.

G.3.7.5 Dipper Well Faucets
Where dipper wells have a permanent water supply, the faucet shall have metered or sensor activated flow. The volume of water dispensed into a dipper well in each activation cycle of a self-closing fixture fitting shall not exceed the water capacity of the dipper well, and the maximum flow shall not exceed 0.2 gpm (0.8 L/~~m~~min) at a supply pressure of 60 psi (414 kPa).

G.3.7.6.1 Pulpers and Mechanical Strainers
The water use for the pulpers or mechanical strainers shall not exceed 2 gpm (7.6 L/~~m~~min). A flow restrictor shall be installed on the water supply to limit the water flow.

G.3.7.6.2 Food Waste Disposers
The water use for the food waste grinder shall not exceed the 8 gpm (30 L/min) under full load condition and 1 gpm (3.8 L/~~m~~min) under no-load condition. Flow restrictors shall be installed on the water supply to limit the water flow rate to a maximum of 8 gpm (30 L/~~m~~min). A load sensing device shall be installed to monitor current demand and regulate water flow.

G.3.7.7 Tempering Water
The discharge waste from commercial dishwashers, ware washers, combination ovens, and food steamers that exceeds 140°F (60°C) shall not be tempered with potable water.

G.3.8 Medical and Laboratory Facilities

G.3.8.3 Steam Sterilizers
Controls shall be installed to limit the discharge temperature of condensate or water from steam sterilizers to 140°F (60°C) or less. The discharge waste from steam sterilizers shall not be tempered with potable water. A venturi-type vacuum system shall not be utilized with vacuum sterilizers.

G.3.9 Leak Detection and Control

G.3.9.1 General
Where installed, leak detection and control devices shall comply with IAPMO IGC 115, ~~or~~ IAPMO IGC 349, or ANSI/CAN/IAPMO Z1349. Leak detection with control devices shall not ~~be installed where they isolate~~restrict flow to fire ~~sprinkler~~ suppression systems.

G.3.10 Fountains and Other Water Features

G.3.10.1 Use of Alternate Water Source for Water Features
Special water features such as ponds and water fountains shall be provided with reclaimed (recycled) water, rainwater, or on-site treated nonpotable water where the source and capacity is available on the premises and approved by the Authority Having Jurisdiction.

G.3.11 Meters

G.3.11.1 Required A water meter shall be required for each building site connected to a public water system, including municipally supplied reclaimed (recycled) water. ~~In other than single-family houses, a~~A dedicated meter shall be installed in accordance ~~to~~with Table G.3.11.1.

G.3.11.1.1 Meter Performance Specifications
Consumption data shall be capable of being reported within 0.35 cubic feet (ft^3) (0.01 m^3) resolution at each 15-minute interval. Flow rate data shall be capable of being reported at each 0.25 gallon per minute (gpm) (1.0 L/min) change in flow rate.

G.3.11.1.2 Unusual Flow. Data shall be capable of being analyzed when one or more of the following unusual flow conditions are met:
(1) Consumption measured is greater than 0.25 gallon per minute (gpm) (1.0 L/min) for more than 6 consecutive hours at a consistent (+/- 0.5 gpm) (+/- 2 L/min) measurement at each interval.
(2) Flow rate exceeds 0.25 gallon per minute (gpm) (1.0 L/min) more than 4 times within a 15-minute interval, where each peak is within 0.5 gpm (2.0 L/min) of each other during low water demand period(s).
(3) Average water consumption for a 15-minute interval exceeds the average water consumption by greater than 50 percent when compared to the average usage calculated in the previous measured intervals.

TABLE G.3.11.1
DEDICATED WATER METERING REQUIREMENTS

APPLICATION	REQUIREMENTS
Cooling Towers	The makeup water supply to cooling towers, evaporative condensers, and fluid coolers. Cooling towers sharing a common basin can be grouped together using one meter.
Evaporative Coolers	The makeup water supply to an evaporative cooler having an air flow exceeding 30 000 cubic feet per minute (ft^3/min) ~~(50 970.3 m3/hr)~~.
Fluid Coolers and Chillers – Open Systems	The makeup water supply on water-cooled fluid coolers and chillers not utilizing ~~C~~closed loop recirculation.

Hydronic Cooling Systems – Closed Loop	Systems with 50 ton ~~(175 843W)~~ or greater of cooling capacity and where a makeup water supply is connected.
Hydronic Heating Systems	The makeup water supply to one or more boilers collectively exceeding 1 000 000 British thermal units per hour (Btu/h) ~~(293 071 W)~~.
Industrial Processes	The water supply to an industrial water-using process where the average consumption exceeds 1000 gallons per day (gal/d) ~~(3 785 L/d)~~. Like equipment sharing one common water supply can be grouped together using one meter. **Exception:** Processes using untreated water where the water is directly returned to the original source after use.
Landscape Irrigation	Landscape irrigation water where either of the following conditions exist: 1. Single-family residential projects: Total accumulated landscape area ~~with~~served by in-ground irrigation system exceeds 2500 ~~sq. ft. (232 m2)~~square feet (ft^2), or 2. Other than single-family residential projects: Total accumulated landscape area ~~using an automatic~~served by in-ground irrigation ~~controller~~system exceeds ~~1500 sq. ft. (139 m2)~~1000 ft^2 **Exception:** Where the water purveyor provides a separate water supply meter that serves only the irrigation system, an additional dedicated meter is not required.
Onsite Water Collection Systems	Potable or reclaimed water supplies for supplementing onsite alternative water collection systems.
Ornamental Water Features	Potable or reclaimed water supplies for ornamental water features where the water feature uses an automatic refill valve.
Pools and Spas	A makeup water supply to a swimming pool or spa. **Exception:** Where the pool or spa has less than 100 ft^2 ~~square feet (9 m2)~~ of water surface and is refilled from a hose bibb without an automatic refill valve.
Roof Spray Systems	Roof spray systems for irrigating vegetated roofs or thermal conditioning covering an area greater than 300 ft^2 ~~square feet (28 m2)~~. **Exception:** Temporary above-surface spray systems connected to a hose bibb and without an automatic controller are not required to have a dedicated meter
Tenant Buildings - Common Areas	Water supplies used in common areas of a site. The dedicated meter for common area water use shall not include water supplied inside tenant space. Water supplies for sanitary fixtures and other water use in common areas can be grouped together for metering requirements, except where dedicated water meter installations are otherwise required.
Tenant Spaces - Residential	All water supplies to each residential tenant space for indoor water use. **Exception:** Where a water purveyor has individual meters for each tenant space, and the other meter requirements included in Table G.3.11.1 do not apply, no additional dedicated meter is required.
Tenant Spaces - Non-residential, car washes	All water supplies to individual non-residential tenant spaces for indoor water use where any of the following conditions exist: 1. The nominal size of a water supply pipe(s) to the individual tenant space is greater than 1/2~~"~~ of an inch, or 2. Water consumption within in the tenant space is estimated or expected to average greater than 1000 gal~~lons~~/day ~~(3 785L/d)~~. Where water is supplied to tenant space that is not required to have dedicated meter, the water supply pipe (s) shall be accessible to install a meter. **Exception:** Where a water purveyor has individual meters for each tenant space and the other meter requirements included in Table G.3.11.1 do not apply, no additional dedicated meter is required.

For SI units: 1 inch = 25 mm, 1 square foot = 0.0929 m^2, 1 gallon = 3.785 L, 1 cubic foot per minute = 0.0283 m^3/min, 1 ton of refrigeration = 3.52 kW, 1000 British thermal units per hour = 0.293 kW

G.3.12 HVAC Water Efficiency

G.3.12.3 Cooling Tower Makeup Water
Water used for air-conditioning cooling towers shall not be discharged where the hardness of the basin water is less than 88 grains per gallon (gr/gal) (1500 mg/L).
EXCEPTION: Where any of the following conditions of the basin water are present: total suspended solids exceed 25 ppm, $CaCO_3$ exceeds 600 ppm, chlorides exceed 250 ppm, sulfates exceed 250 ppm, or silica exceeds 150 ppm.

G.3.12.4 Evaporative Cooler Water Use Evaporative cooling systems ~~(also known as swamp coolers)~~ shall use less than 3.5 gallons (13.2 L) of water per ton-hour of cooling when system controls are set to maximum water use. Water use, expressed in maximum water use per ton-hour of cooling, shall be marked on the device and included in product user manuals~~,~~ and product information literature~~, and installation instructions~~. Water use information shall be readily available at the time of code compliance inspection.

G.3.12.4.1 Overflow Alarm
Cooling systems shall be equipped with an overflow alarm to alert building owners, tenants, or maintenance personnel when the water refill valve continues to allow water to flow into the reservoir when the reservoir is ~~already~~ full. The alarm shall have a minimum sound pressure level rating of 85 dBa measured at a distance of ~~ten~~10 feet (3048 mm).

G.3.12.4.3 Cooler Reservoir Discharge A water quality management system (either timer or water quality sensor) ~~is required~~shall be provided. Where timers are used, the time interval between discharge of reservoir water shall be set to 6 hours or greater of cooler operation. Where water quality sensors are used, the discharge of reservoir water shall be set ~~for greater~~to 800 ppm or ~~greater~~more of Total Dissolved Solids (TDS). Continuous discharge or continuous bleed systems ~~are~~shall be prohibited.

G.3.12.4.4 Discharge Water Reuse Discharge water shall be reused where appropriate applications exist on site. Where a nonpotable water source system exists on site, evaporative cooler discharge water shall be collected and discharged to ~~such~~the collection system.
EXCEPTION: Where the reservoir water adversely affects the quality of the nonpotable water supply making the nonpotable water unusable for its intended purposes.

G.3.12.4.5 Discharge Water to Drain
Where discharge water is not recovered for reuse, the sump overflow line shall not be directly connected to a drain. Where the discharge water is ~~put~~released into a sanitary drain, a minimum 6 inch (152 mm) air gap is required between the termination of the discharge line and the drain opening. The discharge line shall terminate in a location that is readily visible to the building owner, tenants, or maintenance personnel.

G.3.12.5.1 Drift Eliminator
A drift eliminator shall be utilized in a cooling system, utilizing alternate sources of water, where the aerosolized water ~~may come~~comes in contact with employees or members of the public.

G.3.12.5.2 Disinfection
A biocide shall be used to treat the cooling system recirculation water where the recycled water ~~may come~~comes in contact with employees or members of the public.

G.3.14 Water-Powered Sump Pumps

G.3.14.1 General
Sump pumps powered by potable or reclaimed (recycled) water pressure shall ~~only~~ be used as an emergency backup pump and shall comply with IAPMO PS 119. The water-powered pump shall be equipped with a battery powered alarm having a minimum rating of 85 dBa at 10 feet (~~3 m~~3048 mm). Water-powered pumps shall have a water efficiency factor of pumping at least 1.4 gallons (5.3 L) of water to a height of 10 feet (3048 mm) for every gallon of water used to operate the pump, measured at a water pressure of 60 psi (414 kPa). Pumps shall be clearly labeled as to the gallons of water pumped per gallon of potable water consumed.

Water-powered stormwater sump pumps shall be equipped with a reduced pressure principle backflow prevention assembly.

G.3.15 Landscape ~~and Irrigation Systems~~ Design and Installation

G.3.15.1 General

~~Where landscape irrigation systems are installed, they shall comply with Sections G.3.15.2 through G.3.15.15.~~ Vegetated landscapes greater than 500 square feet (ft2) (46.5 m2) shall comply with Section G.3.15.2 through Section G.3.15.20. Vegetated roofs shall be in accordance with Section G.3.15.21.

~~**G.3.15.1.1 Irrigation Design and Installation**~~

~~The Authority Having Jurisdiction shall have the authority to require landscape irrigation contractors, installers, or designers to demonstrate competency. The system shall be designed and record drawings showing changes during installation shall be made available for the owner and for any required inspections. Where required by the Authority Having Jurisdiction, the contractor, installer, or designer shall be licensed, certified, or both to perform such work.~~

G.3.15.2 Required Documentation

The following documents shall be provided to the owner and shall be readily accessible onsite to the Authority Having Jurisdiction at the time of inspection:

(1) The landscape plan and irrigation design as approved.

(2) Drawings and records showing any changes during installation.

(3) The report of the irrigation audit required by Section G.3.15.20.

(4) Irrigation controller information required by Section G.3.15.8.1.

G.3.15.3 Qualifications

Where permits are required, the Authority Having Jurisdiction shall have the authority to require contractors, installers, or service technicians to demonstrate competency. Where determined by the Authority Having Jurisdiction, the irrigation contractor, installer, or service technician shall be approved to perform such work.

G.3.15.4 Plant and Irrigation System Limitations

Plants not requiring supplemental irrigation shall comprise no less than 60 percent of the vegetated landscape that is not principally used as an athletic field or public recreation site. An irrigation system shall not be installed to serve more than 40 percent of the vegetated landscape.

EXCEPTIONS:

(1) Where average annual rainfall is less than 12 inches (305 mm) and in climate zones where the plant materials have an annual ETc of not exceeding 15 inches (381 mm), an in-ground irrigation system shall be allowed to be installed in 80 percent of the vegetated landscape.

(2) Where only onsite alternate water sources in accordance with Section G.4 through Section G.5 are used for irrigation.

G.3.15.4.1 Noxious Plants

Nuisance, invasive and noxious plants as defined by the Authority Having Jurisdiction shall not be installed in the landscape.

G.3.15.4.2 Athletic Fields

Athletic fields shall be irrigated with either reclaimed (recycled) or onsite alternate water sources provided in accordance with Chapter 7 through Chapter 11. Golf courses shall be planted in landscaping which does not require supplemental irrigation except for tees, fairways, and greens. The use of potable water on newly installed athletic fields shall be permitted for a period of not more than 18 months after installation or as approved by the Authority Having Jurisdiction.

G.3.15.4.3 Plant Grouping

Plants shall be grouped into hydrozones based on water use classifications. Irrigation systems shall be designed to provide water requirements to hydrozones as specified by the water use classification of the plant species. Minimum plant water demands shall be determined in accordance with ANSI/ASABE S623.1.

G.3.15.4.4 Narrow or Irregularly Shaped Areas
Vegetated landscapes less than 10 feet (3048 mm) in any direction across any opposing boundaries shall not be irrigated by any irrigation emission device except sub-surface or low flow emitters.

(renumber remaining sections)

~~G.3.15.2~~G.3.15.5 Maximum Velocity
Velocity of water flow shall not exceed 5 feet per second (1.5 m/s) for thermoplastic irrigation pipes. Velocity of water flow shall not exceed 7.5 feet per second (2.3 m/s) for metal irrigation pipes.

~~G.3.15.3~~G.3.15.6 Backflow Protection
Potable water ~~and reclaimed water~~ supplies to ~~landscape~~ irrigation systems shall be protected from backflow in accordance with the plumbing code and Authority Having Jurisdiction.

~~G.3.15.4~~G.3.15.7 Use of Alternate Water Sources for ~~Landscape~~ Irrigation
Where available by pre-existing treatment, storage or distribution network, and where approved by the Authority Having Jurisdiction, ~~alternative~~alternate water source(s) complying with Appendix G.4 shall be utilized for ~~landscape~~ irrigation. Where adequate capacity and volumes of pre-existing alternative water sources are available, the irrigation system shall be designed to use a minimum of 75 percent of ~~alternative~~alternate water ~~for~~to meet the annual irrigation demand ~~before supplemental potable water is used~~.
EXCEPTION: Plants grown for food production for direct human consumption.

~~G.3.15.4.1~~G.3.15.7.1 Master Valve
Where continuously pressurized alternate water sources supply an ~~existing~~ irrigation system, a master valve shall be installed at the point where the alternate water sources supply piping connects to the ~~existing~~ irrigation system downstream of the backflow preventer where required.

~~G.3.15.4.2~~G.3.15.7.2 Identification Where alternate water sources supply an ~~existing~~ irrigation system, the ~~existing~~ sprinkler heads, valve boxes, the continuously pressurized line supplying the irrigation master valve, or any other components required by the Authority Having Jurisdiction, shall be colored purple. The piping supplying the irrigation master valve shall be identified in accordance with Appendix G.4.

~~G.3.15.4.2.1~~G.3.15.7.2.1 Additional Zones Newly installed zones shall have purple pipe.

~~G.3.15.5~~G.3.15.8 Irrigation Control Systems
Where installed as part of ~~a landscape~~an irrigation system, irrigation control systems shall:
(1) Automatically adjust the irrigation schedule to respond to plant water needs determined by weather or soil moisture conditions.
(1) Be listed to either the EPA WaterSense Specification for Weather-Based Irrigation Controllers or the EPA WaterSense Specification for Soil Moisture-Based Irrigation Controllers.
(2) Utilize on-site ~~sensors~~sensor(s), either integral or ~~remote weather data~~auxiliary, to inhibit or suspend irrigation ~~when adequate soil moisture is present or~~ during rainfall or freezing conditions.
~~(3) Utilize either one or more on-site sensors or a weather-based irrigation controller listed to the US EPA WaterSense Weather Based Irrigation Controllers Specification to suspend irrigation when adequate soil moisture is present for plant growth.~~
~~(4) Have the capability to program multiple and different run times for each irrigation zone to enable cycling of water applications and durations to mitigate water flowing off of the intended irrigation zone.~~
~~(5) Be capable of indicating to the user when it is not receiving a signal or local sensor input.~~
~~(6) Be capable of allowing for a manual operation troubleshooting test cycle and shall automatically return to sensor input mode within some period of time as designated by the manufacturer, even when the switch is still positioned for manual operation.~~

~~(7)~~ G.3.15.8.1 Posting of Settings
The site specific settings of the irrigation control system shall be posted at the control system location and be visible at the time of inspection. The posted data, where applicable to the settings of the controller, shall include:
(1) Precipitation rate for each zone.
(2) Plant evapotranspiration coefficients for each zone.
(3) Soil type and ~~basic intake~~infiltration rate for each zone.

(4) Rain sensor settings.
(5) Soil moisture setting.
(6) Peak demand schedule including run times for each zone and the number of cycles to mitigate runoff and monthly adjustments or percentage change from peak demand schedule.

~~G.3.15.7~~G.3.15.9 Low Flow Irrigation
Irrigation zones using low flow ~~irrigation~~ emitters~~, with emitter flow rates not to exceed 6.3 gallons (24 L) per hour,~~ shall comply with ASABE/ICC 802 ~~Landscape Irrigation Sprinkler~~ and ~~Emitter Standard and~~shall be equipped with filters sized according to the manufacturer's recommendation for the specific low flow emitter, and with a pressure regulator installed upstream of the irrigation emission devices as necessary to reduce the operating water pressure ~~meeting~~in accordance with the manufacturers' equipment requirements.

~~G.3.15.8~~ G.3.15.10 Mulched Planting Areas
Only low flow emitters ~~with flow rates not to exceed 6.3 gallons (24 L) per hour are allowed to~~shall be installed in irrigated mulched planting areas with vegetation taller than 12 inches (305 mm).

~~G.3.15.9~~ G.3.15.11 System Performance Requirements
The ~~landscape~~ irrigation system shall be designed and installed to:
(1) Prevent irrigation water from runoff out of the irrigation zone.
(2) Prevent water in the supply-line ~~drainage~~ from draining out between irrigation events.
(3) Not allow irrigation water to be applied onto or enter non-targeted areas including~~:~~ adjacent property and vegetation areas, adjacent hydrozones not requiring the irrigation water to meet its irrigation demand, non-vegetative areas, impermeable surfaces, roadways, and structures.

EXCEPTION: Landscape features outside of the public right of way such as paved walkways, jogging paths, and golf cart paths, are exempted from this requirement where run off drains into the same hydrozone without puddling.

~~G.3.15.10 Narrow or Irregularly Shaped Landscape Areas~~
~~Narrow or irregularly shaped landscape areas, less than 4 feet (1 m) in any direction across any opposing boundaries shall not be irrigated by any irrigation emission device except sub-surface or low flow emitters with flow rates not to exceed 6.3 gallons (24 L) per hour.~~

G.3.15.12 Sloped Areas. Where soil surface rises more than 1 foot (305 mm) per 4 feet (1219 mm) of length, the irrigation zone system average precipitation rate shall not exceed 0.75 inches per hour (in/h) (19.1 mm/h) per hour as verified through one of the following methods:
(1) Manufacturer's documentation that the precipitation rate for the installed sprinkler head does not exceed 0.75 inches per hour (in/h) (19.1 mm/h) where the sprinkler heads are installed not closer than the specified radius and where the water pressure of the irrigation system is not more than the manufacturer's recommendations.
(2) Catch can test in accordance with the requirements of the Authority Having Jurisdiction and where emitted water volume is measured with a minimum of six catchment containers at random places within the irrigation zone for a minimum of 15 minutes to determine the average precipitation rate, expressed as inches per hour (in/h) (mm/h).

~~G.3.15.11 Irrigation System Inspection and Performance Check~~
~~The irrigation system shall be inspected to verify compliance with the irrigation design in accordance with the following:~~
~~(1) Inspection and performance check shall be by an independent third party having credentials in accordance with the US EPA WaterSense program or the Authority Having Jurisdiction.~~
~~(2) Sprinklers shall be installed as specified with proper spacing and required nozzle.~~
~~(3) Sprinklers shall be activated and visually inspected for covering areas without causing overspray or runoff.~~
~~(4) Valves shall be installed as specified.~~
~~(5) Drip irrigation systems shall be inspected to verify the proper valve, pressure regulation, filtering device, location of flush valves, and that the installed emitters comply with the irrigation plan.~~
~~(6) Control system shall be installed as specified and listed as a US EPA WaterSense labeled controller, and all sensors shall be verified for proper installation and operation.~~
~~(7) The peak demand irrigation schedule shall be posted near the controller, or the scheduling parameters for the controller shall be listed for each station including cycle and soak times.~~
~~(8) Record drawings of the irrigation system shall be completed and provided for the irrigation inspection.~~

~~(9) An inspection report shall be provided to the property owner or management company identifying problems and what corrective actions are required.~~

G.3.15.13 Sprinklers
Sprinklers shall not be installed within 24 inches (610 mm) of any non-permeable surface. Extenders over paved areas shall not be used to irrigate shrubs.
EXCEPTION: Adjacent non-permeable surfaces which are designed and constructed to drain entirely to landscaping.

~~G.3.15.12~~ G.3.15.14 Sprinkler Head Installations
All installed sprinkler heads shall comply with ASABE/ICC 802.

~~G.3.15.12.1~~ G.3.15.14.1 Sprinkler Heads in Common Irrigation Zones
Sprinkler heads installed in irrigation zones served by a common valve shall be limited to applying water to plants with similar irrigation needs, and shall have matched precipitation rates (identical inches of water application per hour as rated or tested plus or minus ~~7~~5 percent as labeled or declared in manufacturer's published performance data).

~~G.3.15.12.2~~ G.3.15.14.2 Sprinkler Head Pressure Regulation
Sprinkler heads shall utilize pressure regulating devices (as part of an irrigation system or integral to the sprinkler ~~head~~body) to maintain the manufacturer's recommended operating pressure for each sprinkler and nozzle type. Spray sprinkler bodies with integral pressure regulation shall be listed to the EPA WaterSense Specification for Spray Sprinkler Bodies.

~~G.3.15.12.3~~ G.3.15.14.3 Pop-up Type Sprinkler Heads
Where pop-up type sprinkler heads are installed, the sprinkler heads shall ~~pop-up~~rise to a height above vegetation level and of not less than 4 inches (102 mm) above the soil level when emitting water.

G.3.15.14.4 Sprinkler Head Maximum Precipitation Rate
Where the slope of the landscape exceeds 25 percent, the precipitation rate of sprinkler heads shall not exceed 1.75 inches per hour (in/h) (44.5 mm/h) when tested to ASABE/ICC 802.

~~G.3.15.13~~ G.3.15.15 Outside Hose Bibbs
Outside hose bibbs shall be allowed on irrigation pipe downstream of the backflow preventer. Hose bibbs supplying water from the irrigation system shall be indicated by posted signs marked with the words: "CAUTION: NONPOTABLE WATER. DO NOT DRINK." and the symbol in Figure G.4.3.9.

G.3.15.16 Irrigation Zone Performance Criteria
Irrigation zones shall be designed and installed to ensure the average precipitation rate of the sprinkler heads over the irrigated area does not exceed 1 inch per hour (in/h) (25.4 mm/h) as verified through either of the following methods:
(1) Manufacturer's documentation that the precipitation rate for the installed sprinkler head does not exceed 1 inch per hour (in/h) (25.4 mm/h) where the sprinkler heads are installed not closer than the specified radius and where the water pressure of the irrigation system is not more than the manufacturer's recommendations.
(2) Catch can test where emitted water volume is measured with a minimum of six catchment containers at random places within the irrigation zone for a minimum of 15 minutes to determine the average precipitation rate, expressed as inches per hour (in/h) (mm/h).

G.3.15.17 Stormwater Management and Rainwater Retention
Landscapes and structures shall be designed to include rainwater capture and stormwater infiltration capacity sufficient to prevent stormwater from either the 1 inch (25.4 mm) 24-hour rain event or the 85th percentile, 24-hour rain event from leaving the landscape. The location, installation details, and 24-hour retention or infiltration capacity of any stormwater management feature shall be included in the landscape plan and shall be readily accessible onsite to the Authority Having Jurisdiction at the time of inspection.

~~G.3.15.14~~ G.3.15.18 Depth of Irrigation Pipe
Irrigation pipe downstream from the backflow preventer shall be buried at a minimum depth according to Section ~~G.3.15.14.1~~ G.3.15.18.1 and Section ~~G.3.15.14.2~~ G.3.15.18.2. Irrigation piping shall not be installed below sewage piping.

~~G.3.15.14.1~~ G.3.15.18.1 ~~Landscape~~ Irrigated Areas
Irrigated ~~landscaped~~ areas not exceeding 10,000 square feet (929 m^2) shall have irrigation main lines buried a minimum of 12 inches (305 mm) and irrigation lateral lines buried a minimum of 8 inches (203 mm). Irrigated landscaped areas greater than 10,000 square feet (929 m^2) shall have irrigation main lines buried a minimum of 18 inches (457 mm) and irrigation lateral lines buried a minimum of 12 inches (305 mm).

~~G.3.15.14.2~~ G.3.15.18.2 Vehicular Surfaces
Irrigation pipe installed under vehicular paving and pervious pavers, including landscaped fire lanes, shall be sleeved with a minimum of one 1-inch pipe (25 mm) size greater than the irrigation pipe and buried at a minimum depth of 24 inches (610 mm) in all cases.

~~G.3.15.15~~ G.3.15.19 Backfill
All excavation for irrigation pipe installation shall be backfilled in thin layers to 12 inches (305 mm) with clean earth, which shall not contain stones, boulders, cinderfill, frozen earth, construction debris, or other materials that would damage or break the piping. Fill shall be properly compacted. Suitable precautions shall be taken to ensure permanent stability for pipe laid in filled or made ground.

G.3.15.20 Irrigation System Audit. Prior to final inspection, the irrigation system shall be audited to verify compliance with the approved irrigation design and the provisions of this chapter in accordance with the following:
(1) The audit shall be performed by an independent third party having credentials in accordance with the EPA WaterSense program or the Authority Having Jurisdiction. Irrigation audits shall not be performed by any person participating in the design or installation of the landscape.
  (a) Plants are grouped into hydrozones in accordance with Section G.3.15.4.3.
  (b) Sprinklers are installed as specified with proper spacing and required nozzle.
  (c) Sprinklers shall be activated and visually inspected for covering areas without causing overspray or runoff.
  (d) Valves are installed as specified.
  (e) Drip irrigation systems include the proper valve, pressure regulation, filtering device, location of flush valves, and that the installed emitters comply with the irrigation plan.
  (f) Control system(s) are installed as specified and listed as a EPA WaterSense labeled controller, and all sensors shall be verified for proper installation and operation.
  (g) The peak demand irrigation schedule(s) are posted near the controller, or the scheduling parameters for the controller shall be listed for each station including cycle and soak times.
  (h) Record drawings of the irrigation system are completed and provided for the irrigation inspection.
(2) The audit report shall be provided to the property owner or management company. The audit report shall identify deficiencies and corresponding corrective actions.

G.3.15.21 Vegetated Roofs and Walls. Irrigation systems using potable water for vegetative roofs and walls are prohibited.

G.3.17 Vehicle Wash Facilities

G.3.17.2 Self-Service Spray wands and foamy brushes shall use no more than 3~~.0~~ gpm (11~~.36~~ L/~~m~~min).

G.3.18.2 On and Off Switch
Pool, spa, and hot tub heaters shall be equipped with a readily accessible on and off switch to allow shutting off the heater without adjusting the thermostat setting. Pool heaters fired by natural gas shall not have continuously burning pilot lights. ~~[~~{ASHRAE 90.1:7.4.5.1~~]~~}

G.3.18.3 Covers
Pools and inground permanently installed spas~~,~~ and portable spas~~,~~ shall be provided with a non-liquid vapor retardant cover.

EXCEPTION: Where more than 70 percent of the energy for heating, computed over an operating season, is from site-recovered energy such as from a heat pump or solar energy source.

G.3.18.4 Time Switches
Time switches shall be installed on swimming pool, spa, and hot tub heaters and pumps.
EXCEPTIONS:
(1) Where public health standards require 24-hour pump operation.
(2) Where pumps are required to operate solar and waste heat recovery pool heating systems. {{ASHRAE 90.1:7.4.5.3}}

G.3.18.5 Pool Pumps and Replacement Pool Pump Motors
Pool pumps and replacement pool pump motors shall meet the requirements of APSP PHTA 15.

G.3.19 Non-Sewered Sanitation Systems

G.3.19.1 General
Non-sewered sanitation systems shall comply with ANSI/CAN/IAPMO/ISO 30500.

G.3.19.2 Installation
The installation of non-sewered sanitation systems shall be in accordance with the manufacturer's installation instructions and Section G.3.19.2.1 through Section G.3.19.2.5.

G.3.19.2.1 Operating Conditions
A non-sewered sanitation system in either a conditioned or unconditioned space shall be installed where the ambient temperature, ambient humidity, and altitude (atmospheric pressure) are in accordance with the manufacturer's installation instructions or product listing.

G.3.19.2.2 Clearances for Servicing and Maintenance
A non-sewered sanitation system shall be located to permit access and sufficient clearance for service and maintenance. Unless otherwise specified by the manufacturer's installation instructions, not less than 30 inches (762 mm) in depth, width, and height of working space shall be provided at any access panel.

G.3.19.2.3 Backflow Prevention
A domestic water supply connection to a non-sewered sanitation system shall be protected in accordance with the plumbing code.

G.3.19.2.4 Effluent Storage
Any container or vessel for the storage of effluent discharged from a non-sewered sanitation system and not integral to such system shall be installed in accordance with the plumbing code.

G.3.19.2.5 Systems Employing Combustion
A non-sewered sanitation system employing combustion shall comply with the mechanical code.

G.3.19.3 Operation and Maintenance Manual
Non-sewered sanitation systems shall have an operation and maintenance manual provided by the manufacturer.

G.3.19.4 System Output
The use or disposal of all substances exiting the non-sewered sanitation system shall be determined by the Authority Having Jurisdiction.

G.3.19.5 Connection to Plumbing System Not Required
Unless the Authority Having Jurisdiction determines otherwise, a non-sewered sanitation system shall not be required to be connected to the drainage system of the building or premises.

G.4 ALTERNATE WATER SOURCES FOR NONPOTABLE APPLICATIONS

G.4.1 General

G.4.1.1.1 Allowable Use of Alternate Water
Where approved or required by the Authority Having Jurisdiction, alternate water sources ~~(~~[reclaimed (recycled) water, gray water and onsite treated nonpotable water~~)~~] used in lieu of potable water shall be in accordance with the provisions of this chapter.

G.4.1.2 System Design
Alternate water source systems shall be designed in accordance with this chapter by a licensed plumbing contractor, ~~Registered Design Professional~~registered design professional, or a person who demonstrates competency to design the alternate water source system as required by the Authority Having Jurisdiction. Components, piping, and fittings used in any alternate water source system shall be listed.
EXCEPTIONS:
(1) A person registered or licensed to perform plumbing design work is not required to design gray water systems having a maximum discharge capacity of 250 gallons per day (gal/d) (~~15.77 L/s~~946 L/d) for single family and multi-family dwellings.
(2) A person registered or licensed to perform plumbing design work is not required to design an on-site treated nonpotable water system for single family dwellings having a maximum discharge capacity of 250 gal/d (~~15.77 L/s~~946 L/d).

TABLE G.4.1.5.1
MINIMUM ALTERNATE WATER SOURCE TESTING, INSPECTION, AND MAINTENANCE FREQUENCY

DESCRIPTION	MINIMUM FREQUENCY
Inspect and clean filters and screens, and replace (if necessary)	~~Every 3 months~~In accordance with the manufacturer's instructions or every 3 months
Inspect and verify that disinfection, filters and water quality treatment devices and systems are operational and maintaining minimum water quality requirements as determined by the Authority Having Jurisdiction	In accordance with manufacturer's instructions, and the Authority Having Jurisdiction
Inspect pumps and verify operation	After initial installation and every 12 months thereafter
Inspect valves and verify operation	After initial installation and every 12 months thereafter
Inspect pressure tanks and verify operation	After initial installation and every 12 months thereafter
Clear debris from and inspect storage tanks, locking devices, and verify operation	After initial installation and every 12 months thereafter
Inspect caution labels and marking	After initial installation and every 12 months thereafter
Inspect and maintain mulch basins for gray water irrigation systems	~~As~~Once per year, or as needed to maintain mulch depth and prevent ponding and runoff
Cross-connection inspection and test*	After initial installation and every 12 months thereafter

* The cross-connection test shall be performed in the presence of the Authority Having Jurisdiction in accordance with the requirements of this Chapter.

G.4.1.7 Minimum Water Quality Requirements
The minimum water quality for alternate water source systems shall meet the applicable water quality requirements for the intended application as determined by the Authority Having Jurisdiction. In the absence of water quality requirements for on-site treated nonpotable systems, the water quality requirements of IAPMO IGC 324, NSF/ANSI 350, or the ~~EPA/625/R-04/108~~EPA/600/R-12/618 shall apply.
EXCEPTION: Water treatment is not required for gray water used for subsurface irrigation.

G.4.1.10 Commercial, Industrial, and Institutional Restroom Signs
A sign shall be installed in all restrooms in commercial, industrial, and institutional occupancies using reclaimed (recycled) water and on-site treated water for water closets, urinals, or both. Each sign shall contain letters of a highly visible color on a contrasting background, and letters shall be at least 1/2 inch (12.7 mm) in height. The

location of the sign(s) shall be such that the sign(s) shall be visible to all users. The location of the sign(s) shall be approved by the Authority Having Jurisdiction and shall contain the following text:
TO CONSERVE WATER, THIS BUILDING USES* * TO FLUSH TOILETS AND URINALS.

G.4.1.10.1 Equipment Room Signs
Each room containing reclaimed (recycled) water and on-site treated water, equipment shall have a sign posted in a location that is visible to anyone working on or near nonpotable water equipment with the following wording in not less than 1 inch (25.4 mm) in height letters:
CAUTION: NONPOTABLE * *, DO NOT DRINK. DO NOT CONNECT TO DRINKING WATER SYSTEM. NOTICE: CONTACT BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK ON THIS WATER SYSTEM.
* * Shall indicate RECLAIMED (RECYCLED) WATER or ON-SITE TREATED WATER accordingly.

G.4.1.11 Inspection and Testing
Alternate water source systems shall be inspected and tested in accordance with Section G.4.1.11.1 and Section G.4.1.11.2.
EXCEPTION: Non-pressurized ~~gray water~~graywater or on-site nonpotable water systems without any connection to a potable water system.

G.4.1.12 Separation Requirements
All underground alternate water source service piping other than gray water shall be separated from the building sewer in accordance with the plumbing code. ~~Treated~~Pipes carrying treated nonpotable water ~~pipes~~shall be permitted to be run or laid in the same trench as potable water pipes ~~shall have~~with a 12 inch (305 mm) minimum vertical and horizontal separation ~~when~~where both pipe materials are approved for use within a building. Where horizontal piping materials do not ~~meet~~comply with this requirement, the minimum separation shall be increased to 60 inches (1524 mm). The potable water piping shall be installed at an elevation above the treated nonpotable water piping.

G.4.2 Gray Water Systems

G.4.2.2 Gray Water Collection Piping
~~New single-family dwellings shall have the a separate waste~~ Gray water collection piping ~~system for all gray water fixtures per the Plumbing Code. The separate piping system~~ shall be ~~piped to outside the building and terminate into an approved Gray Water Diverter Valve per Section G.4.2.5 before connecting to the waste system from non-gray water fixtures.~~
~~EXCEPTION: Where ground conditions do not provide percolation or where prohibited by~~in accordance with the plumbing code.

G.4.2.6.1 Cleanout Labeling. Cleanouts for drains that pass through a backwater valve shall be clearly identified with a permanent label stating: "BACKWATER VALVE DOWNSTREAM."

TABLE G.4.2.8
LOCATION OF GRAY WATER SYSTEM

MINIMUM HORIZONTAL DISTANCE ~~IN CLEAR~~ REQUIRED FROM:	SURGE TANK (feet)	SUBSURFACE AND SUBSOIL IRRIGATION FIELD AND MULCH BED (feet)
Building structures[1]	~~5[2],9~~0	2~~[3],8~~[2]7
Property line adjoining private property	5	5~~[8]~~[7]
Water supply wells~~[4]~~[3]	50	100
Streams and lakes~~[4]~~[3]	50	50~~[5]~~[4]
Sewage pits or cesspools	5	5
Sewage disposal field	5	4~~[6]~~[5]
Septic tank	0	5

On-site domestic water service line	5	5
Pressurized public water main	10	10~~7~~[6]

For SI units: 1 foot = 304.8 mm

Note~~s~~: ~~Where irrigation or disposal fields are installed in sloping ground, the minimum horizontal distance between any part of the distribution system and the ground surface shall be 15 feet (4572 mm).~~

~~1 Including~~

~~porches and steps, whether covered or uncovered, breezeways, roofed carports, roofed patios, carports, covered walks, covered driveways, and similar structures or appurtenances.~~

~~2 The distance shall be permitted to be reduced to 0 feet for aboveground~~

~~tanks when first approved by the Authority Having Jurisdiction.~~

~~3 Reference to a 45 degree (0.79 rad) angle from foundation.~~

~~4 Where special hazards are involved, the distance required shall be increased as directed by the Authority Having Jurisdiction.~~

~~5 These minimum clear horizontal distances shall also apply between~~

~~The irrigation or disposal field and the ocean mean higher high tide line. 6 Add 2 feet (610 mm) for each additional foot of depth in excess of 1 foot (305 mm) below the bottom of the drain line.~~

~~7 For parallel construction or for crossings, approval by the Authority Having Jurisdiction shall be required.~~

~~8 The distance shall be permitted to be reduced to 1 ½ feet (457 mm)~~

~~for drip and mulch basin irrigation systems.~~

~~9 The distance shall be permitted to be reduced to 0 feet for surge tanks of 75 gallons (284 L) or less.~~

[1] Building structures do not include porches and steps, whether covered or uncovered, breezeways,roofed carports, roofed patios, carports, covered walks, covered drive- ways, and similar structures or appurtenances.

[2] Reference to a 45 degree (0.79 rad) angle from foundation.

[3] Where special hazards are involved, the distance required shall beincreased as directed by the Authority Having Jurisdiction.

[4] These minimum clear horizontal distances shall also apply between the irrigation or disposal field and the ocean mean higher high tide line.

[5] Add 2 feet (610 mm) for each additional foot of depth in excess of 1 foot(305 mm) below the bottom of the drain line.

[6] For parallel construction or for crossings, approval by the Authority Having Jurisdiction shall be required.

[7] The distance shall be permitted to be reduced to 1½ feet (457 mm) fordrip and mulch basin irrigation systems.

G.4.2.12.1 Single Family Dwellings and Multi-Family Dwellings

The gray water discharge for single family and multi-family dwellings shall be calculated by water use records, calculations of local daily per person interior water use, or the following procedure:

(1) The number of occupants of each dwelling unit shall be calculated as follows:
First ~~Bedroom~~bedroom 2 occupants
Each additional bedroom 1 occupant

(2) The estimated gray water flows of each occupant shall be calculated as follows:
Showers and bathtubs 13 gallons (~~50~~49 L) per day/occupant
Lavatories 4 gallons (15 L) per day/occupant
Laundry 10 gallons (38 L) per day/occupant

(3) The total number of occupants shall be multiplied by the applicable estimated gray water discharge as provided above and the type of fixtures connected to the gray water system.

G.4.2.13.1 Surge Tanks

Where installed, surge tanks shall comply with the following:

(1) Surge tanks shall be constructed of solid, durable materials not subject to excessive corrosion or decay and shall be watertight. Surge tanks constructed of steel shall be approved by the Authority Having Jurisdiction, provided such tanks comply with approved applicable standards.

(2) Each surge tank shall be vented as required by the plumbing code. The vent size shall be determined based on the total gray water fixture units as outlined in the plumbing code.

(3) Each surge tank shall have an access opening with lockable gasketed covers or approved equivalent to allow for inspection and cleaning.

(4) Each surge tank shall have its rated capacity permanently marked on the unit. In addition, a sign stating GRAY WATER, DANGER — UNSAFE WATER shall be permanently marked on the holding tank.
(5) Each surge tank shall have an overflow drain. The overflow drains shall have permanent connections to the building drain or building sewer, upstream of septic tanks, if any. The overflow drain shall not be equipped with a shutoff valve.
(6) The overflow drainpipes shall not be less in size than the inlet pipe. Unions or equally effective fittings shall be provided for all piping connected to the surge tank.
(7) Surge tank shall be structurally designed to withstand anticipated earth or other loads. Surge tank covers shall be capable of supporting an earth load of not less than 300 pounds-force per square foot (~~lb~~lbf/ft^2) (~~1465 kg/m2~~14.4 kPa) when the tank is designed for underground installation.
~~(8) If a surge tank is installed underground, the system shall be designed so that the tank overflow will gravity drain to the existing sewer line or septic tank.~~
(8) The tank shall be protected against sewer line backflow by a backwater valve installed in accordance with the plumbing code.
(9) Surge tanks shall be installed on dry, level, well-compacted soil if underground or on a level 3 inch (76 mm) thick concrete slab if aboveground.
(10) Surge tanks shall be anchored to prevent against overturning when installed aboveground. Underground tanks shall be ballasted, anchored, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold down system shall meet or exceed the buoyancy forces of the tank.

G.4.2.13.3 Subsoil Irrigation Field Materials
Subsoil irrigation field piping shall be constructed of perforated high-density polyethylene pipe, perforated ABS pipe, perforated PVC pipe, or other approved materials, provided that sufficient openings are available for distribution of the gray water into the trench area. Material, construction, and perforation of the pipe shall be in compliance with the appropriate ~~ab- sorption~~absorption field drainage piping standards and shall be approved by the Authority Having Jurisdiction.

G.4.2.17 Special Provisions
Special provisions for gray water systems shall comply with Section G.4.2.17.1 and Section G.4.2.17.2.

G.4.2.17.1 Other Collection and Distribution Systems Other collection and distribution systems shall be approved by the local Authority Having Jurisdiction~~, as allowed by Section 102.0 of the WE-Stand~~ and the plumbing code.

G.4.3 Reclaimed (Recycled) Water Systems

G.4.3.5 Water Pressure. Reclaimed (recycled) water systems supplying water to water closets, urinals, and trap primers shall be capable of delivering not less than 15 pounds-force per square inch (psi) (103 kPa) residual pressure at the highest and most remote outlet served. Where the water pressure in the reclaimed water supply system within the building exceeds 80 psi (552 kPa), a pressure reducing valve reducing the pressure to 80 psi (552 kPa) or less to water outlets in the building shall be installed.

(renumber remaining sections)

G.4.4 On-Site Treated Nonpotable Water Systems

G.4.4.5 Water Pressure
On-site treated non-potable water systems supplying water to water closets, urinals, and trap primers shall be capable of delivering not less than 15 pounds-force per square inch (psi) (103 kPa) residual pressure at the highest and most remote outlet served. Where the water pressure in the on-site treated non-potable water supply system within the building exceeds 80 psi (552 kPa), a pressure reducing valve reducing the pressure to 80 psi (552 kPa) or less to water outlets in the building shall be installed.

(renumber remaining sections)

G.4.4.7 On-Site Treated Nonpotable Water Devices and Systems
Devices or equipment used to treat on-site treated nonpotable water in order to maintain the minimum water quality requirements determined by the Authority Having Jurisdiction shall be listed ~~or~~and labeled (third-party certified) by a listing agency (accredited conformity assessment body) or approved for the intended application. Devices or equipment used to treat on-site treated nonpotable water for use in water closet and urinal flushing, surface irrigation and similar applications shall ~~be listed or labeled to~~comply with IAPMO ~~IGC207~~IGC 324, NSF/ANSI 350, or as approved by the Authority Having Jurisdiction.

G.4.4.10.2 Minimum Water Quality
On-site treated nonpotable water supplied to toilets or urinals or for other uses in which it is sprayed or exposed shall be disinfected. Acceptable disinfection methods shall include chlorination, ultraviolet ~~sterilization, ozone~~disinfection, ozonation, or other methods as approved by the Authority Having Jurisdiction. The minimum water quality for on-site treated nonpotable water systems shall meet the applicable water quality requirements for the intended applications as determined by the Authority Having Jurisdiction. Potable water shall be supplied to personal hygiene devices (bidet and bidet seats).

G.5 NONPOTABLE RAINWATER CATCHMENT SYSTEMS

G.5.1.2 System Design
Rainwater catchment systems shall be designed in accordance with this chapter by a licensed plumbing contractor, ~~Registered Design Professional~~registered design professional, or a person who demonstrates competency to design rainwater catchment systems as required by the Authority Having Jurisdiction. Components, piping, and fittings used in any rainwater catchment systems shall be listed.
EXCEPTIONS:
(1) Rainwater catchment systems used for irrigation with a maximum storage capacity of 5~~,~~ 000 gallons (18 927 L) where the tank is supported directly upon grade and the ratio of height to width (or diameter) does not exceed 2 to 1.
(2) Rainwater catchment systems for single family dwellings where all outlets, piping, and system components are located on the exterior of the building.

TABLE G.5.1.5.1
MINIMUM ALTERNATE WATER SOURCE TESTING, INSPECTION, AND MAINTENANCE FREQUENC

DESCRIPTION	MINIMUM FREQUENCY
Inspect and clean filters and screens, and replace (if necessary)	Every 3 months
Inspect and verify that disinfection, filters and water quality treatment devices and systems are operational and maintaining minimum water quality requirements as determined by the Authority Having Jurisdiction	In accordance with manufacturer's instructions, and the Authority Having Jurisdiction
Inspect and clear debris from rain- water gutters, downspouts, and roof washers	Every 6 months
Inspect and clear debris from roof or other aboveground rainwater collection surfaces	Every 6 months
Remove tree branches and vegetation overhanging roof or other aboveground rainwater collection surfaces	As needed
Inspect pumps and verify operation	After initial installation and every 12 months thereafter
Inspect valves and verify operation	After initial installation and every 12 months thereafter
Inspect pressure tanks and verify operation	After initial installation and every 12 months thereafter
Clear debris from and inspect storage tanks, locking devices, and verify operation	After initial installation and every 12 months thereafter
Inspect caution labels and marking	After initial installation and every 12 months thereafter
~~Inspect and maintain mulch basins for gray water irrigation systems As needed to maintain mulch depth and prevent ponding~~	After initial installation and every 12 months thereafter

~~and runoff~~ Cross-connection inspection and test*	
Test water quality of rainwater catchment systems required by Section 1103.5 to maintain a minimum water quality	Every 12 months. After system renovation or repair.

* The cross-connection test shall be performed in the presence of the Authority Having Jurisdiction in accordance with the requirements of this chapter.

G.5.2 Nonpotable Rainwater Catchment Systems

G.5.2.1 General
The provisions of this section shall apply to the installation, construction, alteration, and repair of rainwater catchments systems intended to supply uses such as water closets, urinals, trap primers for floor drains and floor sinks, irrigation, industrial processes, water features, cooling tower makeup and other uses approved by the Authority Having Jurisdiction. ~~Additional design criteria can be found in the ARCSA/ASPE 63 Standard.~~

G.5.3 Design and Installation
G.5.3.1 Rainwater Catchment Systems. The design and installation of nonpotable rainwater catchment systems shall be in accordance with Section G.5.3.2 through Section G.5.3.16.

(renumber remaining sections)

G.5.3.4 Minimum Water Quality
The minimum water quality for harvested rainwater shall meet the applicable water quality requirements for the intended applications as determined by the Authority Having Jurisdiction. In the absence of water quality requirements determined by the Authority Having Jurisdiction, the minimum treatment and water quality shall ~~also comply~~be in accordance with Table G.5.3.4, IAPMO IGC 324, or NSF/ANSI 350.
EXCEPTION: No treatment is required for rainwater used for subsurface or nonsprinkled surface irrigation where the maximum storage volume is less than 360 gallons (1 363 L).

~~**G.5.3.4.1 Treatment**~~
~~If the quality of the tested water cannot consistently be maintained at the minimum levels specified in Table G.5.3.4, then the system shall be equipped with an appropriate treatment device meeting applicable NSF Standard referenced in Table 901.1.~~

G.5.3.5.4 Below Grade
Rainwater storage tanks installed below grade shall be structurally designed to withstand all anticipated earth or other loads. Holding tank covers shall be capable of supporting an earth load of not less than 300 pounds-force per square foot (~~lb~~lbf/ft^2) (~~1465 kg/m2~~14.4 kPa) when the tank is designed for underground installation. Below grade rainwater tanks installed underground shall be provided with manholes. The manhole opening shall not be less than 20 inches (508 mm) in diameter and located not less than 4 inches (102 mm) above the surrounding grade. The surrounding grade shall be sloped away from the manhole. Underground tanks shall be ballasted, anchored, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold down system should meet or exceed the buoyancy force of the tank.

G.5.3.5.8 Storage Tank Venting
Where venting by means of drainage or overflow piping is not provided or is considered insufficient, a vent shall be installed on each tank. The vent shall extend from the top of the tank and terminate a minimum of 6 inches (152 mm) above grade and shall be a minimum of 1½ inches (~~38~~40 mm) in diameter. The vent terminal shall be directed downward and covered with a 3/32 inch (2.4 mm) mesh screen to prevent the entry of vermin and insects.

G.5.3.13.1 Commercial, Industrial, and Institutional Restroom Signs
A sign shall be installed in all restrooms in commercial, industrial, and institutional occupancies using nonpotable rainwater for water closets, urinals, or both. Each sign shall contain not less than ½ inch (12.7 mm) letters of a highly visible color on a contrasting background. The location of the sign(s) shall be such that the sign(s) shall be visible to

all users. The number and location of the sign(s) shall be approved by the Authority Having Jurisdiction and shall contain the following text:
TO CONSERVE WATER, THIS BUILDING USES RAINWATER TO FLUSH TOILETS AND URINALS.

G.5.3.13.2 Equipment Room Signs
Each equipment room containing nonpotable rainwater equipment shall have a sign posted ~~in a location that is visible to anyone working on or near nonpotable water equipment~~ with the following wording in not less than 1 inch (25.4 mm) letters:
CAUTION: NONPOTABLE RAINWATER, DO NOT DRINK. DO NOT CONNECT TO DRINKING WATER SYSTEM. NOTICE: CONTACT BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK ON THIS WATER SYSTEM.
This sign shall be posted in a location that is visible to anyone working on or near rainwater equipment.

G.6 WATER HEATING DESIGN, EQUIPMENT, AND INSTALLATION

G.6.2.3 Temperature Maintenance Controls
~~For other than low-rise residential buildings, systems~~ Systems designed to maintain usage temperatures in hot-water pipes, such as recirculating hot-water systems or heat trace, shall be equipped with automatic time switches or other controls that can be set to switch off the usage temperature maintenance system during extended periods when hot water is not required. [ASHRAE 90.1:7.4.4.2]

G.6.3.7 Maximum Hot Water System Ratio
The ratio of the hot water system rectangle to the dwelling unit footprint shall not exceed 60 percent.

(renumber remaining sections)

G.6.3.7 Maximum Volume and Length of Hot Water
The maximum volume of water contained in a hot water branch shall comply with Section G.6.3.7.1. The maximum length per volume of piping shall comply with Section G.6.3.7.2.

G.6.3.7.1 Maximum Volume of Hot Water in a Branch The water volume per foot of piping shall be calculated using Table G.6.3.7.1. The maximum volume of water in a fixture branch between any source of hot water (water heaters, recirculation loops and electrically heat traced pipe shall be considered sources of hot water) and the fixture fitting shall be:
(1) 24 ~~oz.~~ounces (0.7 L) where a single branch serves a single fixture.
(2) 40 ~~oz.~~ounces (1.2 L) where a series branch incorporating one or more ~~Flow-Through Design~~flow-through design configurations that serves two or more fixtures.
(3) 60 ~~oz.~~ounces (1.8 L) where a ring branch incorporating two or more ~~Flow-Through Design~~flow-through design configurations that serves two or more fixtures.
Exceptions:
(1) The maximum volume of a single branch or series branch between any source of hot water and a kitchen sink and dishwasher located on an island or a peninsula where the floor is a concrete slab shall not contain more than 40 oz~~.~~ (1.2 L).
(2) The maximum volume of a single branch to a stand-alone tub shall not contain more than 80 oz~~.~~ (2.4 L).

G.6.3.7.3 Hot Water System Submeters
Where a hot water pipe from a circulation loop or electric heat trace line is equipped with a submeter, the hot water distribution system downstream of the submeter shall have either an end-of-line hot water circulation pump or shall be electrically heat traced. The maximum volume of water in any branch from the circulation loop or electric heat trace line downstream of the submeter shall not exceed 16 oz (473 mL).
If there is no circulation loop or electric heat traced line downstream of the submeter, the submeter shall be located within 2 feet (610 mm) of the central hot water system; or the branch line to the submeter shall be circulated or heat traced to within 2 feet (610 mm) of the submeter. The maximum volume from the submeter to each fixture shall not exceed 32 oz (946 mL).
The circulation pump controls shall comply with the provisions of Section G.6.2.2.

TABLE G.6.3.7.1 WATER VOLUME (OZ/FT) FOR DISTRIBUTION PIPING MATERIALS														
NOMINAL SIZE (inch)	)PPER M	)PPER L	)PPER K	CPVC CTS SDR 11	CPVC SCH 40	EX-AL-PEX	E-AL-PE	CPVC SCH 80	EX CTS SDR 9	PE-RT SDR 9	PP SDR 6	P SDR 7.3	P SDR 11	CPVC PIPE SDR 11
3⁄8	1.06	0.97	0.84	0.68	1.17	0.59	0.59	0.85	0.64	0.64	0.85	1.02	NA	1.48
1⁄2	1.69	1.55	1.45	1.23	1.89	1.22	1.22	1.44	1.18	1.18	1.35	1.64	NA	2.33
3⁄4	3.43	3.22	2.90	2.52	3.38	3.28	3.28	2.72	2.35	2.35	2.14	2.54	NA	3.68
1	5.81	5.49	5.17	4.24	5.53	5.37	5.37	4.58	3.88	3.88	3.46	4.22	NA	5.83
1¼	8.70	8.36	8.09	6.38	9.66	8.65	8.65	8.23	5.80	5.80	5.47	6.59	NA	9.35
1½	12.18	11.83	11.45	8.95	13.20	13.91	13.91	11.38	8.08	8.08	8.64	10.27	NA	12.27
2	21.50	20.58	20.04	15.38	21.88	23.16	23.16	19.11	13.86	13.86	13.64	16.42	NA	19.19

For SI units: 1 inch = 25 mm, 1 foot = 304.8 mm, 1 ounce = 29.573 mL

TABLE G.6.3.7.1 WATER VOLUME (OZ/FT) FOR DISTRIBUTION PIPING MATERIALS														
NOMINAL SIZE (inch)	COPPER M	COPPER L	COPPER K	CPVC CTS SDR 11	CPVC SCH 40	PEX-AL-PEX	PE-AL-PE	CPVC SCH 80	PEX CTS SDR 9	PE-RT SDR 9	PP SDR 6	PP SDR 7.3	PP SDR 11	CPVC PIPE SDR 11
3⁄8	1.06	0.97	0.84	0.68	1.17	0.59	0.59	0.85	0.64	0.64	0.85	1.02	NA	1.48
1⁄2	1.69	1.55	1.45	1.23	1.89	1.22	1.22	1.44	1.18	1.18	1.35	1.64	NA	2.33
3⁄4	3.43	3.22	2.90	2.52	3.38	3.28	3.28	2.72	2.35	2.35	2.14	2.54	NA	3.68
1	5.81	5.49	5.17	4.24	5.53	5.37	5.37	4.58	3.88	3.88	3.46	4.22	NA	5.83
1¼	8.70	8.36	8.09	6.38	9.66	8.65	8.65	8.23	5.80	5.80	5.47	6.59	NA	9.35
1½	12.18	11.83	11.45	8.95	13.20	13.91	13.91	11.38	8.08	8.08	8.64	10.27	NA	12.27
2	21.50	20.58	20.04	15.38	21.88	23.16	23.16	19.11	13.86	13.86	13.64	16.42	NA	19.19

For SI units: 1 inch = 25 mm, 1 foot = 304.8 mm, 1 ounce = 29.573 mL

TABLE G.6.3.7.2(3) LENGTH (FT) PER VOLUME OF PIPING									
	PEX & PE-RT CTS SDR 9			PEX-AL-PEX (DN)			PE-AL-PE (DN)		
NOMINAL SIZE, inches (DN)[1]*	24 OZ	40 OZ	60 OZ	24 OZ	40 OZ	60 OZ	24 OZ	40 OZ	60 OZ
3⁄8 (12)	37.5	62.5	93.8	40.7	67.8	101.8	40.7	67.8	101.8
1⁄2 (16)	20.4	33.9	50.9	19.6	32.7	49.0	19.6	32.7	49.0
3⁄4 (25)	10.2	17.0	25.5	7.3	12.2	18.3	7.3	12.2	18.3

1 (32)	6.2	10.3	15.5	4.5	7.4	11.2	4.5	7.4	11.2
1¼ (40)	4.1	6.9	10.3	2.8	4.6	6.9	2.8	4.6	6.9
1½ (50)	3.0	4.9	7.4	1.7	2.9	4.3	1.7	2.9	4.3
2 (63)	1.7	2.9	4.3	1.0	1.7	2.6	1.0	1.7	2.6

For SI units: 1 inch = 25 mm, 1 foot = 304.8 mm, 1 ounce = 29.573 mL
~~1~~* DN is outside diameter

TABLE G.6.3.7.2(3)
LENGTH (FT) PER VOLUME OF PIPING

	PEX & PE-RT CTS SDR 9			PEX-AL-PEX (DN)			PE-AL-PE (DN)		
NOMINAL SIZE, inches (DN)~~1~~*	**24 OZ**	**40 OZ**	**60 OZ**	**24 OZ**	**40 OZ**	**60 OZ**	**24 OZ**	**40 OZ**	**60 OZ**
3⁄8 (12)	37.5	62.5	93.8	40.7	67.8	101.8	40.7	67.8	101.8
1⁄2 (16)	20.4	33.9	50.9	19.6	32.7	49.0	19.6	32.7	49.0
3⁄4 (25)	10.2	17.0	25.5	7.3	12.2	18.3	7.3	12.2	18.3
1 (32)	6.2	10.3	15.5	4.5	7.4	11.2	4.5	7.4	11.2
1¼ (40)	4.1	6.9	10.3	2.8	4.6	6.9	2.8	4.6	6.9
1½ (50)	3.0	4.9	7.4	1.7	2.9	4.3	1.7	2.9	4.3
2 (63)	1.7	2.9	4.3	1.0	1.7	2.6	1.0	1.7	2.6

For SI units: 1 inch = 25 mm, 1 foot = 304.8 mm, 1 ounce = 29.573 mL
~~1~~* DN is outside diameter

TABLE G.6.3.7.2(4)
LENGTH (FT) PER VOLUME OF PIPING

	PP SDR 6 (DN)			PP SDR 7.3 (DN)			PP SDR 11 (DN)[1]		
NOMINAL SIZE, Inches (DN)[2]	**24 OZ**	**40 OZ**	**60 OZ**	**24 OZ**	**40 OZ**	**60 OZ**	**24 OZ**	**40 OZ**	**60 OZ**
3⁄8 (16)	28.2	46.9	70.4	23.5	39.2	58.8	NA	NA	NA
1⁄2 (20)	17.7	29.6	44.3	14.7	24.4	36.6	NA	NA	NA
3⁄4 (25)	11.2	18.7	28.0	9.5	15.8	23.6	NA	NA	NA
1 (32)	6.9	11.6	17.3	5.7	9.5	14.2	NA	NA	NA
1¼ (40)	4.4	7.3	11.0	3.6	6.1	9.1	NA	NA	NA
1½ (50)	2.8	4.6	6.9	2.3	3.9	5.8	NA	NA	NA
2 (63)	1.8	2.9	4.4	1.5	2.4	3.7	NA	NA	NA

For SI units: 1 inch = 25 mm, 1 foot = 304.8 mm, 1 ounce = 29.573 mL
Notes:
[1] PP SDR 11 products are not typically used or rated at 180°F (82°C)
[2] DN is outside diameter

G.6.4 Service Hot Water – Other Than Low-Rise Residential Buildings

G.6.4.2 New Buildings
Service water-heating systems and equipment shall comply with ~~the requirements of this section as described in~~ Section G.6.4.5. [ASHRAE 90.1:~~7.1.1.1~~7.1.2]

G.6.4.3 Additions to Existing Buildings
Service water- heating systems and equipment shall comply with ~~the requirements of this section~~Section G.6.4.5 .
EXCEPTION: When the service water-heating to an addition is provided by existing service water-heating systems and equipment, such systems and equipment shall not be required to comply with this standard. However, any new systems or equipment installed must comply with specific requirements applicable to those systems and equipment. [ASHRAE 90.1:~~7.1.1.2~~7.1.3]

G.6.4.4 Alterations to ~~Existing Buildings~~Service Water-Heating Systems and Equipment
Building service water-heating equipment installed as a direct replacement for existing building service water-heating equipment shall comply with the requirements of Section G.6.4 applicable to the equipment being replaced. New and replacement piping shall comply with Section G.6.5.~~3~~.
EXCEPTION: Compliance shall not be required where there is insufficient space or access to meet these requirements. [ASHRAE 90.1:~~7.1.1.3~~7.1.4]

G.6.4.5 Requirements for Compliance Path(s)
Service water-heating systems and equipment shall comply with Section G.6.4, Section G.6.5, Section G.6.6 Section G.6.7 of this code, and Section 7.8 of ANSI/ASHRAE/IES 90.1. [ASHRAE 90.1:7.2.1]

~~**G.6.4.5 Compliance Path(s)**~~
~~Compliance shall be achieved by meeting the requirements of Section G.6.4.1, General; Section G.6.5, Mandatory Provisions; Section G.6.6, Prescriptive Path; and Section G.6.7, Submittals. [ASHRAE 90.1:7.2.1]~~

~~**G.6.4.6 Energy Cost Budget Method**~~
~~Projects using the Energy Cost Budget Method (Section 11 of ASHRAE 90.1) for demonstrating compliance with the standard shall meet the requirements of Section G.6.5, Mandatory Provisions, in conjunction with Section 11 of ASHRAE 90.1, Energy Cost Budget Method. [ASHRAE 90.1:7.2.2]~~

G.6.5 Mandatory Provisions

G.6.5.1 Load Calculations
Service water-heating system design loads for the purpose of sizing systems and equipment shall be determined in accordance with manufacturers' published sizing guidelines or generally accepted engineering standards and handbooks acceptable to the adopting authority (e.g., ASHRAE Handbook – HVAC Applications). [ASHRAE 90.1:7.4.1]

G.6.5.2 Equipment Efficiency
Water-heating equipment, hot-water supply boilers used solely for heating potable water, pool heaters, and hot-water storage tanks shall meet the criteria listed in Table G.6.5.2. Where multiple criteria are listed, all criteria shall be met. Omission of minimum performance requirements for certain classes of equipment does not preclude use of such equipment where appropriate. Equipment not listed in Table G.6.5.2 has no minimum performance requirements.
EXCEPTIONS: Water heaters and hot-water supply boilers having more than 140 gallons (530 L) of storage capacity are not required to meet the standby loss (SL) requirements of Table G.6.5.2 when all of the following criteria are met:
(1)- The tank surface is thermally insulated to R-12.5~~,~~,
(2)- A standing pilot light is not installed~~,~~ and
(3)- Gas- or oil-fired storage water heaters have a flue damper or fan-assisted combustion. [ASHRAE 90.1:7.4.2]

(Replace Table G.6.52 with the following revised Table G.6.5.2)

TABLE G.6.5.2
PERFORMANCE REQUIREMENTS FOR WATER-HEATING EQUIPMENT-MINIMUM EFFICIENCY REQUIREMENTS
[ASHRAE 90.1: TABLE 7.~~8~~4-1]

EQUIPMENT TYPE	SIZE CATEGORY (INPUT)	SUBCATEGORY OR RATING CONDITION	PERFORMANCE REQUIRED[1]	TEST PROCEDURE[2,3]

Electric table top water heaters	≤12 kW	<4000 (Btu/h)/gal ≥20 gal and <=120 gal	See footnote 7	10 CFR 430 Appendix E
Electric storage water heaters	≤12 kW	<4000 (Btu/h)/gal ≥20 gal and <=55 gal	See footnote 7	10 CFR 430 Appendix E
		<4000 (Btu/h)/gal >55 gal and <=120 gal	See footnote 7	10 CFR 430 Appendix E
	>12 kW[5]	<4000 (Btu/h)/gal	SL <= 0.3 + 27/V_m %/h	10 CFR 431.106
Electric instantaneous water heaters	<=12 kW	>=4000 (Btu/h)/gal <2 gal	See footnote 7	10 CFR 430 Appendix E
	>12 kW and <=58.6 kW[3]	>=4000 (Btu/h)/gal <=2 gal <=180°F	Very Small DP: UEF = 0.80 Low DP: UEF = 0.80 Medium DP: UEF = 0.80 High DP: UEF = 0.80	10 CFR 430 Appendix E
	>58.6 kW[3]	>=4000 (Btu/h)/gal <10 gal	No requirement	-
		>=4000 (Btu/h)/gal >=10 gal	No requirement	-
Gas storage water heaters	≤75 000 Btu/h	<4000 (Btu/h)/gal ≥20 gal and <=55 gal	See footnote 7	10 CFR 430 Appendix E
		<4000 (Btu/h)/gal >55 gal and <=100 gal	See footnote 7	10 CFR 430 Appendix E
	>75 000 Btu/h and <=105 000 Btu/h[4]	<4000 (Btu/h)/gal <=120 gal <=180°F	Very Small DP: UEF = 0.2674 – (0.0009 × V_r) Low DP: UEF = 0.5362 – (0.0012 × V_r) Medium DP: UEF = 0.6002 – (0.0011 × V_r) High DP: UEF = 0.6597 – (0.0009 × V_r)	10 CFR 430 Appendix E
	>105 000 Btu/h[4,6]	<4000 (Btu/h)/gal	80% E_t SL <= (Q/800 + 110√V), Btu/h	10 CFR 431.106
Gas instantaneouswater heaters	>50 000 Btu/h and <=200 000 Btu/h	≥4000 (Btu/h)/gal <2 gal	See footnote 7	10 CFR 430 Appendix E
	>200 000 Btu/h[4,6]	≥4000 (Btu/h)/gal <10 gal	80% E_t	10 CFR 431.106
	>200 000 Btu/h[6]	≥4000 (Btu/h)/gal ≥10 gal	80% E_t SL <= (Q/800 + 100√V), Btu/h	
Oil storage water heaters	≤105 000 Btu/h	<4000 (Btu/h)/gal <=50 gal	See footnote 7	10 CFR 430 Appendix E
	>=105 000 Btu/h and <=140 000 Btu/h[5]	<=120 gal <4000 (Btu/h)/gal <=180°F	Very Small DP: UEF=0.2932–(0.0015×V_r) Low DP: UEF=0.5596–(0.0018× V_r) Medium DP: UEF=0.6194–(0.0016× V_r) High DP: UEF=0.6740–(0.0013× V_r)	10 CFR 430 Appendix E
	>140 000 Btu/h	<4000 (Btu/h)/gal	80% E_t SL <= (Q/800+100√V), Btu/h	10 CFR 431.106
Oil instantaneous water heaters	≤210 000 Btu/h	≥4000 (Btu/h)/gal <2 gal	80% E_t EF >= 0.59-0.0005×V	10 CFR 430 Appendix E as it appeared as of

				1/1/2014
	≥210 000 Btu/h	≥4000 (Btu/h)/gal <10 gal	80% E_t	10 CFR 431.106
	≥210 000 Btu/h	≥4000 (Btu/h)/gal ≥10 gal	78% E_t SL <= (Q/800 + 100√V), Btu/h	
Hot-water supply boilers, gas and oil[6]	≥300 000 Btu/h and <12 500 000 Btu/h	≥4000 (Btu/h)/gal <10 gal	80% E_t	10 CFR 431.106
Hot-water supply boilers, gas[6]	>=300 000 Btu/h and <12 500 000 Btu/h	≥4000 (Btu/h)/gal ≥10 gal	80% E_t SL <= (Q/800 + 100√V), Btu/h	
Hot-water supply boilers, oil	>=300 000 Btu/h and <12 500 000 Btu/h	≥4000 (Btu/h)/gal ≥10 gal	78% E_t SL <= (Q/800 + 100√V), Btu/h	
Pool heaters, gas	All	———	82% E_t for commercial pool heaters	10 CFR 430 Appendix P
Heat pump pool heaters	All	50°F db 44.2°F wb Outdoor air 80.0°F entering water	4.0 COP	10 CFR 430 Appendix P
Unfired storage tanks	All	———	R-12.5	(none)

For SI units: 1 gallon = 3.785 L, 1000 British thermal units per hour = 0.293 kW, °C = (°F-32)/1.8

Notes:

1 Thermal efficiency (E_t) is a minimum requirement, while standby loss (SL) is a maximum ~~Btu/h based on a 70°F temperature difference between stored water and ambient requirements.~~ requirement. In the SL equation, V is the rated volume in gallons (gal) (L) and Q is the nameplate input rate in Btu/h~~.~~ (kW). V_m is the measured volume in the tank in gallons~~.~~ (gal) (L). Standby loss for electric water heaters is in terms of %/h and denoted by the term "S," and standby loss for gas and oil water heaters is in terms of Btu/h (kW) and denoted by the term "SL." Draw pattern (DP) refers to the water draw profile in the uniform energy factor (UEF) test. UEF and energy factor (EF) are minimum requirements. In the UEF standard equations, V_r refers to the rated volume in gallons (gal) (L).

2 Section 13 of ANSI/ASHRAE/IES 90.1 ~~Section 12~~ contains a complete specification, including the year version, of the referenced test procedure.

3 ~~Section G1 is titled "Test Method for Measuring Thermal Efficiency" and Section G2 is titled "Test Method for Measuring Standby Loss."~~

~~4 Instantaneous~~Electric instantaneous water heaters with input ~~rates below~~ capacities greater than 40 000 Btu/h (11.7 kW) and less than or equal to 200 000 Btu/h (58.6 kW) ~~must~~shall comply with ~~these~~the requirements for 200 000 Btu/h (58.6 kW) if the water heater ~~is designed to heat water to temperatures of 180°F (82°C) or higher.~~meets one of the following conditions:

~~5 Electric~~ (a) Has a storage volume greater than 2 gallons (7.6 L),

(b) Is designed to provide outlet hot water at temperatures greater than 180°F (82°C), or

(c) Uses three-phase power.

4 Gas storage water heaters with input ~~rates~~capacities greater than 75 000 Btu/h (22 kW) and less than ~~40 946~~or equal to 105 000 Btu/h (~~12~~30.8 kW) shall ~~be in accordance~~comply with ~~these~~the requirements ~~where~~for greater than 105 000 Btu/h (30.8 kW) if the water heater ~~is~~meets one of the following conditions:

(a) Has a storage volume greater than 120 gallons (454 L);

(b) Is designed to ~~heat~~provide outlet hot water ~~to~~at temperatures ~~of~~greater than 180°F (82°C), or ~~higher~~.

(c) Uses three-phase power.

5 Oil storage water heaters with input capacities greater than 105 000 Btu/h (30.8 kW) and less than or equal to 140 000 Btu/h (41 kW) must comply with the requirements for greater than 140 000 Btu/h (41 kW) if the water heater meets one of the following conditions:

(a) Has a storage volume greater than 120 gallons (454 L);

(b) Is designed to provide outlet hot water at temperatures greater than 180°F (82°C); or

(c) Uses three-phase power

6 Refer to ~~ASHRAE 90.1~~ Section 7.5.3 of ANSI/ASHRAE/IES 90.1 for additional requirements for gas storage and instantaneous water heaters and gas hot-water supply boilers.

7 ~~In the U.S., the efficiency requirements for water~~Water heaters or gas pool heaters in this category or subcategory are ~~specified~~regulated as consumer products by the U.S. Department of Energy~~. Those requirements and applicable test procedures are found~~ (U.S. DOE) as defined in ~~the Code of Federal Regulations~~ 10 CFR ~~Part~~ 430.
~~Informative Note:~~ See ~~ASHRAE 90.1~~ Informative Appendix F of ANSI/ASHRAE/IES 90.1 for the U.S. ~~Department of Energy~~DOE efficiency requirements applicable to these water heaters and pool heaters.

G.6.5.4 Hot Water System Design
Hot water system design shall comply with Section G.6.5.4.1 and Section G.6.5.4.2.

G.6.5.4.1 Recirculation Systems
Recirculation systems shall meet the provisions in Section G.6.2.

G.6.5.4.2 Maximum Volume of Hot Water
The maximum volume of water contained in hot water distribution lines between the water heater and the fixture stop or connection to showers, kitchen faucets, and lavatories shall be determined in accordance with Section G.6.3.7.

G.6.5.5 Service Water~~-~~-Heating System Controls
Temperature controls shall comply with Section G.6.5.5.1 and Section G.6.5.5.2.

G.6.5.5.1 ~~Storage~~ Temperature Controls
Temperature controls shall be provided that allow for storage temperature adjustment from 120°F (49ºC) or lower to a maximum temperature compatible with the intended use.
EXCEPTION: When the manufacturers' installation instructions specify a higher minimum thermostat setting to minimize condensation and resulting corrosion. [ASHRAE 90.1:7.4.4.1]

G.6.5.5.2 Outlet Temperature Controls
Temperature controlling means shall be provided to limit the maximum temperature of water delivered from lavatory faucets in public facility restrooms to 110°F (43ºC). [ASHRAE 90.1:7.4.4.3]

G.6.5.6 Heat Traps
Vertical pipe risers serving storage water heaters and storage tanks not having integral heat traps and serving a nonrecirculating system shall have heat traps on both the inlet and outlet piping as close as practical to the storage tank. A heat trap is a means to counteract the natural convection of heated water in a vertical pipe run. The means ~~is~~shall be either ~~a~~of the following:
(1) A device specifically designed for the purpose or an arrangement of tubing that forms a loop of 360 degrees (6.28 rad) or
(2) ~~p~~Piping that from the point of connection to the water heater (inlet or outlet) includes a length of piping directed downward before connection to the vertical piping of the supply water or hot-water distribution system, as applicable. [ASHRAE 90.1:7.4.6]

G.6.6 Prescriptive Path

G.6.6.1 Space Heating and Service Water~~-~~-Heating
The use of a gas-fired or oil-fired space-heating boiler system otherwise complying with Section G.6.4 to provide the total space heating and service water~~-~~-heating for a building is allowed when one of the following conditions is met:
(1) The single space-heating boiler, or the component of a modular or multiple boiler system that is heating the service water, has a standby loss in Btu/h (kW) not exceeding (13.3 × *pmd* + 400)/*n*, where (*pmd*) is the probable maximum demand in gallons per hour (gph) (L/h), determined in accordance with the procedures described in generally accepted engineering standards and handbooks, and (*n*) is the fraction of the year when the outdoor daily mean temperature is greater than 64.9°F (18.28°C).

The standby loss ~~is to~~shall be determined for a test period of 24 hours duration while maintaining a boiler water temperature of at least 90°F (50°C) above ambient, with an ambient temperature between 60°F (16°C) and 90°F (32°C). For a boiler with a modulating burner, this test shall be conducted at the lowest input.

(2) It is demonstrated to the satisfaction of the Authority Having Jurisdiction that the use of a single heat source will consume less energy than separate units.

(3) The energy input of the combined boiler and water heater system is less than 150,000 Btu/h (44 kW). [ASHRAE 90.1:7.5.1]

G.6.6.2 Service Water-Heating Equipment

Service water-heating equipment used to provide the additional function of space heating as part of a combination (integrated) system shall satisfy all stated requirements for the service water-heating equipment. [ASHRAE 90.1:7.5.2]

G.6.6.3 Heat Recovery for Service Water-Heating

Heat recovery systems shall comply with Section G.6.6.3.1 and Section G.6.6.3.2.

G.6.6.3.1 Condenser

Condenser heat recovery systems shall be installed for heating or preheating of service hot water provided all of the following are true:

(1) The facility operates 24 hours a day.

(2) The total installed heat-rejection capacity of the water-cooled systems exceeds 6,000,000 Btu/h (1758 kW) of heat rejection.

(3) The design service water-heating load exceeds 1,000,000 Btu/h (293 kW). [ASHRAE 90.1:6.5.6.2.1]

G.6.6.3.2 Capacity

The required heat recovery system shall have the capacity to provide the ~~smaller~~lesser of the following:

(1) Sixty percent of the peak heat rejection load at design conditions~~.~~, or

(2) Preheat of the peak service hot water draw to 85°F (29°C). ~~[ASHRAE 90.1:6.5.6.2.2]~~

EXCEPTIONS:

(a) Facilities that employ condenser heat recovery for space heating with a heat recovery design exceeding 30 percent of the peak water-cooled condenser load at design conditions.

(b) Facilities that provide 60 percent of their service water-heating from on-site ~~solar~~ renewable energy or site-recovered energy or from other sources. [ASHRAE 90.1:6.5.6.2.2]

G.6.7 Submittals

G.6.7.1 General

The Authority Having Jurisdiction shall require submittal of compliance documentation and supplemental information, in accordance with Administration Section 1.9 of the NSPC ~~103.0 of the WE-Stand~~ and the applicable mechanical and building codes.

G.6.8 Hard Water

G.6.8.1 Softening and Treatment

Where water has hardness equal to or exceeding 10 grains per gallon (gr/gal) (171 mg/L) measured as total calcium carbonate equivalents, the water supply line to water heating equipment and the circuit of boilers shall be softened or treated to prevent accumulation of lime scale and consequent reduction in energy efficiency.

G.6.9 Drain Water Heat Exchangers

G.6.9.1 General

Drain water heat exchangers shall comply with IAPMO PS-92. The heat exchanger shall be accessible.

G.6.10 Heat Recovery from Steam Boiler Blowdown

G.6.10.1 General
Where heat recovery can be used beneficially to heat boiler makeup water or for other purposes, boiler blowdown from steam boilers exceeding 15 psig (103 kPa) and ~~3.4 million BTU's per hour (100 HP)~~ 3 400 000 BTU/h (996.4 kW) shall be directed to a heat recovery system that reduces the temperature of the blowdown discharge to below 140°F (60°C) without using tempering water.

G.7 POTABLE RAINWATER CATCHMENT SYSTEMS

G.7.1.2 System Design
Potable rainwater catchment systems complying with this appendix shall be designed by a ~~person~~ registered~~,~~ ~~licensed,~~ design professional or person deemed competent by the Authority Having Jurisdiction to perform potable rainwater catchment system design work. Where required, rainwater catchment systems shall be seismically restrained against earthquakes in accordance with the building code.

G.7.1.4 Product and Material Approval
System components and materials shall be labeled in accordance with Section G.7.1.4.1 and Section G.7.1.4.2.

G.7.1.7 Minimum Water Quality Requirements
The minimum water quality for ~~all~~ potable rainwater catchment systems shall be in accordance with ARCSA/ASPE/ANSI 63 or shall meet the applicable water quality requirements as determined by the Authority Having Jurisdiction for private wells.

G.7.3 Potable Rainfall Catchment System Materials

G.7.3.1 Collections Surfaces
The collection surface for potable applications shall be constructed of a hard, impervious material ~~and~~. Roof materials containing lead, arsenic, or biocides shall be ~~approved for potable water use.~~prohibited. Roof coatings, paints, and liners shall comply with NSF ~~Protocol~~ P151.

G.7.3.2 Rainwater Catchment System Drainage Materials
Gutters and downspouts used in rainwater catchment drainage systems shall be made from metal or plastic pipe that meets the requirements of NSF/ANSI 14 and NSF/ANSI/CAN 61. All rainwater system components under the scope of NSF/ANSI/CAN 61 shall comply with ~~NSF Protocol~~it. Additional rainwater components under the scope of NSF P151~~, and leaders and conductors~~ shall ~~be listed to NSF 61~~comply with it.

TABLE G.7.4.2.1 MINIMUM WATER QUALITY	
TOTAL COLIFORM	**NON-DETECTABLE**
Escherichia coli (fecal coliform):	Non-detectable
Turbidity:	<0.3 NTU

G.7.4.2.3 Maintenance
Normal system maintenance shall require system testing for total coliform. If a total coliform test is positive, the system shall be tested for Escherichia coli (fecal coliform). Total coliform and turbidity shall be tested every 3 months in accordance with Table G.7.4.2.3. Upon failure of the fecal coliform test, systems shall be re-commissioned involving cleaning, and retesting in accordance with Section G.7.4.2.

G.7.4.3.1 Filtration Devices
Potable water filters shall comply with NSF/ANSI 53 and shall be installed in accordance with manufacturer's instructions.

G.7.4.3.2 Disinfection Devices
Chlorination, ~~ozone~~ozonation, and ultraviolet disinfection, or other disinfection methods shall be approved by ~~an~~the Authority Having Jurisdiction, or the product shall be listed according to a microbiological reduction performance standard for drinking water used to treat harvested rainwater to meet the required water quality permitted. The disinfection devices and systems shall be installed in accordance with the manufacturer's installation instructions and the conditions of listing. Disinfection devices and systems shall be located downstream of the water storage tank.

G.7.4.5.1 Construction
Rainwater storage tanks shall be constructed of solid, durable materials not subject to excessive corrosion or decay and shall be watertight. Storage tanks or storage tank liners and coatings shall be listed to NSF/ANSI/CAN 61 and approved by the Authority Having Jurisdiction for potable water applications, provided such tanks comply with approved applicable standards.

G.7.4.5.2.1 Above Grade
Above grade storage tanks shall be of an opaque material, approved for aboveground use in direct sunlight, or shall be shielded from direct sunlight. Tanks shall be installed in an accessible location to allow for inspection and cleaning. The tank shall be installed on a foundation or platform that is constructed to accommodate ~~all~~the weight and loads when filled to maximum capacity in accordance with the building code.

G.7.4.5.2.2 Below Grade
Rainwater storage tanks installed below grade shall be structurally designed to withstand all anticipated earth or other loads. Holding tank covers shall be capable of supporting an earth load of not less than 300 pounds-force per square foot (~~lb~~lbf/ft^2) (~~1465 kg/m2~~14.4 kPa) when the tank is designed for underground installation. Below grade rainwater tanks installed underground shall be provided with manholes. The manhole opening shall be a minimum diameter of 20 inches (508 mm) and located not less than 4 inches (102 mm) above the surrounding grade. The surrounding grade shall be sloped away from the manhole. Underground tanks shall be ballasted, anchored, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold down system ~~should~~shall meet or exceed the buoyancy force of the tank.

G.7.4.5.7 Storage Tank Venting
Where venting by means of drainage or overflow piping is not provided or is considered insufficient, a vent shall be installed on each tank. The vent shall extend from the top of the tank and terminate a minimum of 6 inches (152 mm) above grade and shall be a minimum of 1½~~"~~ inches (~~38~~40 mm) in diameter. The vent terminal shall be directed downward and covered with a 3/32 inch (2.4 mm) mesh screen to prevent the entry of vermin and insects.

G.7.4.9.1 Size
The roof washer shall be sized to direct a sufficient volume of rainwater containing debris that has accumulated on the collection surface away from the storage tank. ~~The~~
Note: See ARCSA/ASPE/ANSI 63 ~~Standard contains~~for additional guidance on acceptable methods of sizing roof washers.

G.8 PEAK WATER DEMAND CALCULATOR

(~~This Appendix is based on the technical paper entitled "Peak Water Demand Study." A copy of the paper is available for download at: www.iapmo.org/WE-Stand/~~ The requirements listed in this appendix are based on the technical paper entitled "Peak Water Demand Study." Both the Water Demand Calculator and a copy of this technical paper are available for download at: https://www.iapmo.org/water-demand-calculator/.)

G.8.1 General

G.8.1.1 Applicability
~~This appendix provides a~~ The provisions of this appendix shall establish the method for estimating the supply demand load for the building water supply and principal branches ~~for~~ and riser for new construction of single- and multi-family dwellings. ~~with water-conserving plumbing fixtures, fixture fittings, and appliances.~~ The plumbing

code shall be used for all other occupancies.

G.8.2 Demand Load

G.8.2.1~~G.8.2.2~~ Water Demand Calculator
The estimated ~~design~~ supply demand flow rate for the building supply and principal branches and risers shall be determined by the IAPMO Water Demand Calculator. ~~available for download at: www.iapmo.org/WEStand/Pages/WaterDemandCalculator.aspx~~

G.8.2.1.1~~G.8.2.1~~ Water-Conserving Fixtures
~~Plumbing~~ The flow rates for plumbing fixtures, fixture fittings, and appliances shall not exceed the ~~design~~ supply demand flow rates in Table G.8.2.1.1 ~~G.8.2.1~~.

G.8.2.1.2~~G.8.2.6~~ Other Fixtures
~~Fixtures~~ Indoor fixtures, fixture fittings, and appliances not specified ~~included~~ in Table G.8.2.1.1 ~~G.8.2.1~~shall be added in Rows 12 through 14 in the Water Demand Calculator as Other Fixtures. The probability of use and design flow rate for Other Fixtures shall be added by selecting a comparable probability of use and flow rate from ~~Columns [C] and [E]~~ the Water Demand Calculator.

TABLE G.8.2.1.1~~G.8.2.1~~
MAXIMUM DESIGN FLOW RATE FOR ~~WATER-CONSERVING~~ PLUMBING FIXTURES, FIXTURE FITTINGS, AND APPLIANCES ~~IN RESIDENTIAL OCCUPANCIES~~

FIXTURE AND APPLIANCE	MAXIMUM DESIGN FLOW RATE (gallons per minute)
Bar Sink	1.5
Bathtubs[2]	5.5
Bidet	2.0
Clothes Washer[1]	3.5
Combination Bath/Shower	5.5
Dishwasher[1]	1.3
Kitchen Faucet	2.2
Laundry Faucet (with aerator)	2.0
Lavatory Faucet	1.5
Shower, per head	2.0
Water Closet, 1.28 GPF Gravity Tank	3.0
Other fixtures	6.0

For SI units: 1 gallon per minute = 0.06 L/s
Notes:
[1] Clothes washers and dishwashers shall have an Energy Star label.
[2] Including whirlpools and similar fixtures.

G.8.2.2 Supply Demand. The supply demand flow rate shall be determined in accordance with Section G.8.2.2.1 and Section G.8.2.2.2.
G.8.2.2.1~~G.8.2.3~~ Meter and Building Supply
To determine the ~~design~~ supply demand flow rate for the water meter and building supply, enter the total number of each indoor plumbing fixture~~s~~ and appliance~~s~~ for the building ~~in Column [B] of~~ into the Water Demand Calculator and run the Calculator. (See ~~Table~~ Figure G.8.2.3 for an example.)

(Remove Table G.8.2.3 and replace with Figure G.8.2.3)

TABLE G.8.2.3 WATER DEMAND CALCULATOR EXAMPLE					
	[A] FIXTURE	[B] ENTER NUMBER OF FIXTURES	[C] PROBABILITY OF USE (%)	[D] ENTER FIXTURE FLOW RATE (GPM)	[E] MAXIMUM RECOM-MENDED FIXTURE FLOW RATE (GPM)
1	Bar Sink	0	2.0	1.5	1.5
2	Bathtub	0	1.0	5.5	5.5
3	Bidet	0	1.0	2.0	2.0
4	Clothes Washer	1	5.5	3.5	3.5
5	Combination Bath/Shower	1	5.5	5.5	5.5
6	Dishwasher	1	0.5	1.3	1.3
7	Kitchen Faucet	1	2.0	2.2	2.2
8	Laundry Faucet	0	2.0	2.0	2.0
9	Lavatory Faucet	1	2.0	1.5	1.5
10	Shower, per head	0	4.5	2.0	2.0
11	Water Closet, 1.28 GPF Gravity Tank	1	1.0	3.0	3.0
12	Other Fixture 1	0	0.0	0.0	6.0
13	Other Fixture 2	0	0.0	0.0	6.0
14	Other Fixture 3	0	0.0	0.0	6.0
Total Number of Fixtures		6		RESET	RUN WATER DEMAND CALCULATOR
99th Percentile Demand Flow =		8.5 GPM			

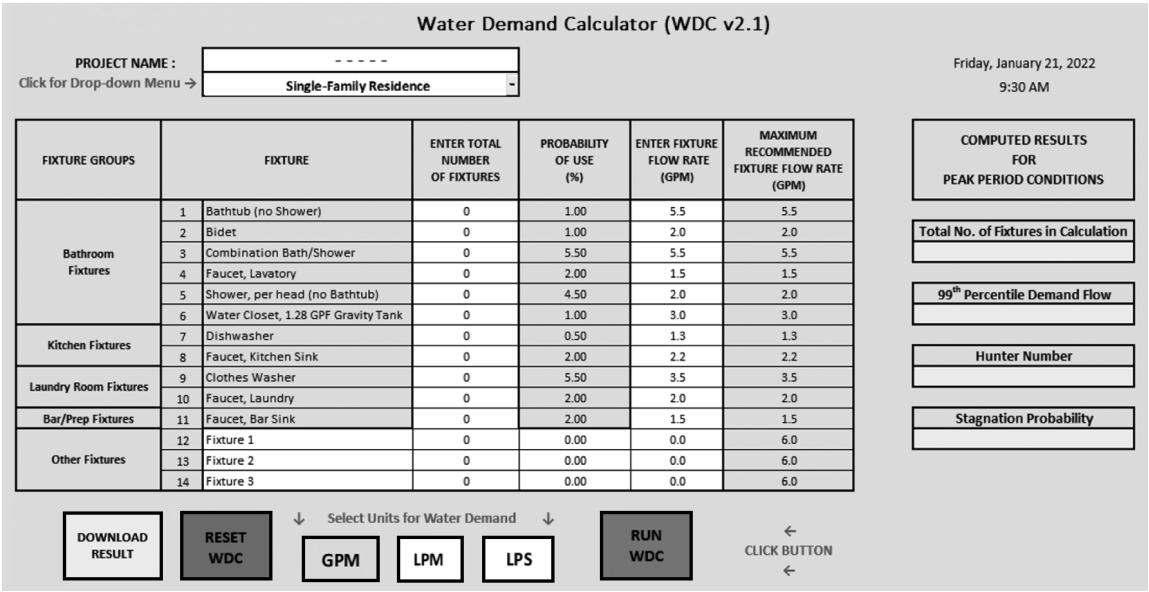

Figure G.8.2.3 Water Demand Calculator

G.8.2.2.2~~G.8.2.4 Fixture~~ Branches and ~~Fixture Supplies~~ Risers

To determine the ~~design~~ supply demand flow rate for ~~fixture~~ branches and risers, enter the total number of each plumbing fixture~~s~~ and appliance~~s~~ on each ~~for the fixture~~ branch or riser ~~in Column [B] of~~ into the Water Demand Calculator and run the Calculator. The flow rate for one fixture branch and one fixture supply shall be the design flow rate of the fixture according to Table G.8.2.1.1 ~~G.8.2.1~~.

G.8.2.3~~G.8.2.5~~ Continuous Supply Demand

~~Continuous~~The continuous supply demand~~s~~ in gallons per minute (gpm)(L/s) for lawn sprinklers, air conditioners, hose bibbs, etc., shall be determined ~~added to the total estimated demand~~ for the building supply, branches, and risers in accordance with the plumbing code~~as determined by Section G.8.2.3~~.

Exceptions:

(1) Where there is more than one hose bibb installed on the plumbing system, the demand for only one hose bibb shall be added to the total estimated demand for the building supply.

(2) Where a hose bibb is installed on a principal branch, riser or fixture branch, the demand of the hose bibb shall be added to the design flow rate for the principal branch, riser or fixture branch as applicable ~~determined by Section G.8.2.4~~.

G.8.3 ~~G.8.2.7~~ Size of Water Piping

G.8.3.1 General
When determining the size of the water piping, procedures set forth in Appendix B shall be used except when estimating the demand load for single-and multi-family dwellings, Section G.8 shall be used in lieu of subsection B.5.

G.8.3.2 Total Demand Load
The total demand load shall be the sum of the supply demand load calculated in accordance with Section G.8.2.2 and the continuous demand load calculated in accordance with Section G.8.2.3 for the building supply, branches, risers, and fixture branches as applicable.

G.8.3.3 Determining Pipe Diameters
After determining the permissible friction loss per 100 feet of pipe and the total demand loads in accordance with Section G.8.3.2. The diameter of the building supply pipe, branches and risers shall be determined in accordance with Chart B.9.8(1) through Chart B.9.8(7) in Appendix B.

G.8.4 ~~G.8.2.8~~ Examples Illustrating Use of Water Demand Calculator
For examples on how to use the WDC, Download the Consise User Guide at: https://iapmo.org/we-stand/water-demand-calculator

(RENUMBER ALL THE FOLLOWING SUBSECTIONS TO FOLLOW G.9.0)

G.9.0 ONSITE WASTEWATER TREATMENT FOR DIRECT POTABLE WATER USE

101.0 General.

101.1 Applicability. The provisions of this appendix shall apply to the design and installation of onsite wastewater treatment systems for direct potable water use in dwelling units.

101.2 Permit. It shall be unlawful for any person to construct, install, alter, or cause to be constructed, installed, or altered any onsite wastewater treatment system within a building or on a premises without first obtaining a permit to do such work from the Authority Having Jurisdiction.

101.2.1 Plumbing Plan Submission. No permit for any onsite wastewater treatment system shall be issued until complete plumbing plans, with appropriate data satisfactory to the Authority Having Jurisdiction, have been submitted and approved.

101.2.2 System Changes. No changes or connections shall be made to the onsite wastewater treatment system without approval by the Authority Having Jurisdiction.

101.3 Component Identification. System components shall be properly identified as to the manufacturer.

101.4 Maintenance and Inspection. Mechanical and plumbing systems, materials, and appurtenances, both existing and new, of a premise under the Authority Having Jurisdiction, shall be maintained in operating conditions. Devices or safeguards required by this appendix shall be maintained in accordance with the standard edition under which installed. The owner or the owner's designated agent shall be responsible for the maintenance of mechanical and plumbing systems. To determine compliance with this subsection, the Authority Having Jurisdiction shall be permitted to cause a system to be reinspected.

101.5 Material Compatibility. Onsite wastewater treatment systems shall be constructed of materials that are compatible with the type of pipe and fitting materials, water treatment, and water conditions in the system.

101.6 Minimum Water Quality Requirements. The minimum water quality at the point of use (POU) of an onsite wastewater treatment system shall comply with Table G.7.4.2.1, ARCSA/ASPE/ANSI 63, and the potable water

quality requirements specified by the Authority Having Jurisdiction, or in absence, shall meet the potable water requirements of the adopted direct potable water use standards.

102.0 Definitions.

102.1 General. For purposes of this appendix, the following definitions shall apply:

Aerobic Bioreactor. A device that uses oxygen to create a biologically active matrix for the purpose of breaking down organic matter.

Biochemical Oxygen Demand (BOD). The amount of dissolved oxygen required by organisms to break down organic matter under aerobic conditions at a specific temperature. This value, measured in parts per million (ppm) (mg/L), is used as an indicator of wastewater treatment effectiveness.
Biological Treatment. Water treatment by means of aerobic or anerobic bioremediation using microbes or fungi.

Chlorination. A disinfection process using chlorine to either kill or inhibit the RNA to DNA transcription, rendering pathogens harmless.
Coagulation. A process which introduces small, highly charged molecules into water to destabilize the charges on particles, colloids, or oily materials in suspension increasing solid removal efficiency.

Direct Potable Water Use. Multiple phases of advanced water purification to transform treated wastewater into a safe, reliable drinking water supply.
Dwelling Unit. A single residential unit which provides independent water utility for one or more persons of the same family or household.

Flocculation. A process in which clays, polymers or other small charged particles become attached and form a fragile structure, a floc.

Membrane Filtration. A physical process to separate substances via membranes which serve as thin layers of semi-permeable material that separate substances when a driving force is applied across the membrane.

Nanofiltration. A water filtration process utilizing a thin-film membrane operating under low pressure to remove particles smaller than 10 nanometers (nm).

Ozonation. The process of treating with ozone, often as part of a purification process.

Polishing. A finishing treatment method used to maintain water quality levels after water leaves the treatment and processing stages.
Potable Water. Water that is satisfactory for drinking, culinary, and domestic purposes and that meets the requirements of the health Authority Having Jurisdiction.

Raw Water. Influent water collected from the dwelling unit and supplied to the direct potable water use treatment system. Also known as wastewater.

103.0 System Requirements.

103.1 General. Direct potable use systems shall be designed in accordance with this appendix by a registered design professional, or a person who demonstrates competency to design direct potable use systems as required by the Authority Having Jurisdiction. Where deemed necessary by the registered design professional, considerations shall be made for non-regulated contaminants, including but not limited to, heavy metals, cleaning agents, and hormones. Chemotherapy pharmaceuticals shall not enter the direct potable water use system.

103.2 Connections to Potable Water Supply. Onsite wastewater treatment systems shall have no direct connection to any potable water supply. Potable water shall be permitted to be used as makeup water for an onsite wastewater treatment system provided the potable water supply connection is protected by an airgap in accordance with the plumbing code.

103.2.1 Cross-Contamination. No person shall make a connection or allow one to exist between pipes or conduits carrying domestic water supplied by a public or private building supply system, and pipes, conduits, or fixtures containing or carrying water from any other source or containing or carrying water that has been used for any purpose whatsoever, or piping carrying chemicals, liquids, gases, or substances whatsoever, unless there is provided a backflow prevention device approved for the potential hazard and maintained in accordance with the plumbing code. Each point of use shall be separately protected where potential cross-contamination of individual units exists.

103.2.2 Cross-Connection Inspection and Testing. A cross-connection test is required in accordance with Section G.4.1.11.2. Before the building is occupied or the system is activated, the installer shall perform the initial cross-connection test in the presence of the Authority Having Jurisdiction. The test shall be ruled successful by the Authority Having Jurisdiction before final approval is granted.

103.3 Overflow. Raw water overflow shall be connected directly to the plumbing drainage system. The overflow piping shall be provided with a backwater valve at the point of connection to the plumbing drainage system. The backwater valve shall be accessible for inspection and maintenance.

103.4 Treated Water. Treated water shall be connected directly to an aerated storage tank capable of maintaining water quality in accordance with Section 101.6. Storage tanks shall be protected from light intrusion. Storage tanks, liners, and coatings shall be listed to NSF/ANSI/CAN 61. Tank openings shall be protected to prevent the entrance of insects, birds, or rodents. Storage capacity shall be determined based on the estimated daily volume of wastewater and usage of potable water.

103.5 Diverter Valves. The onsite wastewater treatment system shall connect to the sanitary drainage system through a diverter valve(s) approved by the Authority Having Jurisdiction. At a minimum, a diverter valve shall be installed between the main drain line and the onsite treatment system. Additional diverter valves shall be permitted to be installed at other locations as specified by the registered design professional and the Authority Having Jurisdiction. Where toxins and contaminants are detected in accordance with Section 103.7, raw water shall be diverted to the sewage system, and the diverter valve shall be reset only once safe operating conditions are met.

103.6 Isolation Valves. A means of isolation shall be provided between the treatment system and the plumbing system. Automatic shutoff shall be provided in accordance with Section 103.7.

103.7 Monitoring and Controls. Onsite wastewater treatment systems shall be provided with a means of continuous monitoring of the treatment stages and shall be provided with a means of automatic shutoff when a malfunction occurs or when measured parameters are outside of the acceptable ranges specified by the Authority Having Jurisdiction. In the event of a malfunction, raw water shall be diverted to the sewage system, and the diverter valve shall be reset only once safe operating conditions are met.

Notes:

(1) Biological and pathogen parameters may only be measured by a qualified testing laboratory. Such testing requires multi-day turnaround for results. To control a system in real-time and react to water quality and flow fluctuations, reliable online measurement technology should be deployed.

(2) The following types of sensors are available in the industry and provide reliable outputs:
- (a) Flow rate
- (b) Pressure
- (c) Solid content
- (d) Oxidation-reduction potential (ORP)
- (e) Temperature
- (f) pH
- (g) Dissolved oxygen
- (h) Turbidity
- (i) Total Suspended Solids
- (j) Conductivity
- (k) Gas

103.8 Validation. Where required by the Authority Having Jurisdiction, treatment processes shall be tested to verify the pathogen reduction performance. The treatment processes shall be validated through third-party component validation or field verification using challenge testing. The results of the third-party component validation and/or challenge testing shall be summarized in a validation report prepared by a registered design professional. The validation report shall document the treatment technology's log reduction performance, including information on the operating conditions and surrogate parameters.

104.0 System Design.

104.1 General. Onsite wastewater treatment systems shall be designed in accordance with this appendix and installed by a registered design professional. Onsite wastewater treatment systems covered by this appendix shall include the following treatment stages:

Stage 1: Solid separation in accordance with Section 104.2.
Stage 2: Primary treatment in accordance with Section 104.3.
Stage 3: Secondary treatment in accordance with Section 104.4.
Stage 4: Tertiary treatment in accordance with Section 104.5.
Stage 5: Storage after treatment in accordance with Section 103.4.
Stage 6: Electrolyte addition, carbon filtration, and remineralization.

(See Figure 104.1 for a flow diagram of treatment methods and stages utilized in direct potable use systems.)

Notes:

(1) To eliminate a single point of failure in the sanitization stage, an additional method of filtration is recommended between Stage 3 and Stage 4. The recommended level of filtration is 0.05 micron (0.05 µm).
(2) Where approved by the registered design professional, storage may be provided after any treatment stage.

104.2 Solid Separation. Collected wastewater shall pass through a filter screen of not less than 18 mesh (1 mm) prior to primary treatment. Separated solids and organic matter from the wastewater shall be diverted to a treatment chamber. Wastewater shall be diverted to a designated basin or storage tank.

104.3 Primary Treatment. Separated solids and organic matter shall undergo sanitization or disinfection prior to removal. Primary treatment for wastewater shall be completed by one or more of the following means:

(1) Biological treatment,
(2) Flocculation,
(3) Coagulation, or
(4) Other equivalent method of treatment as approved by the Authority Having Jurisdiction.

Minimum standards for the biochemical oxygen demand (BOD), total suspended solids (TSS), and pH limitations shall be in accordance with the Authority Having Jurisdiction.

104.4 Secondary Treatment. Secondary treatment for wastewater shall be in accordance with this section, and Section 104.4.1 through Section 104.4.3. Treatment shall be completed by one or more of the following means:

(1) Chemical disinfection,
(2) Electrolysis,
(3) Aerobic reactors,
(4) Nanofiltration,
(5) Ozonation, or
(6) Other equivalent method of treatment as approved by the Authority Having Jurisdiction.

104.4.1 Ozone. Design, installation, and commissioning of ozone systems shall comply with AWWA F120. Ozone systems shall be equipped with an airflow switch monitored by a controller as well as an oxidation reduction potential (ORP) sensor. The ORP reading of water shall not be less than 500 mV near the exit point of the system.

104.4.2 Chlorination/Dechlorination. In systems where chlorine is used for secondary treatment, the chlorine dosage shall be determined by the total chlorine level required for disinfection, and a means of dechlorination shall be provided to meet the potable water quality parameters for free chlorine as approved by the Authority Having Jurisdiction. Plans and procedures for dechlorination shall be in accordance with AWWA C655. Chlorine disinfection systems shall be equipped with ORP sensors, or equivalent, to determine the concentration of free available chlorine.

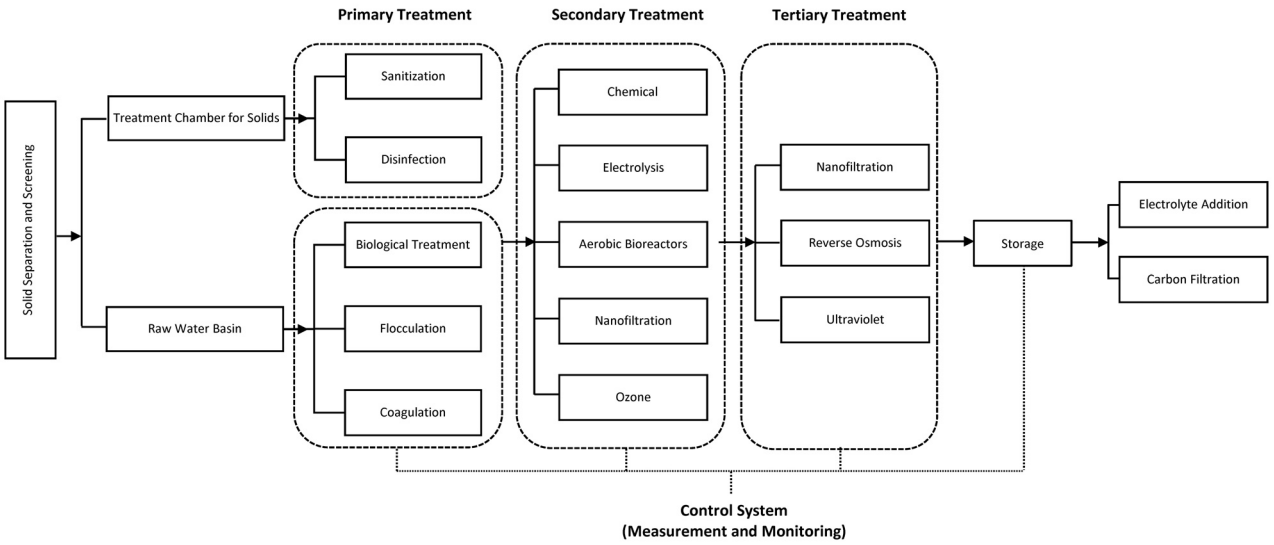

FIGURE 104.1

ONSITE WASTEWATER TREATMENT STAGES FOR DIRECT POTABLE USE[1,2,3,4]

Notes:

[1] Nanofiltration may be utilized in either the secondary or tertiary treatment stages, or both, dependent upon the desired level of water quality. Repetitive use of nanofiltration adds reliability to the treatment system and reduces system malfunction.

[2] The control system may be utilized to monitor the storage tank and initiate polishing by means of recirculating the treated water back through the primary, secondary, and tertiary treatment stages. Storage tank monitoring methods may include, but are not limited to, conductivity sensors, flow meters measuring depletion volumes, timers to initiate automatic turnover, and water temperature sensors.

[3] Carbon filtration may be utilized as a means of taste enhancement for stored treated water.

[4] Where approved by the registered design professional, storage may be provided after any treatment stage.

104.4.3 Filtration. The level of filtration shall be selected in accordance with the water quality requirements of Section 101.6.

104.5 Tertiary Treatment. Tertiary treatment for wastewater shall be in accordance with this section, Section 104.5.1, and Section 104.5.2. Treatment shall be completed by one or more of the following means:

(1) Nanofiltration,
(2) Reverse Osmosis (RO),
(3) Ultraviolet (UV) sterilization, or
(4) Other equivalent method of treatment as approved by the Authority Having Jurisdiction.

104.5.1 UV Sterilization. Where utilized, ultraviolet microbiological treatment systems shall be in accordance with NSF/ANSI 55, Class A systems. A minimum of 2 inline filters, one 5 micron (5 µm) filter followed by one 0.5-1 micron (0.5-1µm) filter, shall be installed prior to the UV disinfection system.

104.5.2 Reverse Osmosis (RO). Where installed, reverse osmosis water treatment systems shall be listed in accordance with NSF/ANSI 58 and ASSE 1086, or other equivalent standards, and shall be installed and maintained in accordance with the manufacturer's specifications.

Exception: Where approved by the registered design professional, the waste stream on the RO system shall be rerouted back into the water treatment system, and compliance with ASSE 1086 shall not be required.

Reverse osmosis water treatment systems shall be equipped with automatic shutoff valves to prevent discharge when there is no call for producing treated water. RO systems shall be selected and sized based on the following conditions:

(1) Estimated volume of water to be disinfected (gal/day) (L/day).

(2) Not less than a 20 percent variation in volume (gal) (L).
(3) Lowest expected water temperature (°F) (°C).

105.0 Commissioning.

105.1 General. Onsite wastewater treatment systems for potable use shall be commissioned in accordance with the requirements of Section 105.2 through Section 105.5.

105.2 Requirements. Commissioning for onsite wastewater treatment systems shall be included in the design and construction processes of the project. Commissioning shall be performed by a person who demonstrates competency in commissioning onsite wastewater treatment systems as required by the Authority Having Jurisdiction.

105.3 Plan. The construction documents shall include the commissioning plan for the onsite wastewater treatment system. The commissioning plan shall be approved by the Authority Having Jurisdiction prior to commissioning the onsite wastewater treatment system. The commissioning plan shall include the following:
(1) General project information.
(2) Equipment to be tested, including the test methodology.
(3) Processes to be tested.
(4) Criteria or process for testing.
(5) Criteria for acceptance.
(6) Commissioning team contact information.
(7) Commissioning process activities, schedules, and responsibilities.
(8) Plans for the completion of functional performance testing, post construction documentation and training, and the commissioning report.

105.4 Performance Testing. Performance tests shall verify that the installation and operation of the equipment of the onsite wastewater treatment system are in accordance with the approved plans and specifications. The performance test report shall include the equipment tested, the testing methods utilized, and proof of proper calibration of the equipment.

105.5 Commissioning Report. The commissioning report shall be submitted to the Authority Having Jurisdiction.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 63

Proponent: __Anthony Menafro_____ Date: 2/28/2025

Representing: ___Self_____

Mailing Address: 122 West 16thStreet_____

City: ____Bayonne_____ State: ___NJ_____ Zip: __07002_____

Phone: __201-988-1525_____ E-mail ____ajmplumb@aol.com_____

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

__X___ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: ___G.2.6 Definitions_____

Dead End, Potable Water: A branch line terminating at a developed length of two (2) feet or more from an active potable water line by means of a plug or cap.

Basis/Reason for Change:

Dead end is still cited in Appendix G so a definition is necessary

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 64

Proponent: Enrique Gonzalez

Date: February 28, 2025

Representing: IAPMO

Mailing Address: 4750 East Philadelphia Ave

City: Ontario State: CA Zip: 91761

Phone: 909-230-5535 E-mail: Enrique.gonzalez@iapmo.org

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_X____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: G.3.6.4 Drinking Water Treatment Systems

G.3.6.4 Drinking Water Treatment Systems
G.3.6.4.1 Drinking water treatment systems shall be listed to WQA/ASPE S-803.
G.3.6.4.2 Legionella Treatment Devices. Legionella reduction and treatment devices shall comply with ASSE LEC 2011.

Basis/Reason for Change:

Per the scope of ASSE LEC 2011 Listing Evaluation Criteria for *Legionella* Reduction and Treatment Devices 2022: "*Legionella* reduction and treatment devices are designed to reduce the microorganisms in the genus *Legionella* (e.g., *Legionella pneumophila*) typically found in potable water systems. The devices reduce the number of bacteria through inactivation and/or filtration. They can reduce or prevent the downstream bacterial colonization of a water system and thus ultimately the release of the bacteria into the product water. Devices are intended to be used at Point of Entry (POE) or Point-Of-Use (POU) in applications for hot or cold-water or both for drinking water, washing hands or showering." The 2022 ASSE LEC 2011 document defines performance criteria for devices designed to reduce *Legionella*. The ASSE LEC 2011 standard can be reviewed at the following link:

https://codes.iapmo.org/epubs/standards/ASSE/LEC2011-2022/

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

---

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 65

Proponent: Enrique Gonzalez

Representing: IAPMO

Mailing Address: 4750 East Philadelphia Ave

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Phone: 909-230-5535 E-mail: Enrique.gonzalez@iapmo.org

Date: February 28, 2025

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

_____ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: New Appendix on Hydrogen (NSPC Appendix P)

APPENDIX P
MANUAL OF RECOMMENDED PRACTICE FOR HYDROGEN FUEL GAS PIPING

P 101.0 General.
P 101.1 Applicability. The regulations of this appendix shall govern the installation of hydrogen fuel gas piping in or in connection with a building, structure or within the property lines of premises, where supplied by an authorized hydrogen gas generator or supplier.
P 101.2 Purpose. The purpose of the appendix is specific to gas piping systems utilizing 95 percent to 100 percent gaseous hydrogen, unless otherwise noted.
P 101.3 Applications. This appendix shall not apply to fuel gas types covered by Chapter 12 of this code.

P 102.0 Definitions.
P 102.1 General. For the purpose of this appendix, the following definitions shall apply:
Fuel Gas: Natural, manufactured liquefied petroleum or a mixture of these.
Hydrogen Admixtures: Fuel gas to which hydrogen is blended and/or mixed over 5 percent but not exceeding 20 percent by volume from the generator or supplier at the point of delivery.
Hydrogen Gas: Fuel gas with 95 percent or more gaseous hydrogen, unless otherwise specified as a hydrogen admixture.

Part I - Hydrogen Gas

P 103.0 Inspections.

P 103.1 Inspection Notification. Upon completion of the installation, alteration, or repair of hydrogen gas piping, and prior to the use thereof, the Authority Having Jurisdiction shall be notified that such hydrogen gas piping is ready for inspection.

P 103.2 Excavation. Excavations required for the installation of underground piping shall be kept open until the piping has been inspected and approved. Where such piping is covered or concealed before such approval, it shall be exposed upon the direction of the Authority Having Jurisdiction.

P 103.3 Type of Inspections. The Authority Having Jurisdiction shall perform inspections in accordance with Section P 103.3.1 and Section P 103.3.2, and either shall approve that portion of the work as completed or shall notify the permit holder wherein the same fails to be in accordance with this manual.

P 103.3.1 Rough Piping Inspection. A rough piping inspection shall be made after hydrogen gas piping authorized by the permit has been installed and before such piping has been covered or concealed or a fixture or appliance has been attached thereto. This inspection shall include a visual examination to determine that the hydrogen gas piping size, material, and installation meet the requirements of this appendix.

P 103.3.2 Final Piping Inspection. A final piping inspection shall be made after hydrogen gas piping authorized by the permit has been installed, and after portions, thereof that are to be covered or concealed are so concealed, and before fixtures, appliances, or shutoff valves has been attached thereto. This inspection shall comply with Section P 103.0. Test gauges used in conducting tests shall be in accordance with the Authority Having Jurisdiction.

P 104.0 Certificate of Inspection.

P 104.1 Issuance. Whereupon final piping inspection, the installation is found to be in accordance with the provisions of this appendix, a certificate of inspection shall be issued by the Authority Having Jurisdiction.

P 104.2 Hydrogen Gas Generator or Supplier. Upon request by the hydrogen gas supplier, the Authority Having Jurisdiction shall issue a copy of the certificate of final piping inspection to the hydrogen gas supplier serving the premises.

P 104.3 Unlawful. Where piping has been installed or replaced, it shall be unlawful for a serving hydrogen gas sup plier to turn on or cause to be turned on, hydrogen gas or hydrogen gas meters, without approval from the Authority Having Jurisdiction. All piping, appliances and appurtenances shall be listed and approved.

P 105.0 Authority to Render Hydrogen Gas Service.

P 105.1 Authorized Personnel. It shall be unlawful for a person, firm, or corporation, except the Authority Having Jurisdiction to turn on or reconnect hydrogen gas service in or on a premises where hydrogen gas service is, at the time, not being rendered.

P 105.2 Outlets. It shall be unlawful to turn on or connect gas in or on the premises unless outlets are securely connected to gas appliances or capped or plugged with screw joint fittings.

P 105.3 Notification. The serving hydrogen gas supplier shall notify the Authority Having Jurisdiction in writing of any changes to hydrogen gas supplies that include admixtures of gaseous hydrogen greater than 5 percent by volume.

P 106.0 Authority to Disconnect Service.

P 106.1 Disconnection. The Authority Having Jurisdiction or the serving hydrogen gas supplier shall be permitted to disconnect hydrogen gas piping, appliance(s), or both, where such piping or appliances do not comply with this appendix or they are found to be defective and in such a condition as to endanger life or property.

P 106.2 Notice. Where disconnections in accordance with Section P 106.1 are made, a notice stating disconnection, with reasons thereof, shall be attached to the disconnected hydrogen gas piping, appliance(s), or both.

P 106.3 Capped Outlets. It shall be unlawful to remove or disconnect hydrogen gas piping or appliances without capping or plugging with a screw joint fitting, the outlet from which the pipe or appliance was removed. Outlets to which appliances are not connected shall be left capped and gastight on a piping system that has been installed, altered, or repaired.

P 107.0 Temporary Use of Hydrogen Gas.

P 107.1 General. Temporary use of a hydrogen gas piping system shall be permitted where the gas piping system is in accordance with the provisions of this appendix and a permit specifying the duration of such use is obtained from the Authority Having Jurisdiction.

P 108.0 Hydrogen Gas Piping System Design, Materials, and Components.

P 108.1 Design of Hydrogen Piping System. Where required by the Authority Having Jurisdiction, construction documents shall be prepared prior to commencing with the installation. The design, construction, and workmanship shall be in accordance with the construction documents. The construction documents shall indicate the material to be used, the dimensions such as the length of branches, the load demand, point of delivery and the location of the piping.

P 108.2 Sizing of Hydrogen Gas Piping Systems. Hydrogen gas piping systems shall be sized and installed to supply not less than the maximum hydrogen gas demand in accordance with Section P 108.2.1, and to supply hydrogen gas to each appliance inlet at not less than the minimum supply pressure in accordance with appliance manufacturer's installations instructions.

P 108.2.1 Maximum Hydrogen Gas Demand. The maximum hydrogen gas demand shall be the total volumetric flow rate of hydrogen gas required to meet the combined maximum input ratings of all appliances served. The maximum input ratings shall be in accordance with the appliance manufacturer's installation instructions.

P 108.2.2 Sizing Methods. Hydrogen gas piping shall be sized in accordance with Section P 113.0.

P 108.3 Maximum Operating Pressure in Buildings. The maximum operating pressure for hydrogen gas piping systems located inside buildings shall not exceed 5 psi (34 kPa) unless approved in accordance with Section P 114.0 and Section P 115.0.

P 108.4 Acceptable Piping Materials and Joining Methods. Materials used in hydrogen gas piping systems shall be listed for such use and shall be in accordance with this appendix or be approved by the Authority Having Jurisdiction.

P 108.4.1 Other Piping Materials. Materials not covered by specifications listed in this appendix shall be in accordance with Section 301.5.

P 108.5 Metallic Pipe. Metallic pipe shall be in accordance with Section P 108.5.1 and Section P 108.5.2.

P 108.5.1 Wrought and Cast Iron Pipe. Wrought and Cast iron pipe shall not be used.

P 108.5.2 Steel, Stainless Steel, and Copper Pipe. Steel, stainless steel, copper and copper alloy tubing pipe and tubing shall be listed for the use with hydrogen gas.

P 108.6 Metallic Tubing. Metallic tubing shall be in accordance with Section P 108.6.1 through Section P 108.6.3.
P 108.6.1 Steel and Stainless Steel Tubing. Steel and stainless steel tubing shall be listed for the use with hydrogen gas.
P 108.6.2 Copper and Copper Alloy Tubing. Copper and copper alloy tubing shall be of Type K or L and shall be listed for the use with hydrogen gas.
P 108.6.3 Corrugated Stainless Steel Tubing. Corrugated stainless steel tubing systems shall be listed for the use with hydrogen gas.
P 108.7 Metallic Piping Joints and Fittings. Metallic piping joints and fittings used shall be applicable to the system's design conditions such as the pressure and temperature. Metallic piping joints and fittings shall not be subject to undue strains or stresses, and provisions shall be made for expansion and contraction.
P 108.7.1 Pipe Joints. Schedule 40 and heavier pipe joints shall be threaded, flanged, brazed, welded, or assembled with press connect fittings listed for the use with hydrogen gas.
P 108.7.2 Metallic Pipe Threads. Metallic pipe and fitting threads shall be taper pipe threads and shall be listed for the use with hydrogen gas in accordance with Section P 108.4. Thread sealant shall also be listed for use with hydrogen gas.
P 108.7.3 Copper or Copper Alloy Piping Joints. Copper piping joints shall be approved and listed for use in accordance with Section P 108.4. Copper or copper alloy piping joints shall be installed in accordance with the manufacturer's installation instructions, and shall be brazed or assembled with press connection fittings. Brazed joints between copper or copper alloy pipe and fittings shall be made with brazing alloys having a liquid temperature above 1000°F (538°C). The joint surfaces to be brazed shall be cleaned bright by either manual or mechanical means. Press connect fittings for copper or copper alloy pipe shall be listed for use with hydrogen gas.
P 108.7.4 Stainless Steel Tubing Joints. Stainless steel joints shall be installed in accordance with the manufacturer's installation instructions, and shall be welded, or assembled with fittings approved and listed for use with hydrogen gas.
P 108.7.5 Metallic Pipe Fittings. Metallic fittings shall be installed in accordance with the manufacturer's installation instructions and shall be approved and listed for use with hydrogen gas.
P 108.8 Plastic Piping, Joints, and Fittings. Plastic pipes, tubing, and fittings shall only be installed in accordance with the manufacturer's installation instructions, outdoors and underground, and shall be approved and listed for use with hydrogen gas.
P 108.9 Flange Specification. Flanges shall be approved and listed in accordance with Section P 108.4.

P 109.0 Gas Piping Installation.
P 109.1 General. Piping systems shall be installed in accordance with Chapter 12 of this code, the manufacturer's installation instructions, and the Authority Having Jurisdiction.
P 109.2 Pressure Regulators. Hydrogen gas pressure regulators shall be listed for use with hydrogen gas, manufacturer installation instructions and the Authority Having Jurisdiction.
P 109.3 Shutoff Valves. Shutoff valves shall be listed for hydrogen use with hydrogen gas and shall be installed in accordance with Chapter 12 of this code, the manufacturer's installation instructions, and the Authority Having Jurisdiction.

P 110.0 Appliance and Equipment Connections to Building Piping.
P 110.1General. Appliances and equipment shall be listed for use with hydrogen gas and installed in accordance with the manufacturer's installation instructions. The appliance or equipment shall be

connected to the building piping in accordance with this code and shall be listed for use with hydrogen gas and approved by the Authority Having Jurisdiction.

P 111.0 Pressure Testing and Purging.

P 111.1 Test Preparation. Test preparation shall be in accordance with this code, the manufacturer's installation instructions, and the Authority Having Jurisdiction.

P 111.2 Test Pressure. A pressure test shall be performed using air, CO2, or nitrogen at not less than 10 psi (69 kPa) gauge pressure. Test pressures shall be held for a length of time satisfactory to the Authority Having Jurisdiction but in no case less than 15 minutes with no perceptible drop in pressure. Pressure tests shall be performed in the presence of the Authority Having Jurisdiction. Necessary apparatus for conducting tests shall be furnished by the permit holder. Test gauges used in conducting tests shall be in accordance with this code.

P 111.3 Purging and Initial Filling Requirements. Purging of pressure test gas shall be performed in accordance with the Authority Having Jurisdiction. Initial filling of the piping system with hydrogen gas shall be monitored at each outlet to determine that the pressure test gas has been removed. Purging shall be stopped when hydrogen gas is detected at each outlet. Each outlet shall be capped or plugged gastight.

P 112.0 Required Gas Supply.

P 112.1 General. The installation of hydrogen gas piping shall comply with this section, Section P 112.2 through Section P 112.4.

P 112.2 Volume. The hourly volume of gas required at each piping outlet shall be taken at not less than the maximum hourly rating as specified by the manufacturer of the appliance or appliances to be connected to each such outlet.

P 112.3 Gas Appliances. Where the gas appliances to be installed have not been specified, the piping system designer shall be permitted to estimate the hourly volume requirements of the expected hydrogen appliances.

To obtain the cubic feet per hour (m^3/h) of gas required, divide the input of the appliances by the average Btu (kW•h) heating value per cubic foot (m^3) of the hydrogen gas. The average Btu (kW•h) per cubic foot (m^3) of the hydrogen gas in the area of the installation shall be permitted to be obtained from the serving gas supplier.

P 112.4 Size of Piping Outlets. The size of the supply piping outlet for a gas appliance shall be not less than ½ of an inch in diameter (15 mm). The size of a piping outlet for a mobile home shall be not less than ¾ of an inch in diameter (20 mm).

P 113.0 Required Gas Piping Size.

P 113.1 Sizing of Hydrogen Gas Piping Systems. The sizing of the hydrogen gas piping shall be in accordance with Table P 113.1(1) or Table P 113.1(1), or the sizing tables supplied by the manufacturer of a listed hydrogen gas piping system. The hydrogen gas piping regulations and tables are based on the use of hydrogen gas having a specific gravity of 0.07. Where blended gas of a different specific gravity is to be delivered, the specific gravity conversion factors provided by the serving gas supplier shall be used in sizing piping systems in lieu of Table P 113.1(1) and Table P 113.1(2).

P 113.2 Sizing of Piping Sections. To determine the size of each section of pipe in a system within the range of Table P 113.1(1) and Table P 113.1(2) proceed as follows:

(1) Measure the length of the pipe from the gas meter location to the most remote outlet on the system.

(2) Select the length in feet column and row showing the distance, or the next longer distance where the table does not give the exact length.

(3) Starting at the most remote outlet, find in the row just selected the gas demand for that outlet. Where the exact figure of demand is not shown, choose the next larger figure in the row.
(4) At the top of this column will be found the correct size of pipe.
(5) Using this same row, proceed in a similar manner to each section of pipe serving this outlet. For each section of pipe, determine the total gas demand supplied by that section. Where gas piping sections serve both heating and cooling appliances and the installation prevents both units from operating simultaneously, the larger of the two demand loads shall be used in sizing these sections.
(6) Size each section of branch piping not previously sized by measuring the distance from the gas meter location to the most remote outlet in that branch and follow the procedures of steps 2, 3, 4, and 5 above. Size branch piping in the order of their distance from the meter location, beginning with the most distant outlet not previously sized.

P 114.0 Variable Gas Pressure.

P 114.1 General. Where the supply hydrogen gas pressure exceeds 5 psi (34.6 kPa) or is less than 6 inches of water column (1.5 kPa), or where diversity demand factors are used, the design, pipe sizing, materials, location, and use of such systems first shall be approved by the Authority Having Jurisdiction. Piping systems designed for pressures exceeding the serving gas supplier's standard delivery pressure shall have prior verification from the gas supplier of the availability of the design pressure.

P 115.0 Engineering Methods.

P 115.1 General. For conditions other than those covered by Section P 113.0, such as longer runs or greater hydrogen gas demands, the size of each hydrogen gas piping system shall be determined by standard engineering methods acceptable to the Authority Having Jurisdiction, and each such system shall be so designed that the total pressure drop between the meter or another point of supply and an outlet where full demand is being supplied to all outlets, shall be in accordance with the requirements of Section P 108.0.

TABLE P 113.1(1)
100% HYDROGEN GAS (SG=0.07, HV=325 BTU/cu.ft.)
Capacities in MBTU / hr (Thousands of BTU per Hour)

SCHEDULE 40 STEEL PIPE												
Less than 2PSI and 0.5inch WC Drop												
PIPE SIZE (NOMINAL INCH)												
Length (ft)	1/2"	3/4"	1"	11/4"	11/2"	2"	21/2"	3"	4"	5"	6"	8"
10	165	344	649	1 333	1 998	3 849	6 137	10 853	22 147	40 083	64 923	133 454
20	113	237	446	916	1 373	2 646	4 219	7 461	15 225	27 555	44 631	91 742
30	91	190	358	736	1 103	2 125	3 388	5 992	12 228	22 130	35 845	73 682
40	78	163	307	630	944	1 819	2 900	5 129	10 466	18 942	30 682	63 068
50	69	144	272	558	837	1 612	2 571	4 546	9 277	16 790	27 194	55 900
60	62	131	246	506	758	1 461	2 329	4 119	8 406	15 213	24 642	50 652
70	57	120	227	466	698	1 344	2 143	3 790	7 734	13 997	22 671	46 602
80	53	112	211	433	649	1 251	1 994	3 526	7 195	13 022	21 092	43 356
90	50	105	198	406	609	1 173	1 871	3 308	6 751	12 218	19 791	40 681
100	47	99	187	384	575	1 108	1 767	3 125	6 377	11 542	18 695	38 428
125	42	88	166	340	510	982	1 566	2 770	5 653	10 230	16 570	34 061
150	38	80	150	308	462	890	1 419	2 510	5 122	9 270	15 014	30 863
175	35	73	138	284	425	819	1 306	2 309	4 712	8 528	13 814	28 395
200	33	68	128	264	395	762	1 215	2 148	4 384	7 934	12 852	26 417
250	29	60	114	234	351	675	1 077	1 904	3 886	7 033	11 391	23 415
300	26	55	103	212	318	612	976	1 725	3 521	6 372	10 322	21 217
350	24	50	95	195	292	563	898	1 587	3 239	5 863	9 496	19 520
400	22	47	88	181	272	524	835	1 477	3 014	5 454	8 835	18 160
450	21	44	83	170	255	492	784	1 386	2 828	5 118	8 290	17 040
500	20	42	78	161	241	464	740	1 309	2 671	4 835	7 831	16 096

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

TABLE P 113.1(2)
100% HYDROGEN GAS (SG=0.07, HV=325 BTU/cu.ft.)
Capacities in CFH (Cubic Feet per Hour)

SCHEDULE 40 STEEL PIPE												
Less than 2PSI and 0.5inch WC Drop												
PIPE SIZE (NOMINAL INCH)												
Length (ft)	1/2"	3/4"	1"	11/4"	11/2"	2"	21/2"	3"	4"	5"	6"	8"
10	507	1,060	1,997	4,102	6,147	11,844	18,884	33,395	68,146	123,332	199,764	410,628
20	348	728	1,373	2,820	4,226	8,142	12,981	22,957	46,847	84,784	137,327	282,285
30	280	585	1,103	2,265	3,394	6,539	10,426	18,438	37,624	68,093	110,293	226,714
40	239	501	944	1,938	2,905	5,597	8,924	15,782	32,204	58,284	94,405	194,055
50	212	444	836	1,718	2,575	4,961	7,910	13,988	28,544	51,660	83,675	172,000
60	192	402	758	1,557	2,333	4,495	7,167	12,675	25,865	46,811	75,820	155,853
70	177	370	697	1,432	2,147	4,136	6,594	11,661	23,796	43,067	69,757	143,390
80	165	344	649	1,333	1,997	3,848	6,135	10,849	22,139	40,067	64,898	133,402
90	154	323	609	1,250	1,874	3,611	5,756	10,180	20,773	37,595	60,894	125,172
100	146	305	575	1,181	1,770	3,411	5,438	9,616	19,623	35,514	57,522	118,241
125	129	270	510	1,047	1,569	3,023	4,820	8,523	17,392	31,477	50,985	104,802
150	117	245	462	949	1,422	2,739	4,367	7,723	15,760	28,522	46,198	94,964
175	108	225	425	873	1,308	2,520	4,018	7,105	14,499	26,241	42,504	87,370
200	100	210	395	812	1,217	2,345	3,738	6,611	13,489	24,414	39,543	81,284
250	89	186	350	720	1,079	2,078	3,313	5,859	11,956	21,639	35,049	72,046
300	81	168	317	652	977	1,883	3,002	5,309	10,834	19,608	31,759	65,282
350	74	155	292	600	899	1,732	2,762	4,885	9,968	18,040	29,219	60,062
400	69	144	272	558	837	1,612	2,570	4,544	9,273	16,783	27,184	55,878
450	65	135	255	524	785	1,512	2,411	4,264	8,701	15,748	25,507	52,431
500	61	128	241	495	741	1,429	2,278	4,028	8,219	14,876	24,094	49,527

Part II - Hydrogen Admixtures.

P 116.0 Systems Supplied by Hydrogen Admixtures.

P 116.1 Applicability. Fuel gas systems, where hydrogen admixtures are delivered, shall meet the piping requirements in accordance with Chapter 12 of this code for the supplier defined hydrogen admixture limitations, as defined by volume concentration of gaseous hydrogen, and approved by the manufacturer, installer, or Authority Having Jurisdiction.

P 116.2 Fuel Gas Specifications. The Authority Having Jurisdiction shall be provided with specific compositional descriptions for the fuel gas supplied by a utility, including hydrogen admixtures.

P 116.3 Appliances and Equipment Listings. Appliances operating on hydrogen admixtures shall be tested and listed for the specified operation of hydrogen admixtures. All piping systems and fuel gas system components shall be tested and listed for approval for hydrogen admixture limits or as required by the Authority Having Jurisdiction.

P 116.4 Materials. The applicability of piping and fittings materials for systems with hydrogen admixtures shall be in accordance with Table P 116.4.

TABLE P 116.4
MATERIAL APPLICABILITY TABLE FOR HYDROGEN ADMIXTURES*

PIPE AND TUBING	UP TO 20% HYDROGEN	100% HYDROGEN
Steel	Y	Y
Copper	Y	Y
CSST Tubing	Y	Y
Plastic (Aboveground)	N	N
Plastic (Underground)	Y	Y
JOINTS AND FITTINGS	**UP TO 20% HYDROGEN**	**100% HYDROGEN**
Steel	Y	Y
Copper	Y	Y
Stainless	Y	Y
Plastic (Underground)	Y	Y

* All materials listed shall be individually tested, listed and approved for hydrogen gas and appliances served.

Basis/Reason for Change:

Hydrogen is an important growing technology and has very unique properties. The permeation, embrittlement, and wide flammability range are some of the main concerns and codes need to be in place to keep workers, as well as the public as safe as possible. Codes are the right direction for industry standardization and supporting the hydrogen economy. Given the expanding role of hydrogen in global energy systems and its unique safety and material challenges, a dedicated hydrogen piping code is essential. Such a code would enhance safety, support industry growth, and enable the effective transition to a hydrogen based energy economy.

Hydrogen has become an emerging energy source that is being utilized worldwide. Hydrogen is the smallest molecule and blending it in excess of 25% can cause leakage of those molecules with existing piping materials. This proposal substantiates that any mixture that exceeds 20% hydrogen gas is a possible danger to life safety. Blends that are under 20% are safe to utilize existing piping that is in good working condition. This proposal for revising the fuel gas chapter is to confirm that hydrogen blends above 20% do not get utilized in existing piping meant for other fuels. Life safety is a priority of model codes and due to technological advances, I feel that this change is necessary to ensure that.

The world-wide energy industry seeks to address the impact of global climate change through a reduction in the use of fossil fuels. One of the many proposed approaches includes the use of alternative clean fuels, renewable fuels, and fuel blends. These approaches include gaseous hydrogen, hydrogen blended with natural gas, and renewable natural gas. These alternative fuels are not new, but the mainstream introduction of these fuels into the flow of commerce dictates that the model fuel gas codes be amended to accommodate their anticipated impact on general safety, reliability, and efficiency.

This appendix for Hydrogen Fuel Gas Piping contains many new and/or amended industry practices for designing, sizing, installing, and inspecting new fuel gas piping systems containing either hydrogen admixtures or pure gaseous hydrogen. As a fuel, hydrogen has the smallest molecule, and thus presents a challenge to piping system designers and operators regarding containment of the fuel within the piping system. Furthermore, hydrogen has three times less energy content than natural gas making it more challenging to deliver sufficient fuel to maintain proper operation and efficiency within traditional gas appliances.

This manual provides the user with guidance on how the use of hydrogen fuel and admixtures will impact the customary industry practices associated with the distribution of fuel gas within buildings. The user is advised to ensure that only appliances and piping system components that have been tested and listed to a nationally recognized consensus standard for hydrogen service be specified for use within hydrogen piping systems. Furthermore, the user of this document must be aware that the practices recommended within are subject to frequent updating and revision as newer data and research become known regarding the impact of hydrogen gas for this type of service.

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 66

Proponent: Enrique Gonzalez

Representing: IAPMO

Mailing Address: 4750 East Philadelphia Ave

City: Ontario State: CA Zip: 91761

Phone: 909-230-5535 E-mail: Enrique.gonzalez@iapmo.org

Date: February 28, 2025

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

___X__ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: Appendix G WEStand Excerpts

Add the following WEStand Excerpts to Appendix G. Renumber the sections corresponding to Appendix G.

Onsite Blackwater Treatment Systems

801.0 General.

801.1 Applicability. The provisions of this chapter shall apply to the water quality, monitoring, design, construction, alteration, repair, and operation requirements of onsite blackwater treatment systems for non-potable reuse.

801.2 Allowable Use of Blackwater. Where approved or required by the Authority Having Jurisdiction, blackwater shall be permitted to be used in lieu of potable water for uses such as, but not limited, to water closets, urinals, clothes washers, ornamental plant irrigation, and dust suppression.

802.0 System Design.

802.1 Requirements. Onsite blackwater treatment systems shall meet the design, construction, and performance requirements of Section 802.1.1 or Section 802.1.2.

802.1.1 Listed Blackwater Treatment Systems. Onsite blackwater treatment systems shall be listed to NSF/ANSI 350, installed according to the manufacturer's instructions, and commissioned in accordance with Section 803.0.

802.1.2 Alternative Design Systems. Where approved by the Authority Having Jurisdiction, onsite blackwater treatment systems for residential and commercial applications shall comply with the provisions of Section 802.2 through Section 805.0.

802.2 Permit. It shall be unlawful for any person to construct, install, alter, or cause to be constructed, installed, or altered any blackwater treatment system in a building or on a premise without first obtaining a permit to do such work from the Authority Having Jurisdiction.

802.3 Component Identification. System components shall be properly identified as to the manufacturer.

802.4 Material Compatibility. Blackwater treatment systems shall be constructed of materials that are compatible with the type of pipe and fitting materials, water treatment, and water conditions in the system.

802.5 Log Reduction Targets. Blackwater treatment systems shall be designed to meet the log reduction targets as set forth in Table 802.5. To meet the log reduction targets in Table 802.5, treatment processes used in blackwater systems shall comply with Section 802.7 for validation or be operated according to conditions approved by the Authority Having Jurisdiction.

802.6 Effluent Water Quality Parameters. Blackwater treatment systems shall be designed to meet the effluent water quality parameters for water closet and urinal fixture use listed in Table 802.6.

802.7 Validation. Where required by the Authority Having Jurisdiction, treatment processes shall be tested to verify the pathogen reduction performance. The treatment processes shall be validated through third-party component validation or field verification using the challenge testing. The results of the third-party component validation and/or challenge testing shall be summarized in a validation report prepared by a registered design professional. The validation report shall document the treatment technology's log reduction performance, including information on the operating conditions and surrogate parameters.

TABLE 802.5
LOG REDUCTION TARGETS FOR 10^{-4} INFECTIONS PER PERSON PER YEAR BENCHMARKS FOR BLACKWATER TREATMENT SYSTEMS

WATER USE SCENARIO	ENTERIC VIRUSES	PARASITIC PROTOZOA	ENTERIC BACTERIA
Ornamental plant irrigation*/dust suppression	8.0	7.0	6.0
Indoor Use	8.5	7.0	6.0

* Non-food

TABLE 802.6
EFFLUENT WATER QUALITY PARAMETERS FOR WATER CLOSET AND URINAL FIXTURE USE

PARAMETER	MINIMUM	MAXIMUM
Alkalinity	20 ppm	200 ppm
TDS	0 ppm	500 ppm
Turbidity	0 NTU	5 NTU
pH	6.0	9.0
Odor	Non-Offensive	
Oily Film and Foam	Visual Non-detectable	
Free Chlorine Residual	NA	4 ppm
Combined Chlorine	NA	4 ppm
Chloramines	NA	4 ppm

802.8 Health and Safety. Treated blackwater shall not create a nuisance or odor, nor threaten human health, or damage the quality of surface water or groundwater.

802.9 Monitoring Requirements. Monitoring of blackwater treatment systems shall be based on the risk level in accordance with Table 802.9(1). The parameters listed in Table 802.9(2) shall be monitored by sensors placed in the effluent of the system and connected to a smart controller. The smart controller shall activate an alarm when the parameters in Table 802.9(2) are outside the specifications and shall shut the system down when the alarm is not acknowledged after a period of 8 hours has elapsed. For Category 2, quarterly grab samples shall be taken out of the effluent and analyzed by an accredited lab. The sensors' accuracy and response shall be validated upon commissioning of the system by an independent third party.

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TABLE 802.9(1)
RISK LEVELS

RISK LEVEL	TREATED WATER USAGE*
1	Ornamental plant irrigation and dust suppression
2	Water closets, urinals, clothes washers

* See Section 801.2 for other uses approved by the Authority Having Jurisdiction.

TABLE 802.9(2)
MONITORING PARAMETERS

CATEGORY	PARAMETERS TO BE MONITORED	VALIDATION PROCEDURE
1	Turbidity ORP UV intensity (if used)	IAPMO IGC 324 - Sensor validation procedure using 5.4.1.1 (a), (b), (c), and (d) as applicable
2	Turbidity ORP UV intensity (if used) pH Quarterly lab Sample for Total Coliform	

802.10 System Requirements. The design and installation of onsite blackwater treatment systems shall meet the requirements of Section 802.10.1 through Section 802.10.6.

802.10.1 Connections to Potable or Reclaimed (Recycled) Water Systems. Blackwater treatment systems shall have no direct connection to any potable water supply or reclaimed (recycled) water source system. Potable water or reclaimed (recycled) water shall be permitted to be used as makeup water for a blackwater treatment system provided the potable or reclaimed (recycled) water supply connection is protected by an airgap.

802.10.2 Bypass Connection. A bypass shall be provided for the input connection to the blackwater treatment system. The bypass shall be a diverter valve normally open to the blackwater treatment system. The normally closed port of the diverter valve shall be connected directly to the plumbing drainage system according to the plumbing code.

802.10.3 Overflow Connection. Blackwater treatment overflow shall be connected directly to the plumbing drainage system. The overflow shall be provided with a backwater valve at the point of connection to the plumbing drainage system. The backwater valve shall be accessible for inspection and maintenance.

802.10.4 Fail-safe Mechanisms. Blackwater treatment systems shall be equipped with an automatic shutdown of the treatment process when a malfunction occurs.

802.10.5 Flow Meter Totalizer. Buildings with blackwater treatment systems shall include a flow meter totalizer on the treated blackwater distribution system and a flow meter totalizer on the potable make-up water connection to the blackwater treatment system.

802.10.6 Cross-Connection Inspection and Testing. A cross-connection test is required in accordance with Section G.4.1.11.2. Before the building is occupied or the system is activated, the installer shall perform the initial cross-connection test in the presence of the Authority Having Jurisdiction. The test shall be ruled successful by the Authority Having Jurisdiction before final approval is granted.

803.0 Commissioning.

803.1 General. Onsite blackwater treatment systems shall be commissioned in accordance with the requirements of Section 803.2 through Section 803.5.

803.2 Requirements. Commissioning for blackwater treatment systems shall be included in the design and construction processes of the project. Commissioning shall be performed by a person who demonstrates competency in commissioning blackwater treatment systems as required by the Authority Having Jurisdiction.

803.3 Plan. The construction documents shall include the commissioning plan for the blackwater treatment system. The commissioning plan shall be approved by the Authority Having Jurisdiction prior to commissioning the blackwater treatment system. The commissioning plan shall include the following:

(1) General project information.
(2) Equipment to be tested, including the test methodology.
(3) Processes to be tested.
(4) Criteria or process for testing.
(5) Criteria for acceptance.
(6) Commissioning team contact information.
(7) Commissioning process activities, schedules, and responsibilities.
(8) Plans for the completion of functional performance testing, post construction documentation and training, and the commissioning report.

803.4 Performance Testing. Performance tests shall verify that the installation and operation of the equipment of the blackwater treatment system is in accordance with the approved plans and specifications. The performance test report shall include the equipment tested, the testing methods utilized, and proof of proper calibration of the equipment.

803.5 Commissioning Report. The commissioning report shall be submitted to the Authority Having Jurisdiction.

804.0 Operation and Maintenance Manual.

804.1 General. An operation and maintenance manual shall be provided in accordance with Section 701.6 and shall also include the following:

(1) Instructions on operating and maintaining the system, including treatment process operations, instrumentation and alarms, and chemicals storage and handling.
(2) Site equipment inventory and maintenance notes.
(3) Equipment/system warranty documentation and information.
(4) "As-Built" design drawings.
(5) Details on training requirements and qualifications of personnel responsible for operating the system.
(6) Maintenance schedule.

805.0 Inspection.

805.1 General. Field inspections shall take place during and after construction while the contractor is on-site to verify that the blackwater treatment system components have been properly supplied and installed according to the plans and specifications used for installation. Record drawings shall be maintained with changes to the approved plans by the contractor and available for periodic inspection as needed.

Basis/Reason for Change:

This proposal proposes comprehensive requirements related to the water quality, monitoring, design, construction, commissioning, alteration, repair, and operation requirements of blackwater systems for non-potable water reuse. These requirements for a properly designed system, together with appropriate construction, operation, and maintenance, will help ensure blackwater systems will be implemented safely and reliably. The treatment threshold is a Risk-Based Framework for the Development of Public Health Guidance for Decentralized Non-Potable Water Systems. The risk-based water quality approach was developed through recent research by the National Water Research Institute (NWRI) and the Water Research Foundation (WRF), culminating in the report Risk-Based Framework for the Development of Public Health Guidance for Decentralized Non-Potable Water Systems. Utilizing similar methodology as is employed in potable reuse and drinking water regulations, the risk-based LRTs align with the Water Safety Plan approach promoted by the World Health Organization. Blackwater may contain pathogenic microorganisms that, if not properly treated, can cause infection due to exposure to these

waters when recycled and used onsite. The intent of the risk-based framework is to determine the appropriate level of treatment for pathogens that is needed to protect public health, accounting for such factors as the source water quality, specific end use, and acceptable risk of infection from exposure to the treated water. The risk threshold used for this application is the same as has been previously applied in the context of municipal drinking water, i.e. exposure to this water via toilet flushing, irrigation, and other non-potable uses poses no greater risk than drinking municipally supplied drinking water. Because the amount of pathogen reduction for reuse usually spans orders of magnitude, pathogen treatment requirements are specified in terms of log10 reduction; 1-log10 reduction equates to 90% removal, 2-log10 reduction to 99% removal, 3-log10 reduction to 99.9% removal, and so on. The treatment requirements developed using the risk-based methodology in this case are called log reduction targets, or LRTs. The LRTs were developed using a Quantitative Microbial Risk Assessment (QMRA). QMRA is a scientific approach to estimating the potential human health risks associated with exposure to microbial hazards (in this case, human pathogenic viruses, bacteria, and protozoa). LRTs for blackwater and stormwater reuse for unrestricted irrigation and toilet flushing were developed based on the annual risk level of 10^{-4} infections per person per year. Unit treatment processes that are effective at removing and/or inactivating pathogens can be used to meet the LRTs. In most cases, several unit processes are needed in series to provide sufficient treatment. The ability of unit processes to provide a certain level of treatment is verified through the use of ongoing monitoring and, in some cases, validation. For some unit processes, validation is critical to determine how the process can be used to achieve the LRTs. This also proposes to incorporate a monitoring approach for blackwater systems that aligns with the research. The framework for monitoring deviates from traditional approaches of monitoring fecal indicator organisms (FIOs) in grab samples because there are recognized limitations of using FIOs. The primary limitation of FIO monitoring is that it cannot be done continuously to ensure safe water is delivered to the end use at all times. Rather, this is proposing continuous water quality monitoring of surrogate parameters such as turbidity, residual chlorine, ultraviolet transmittance, and others to verify that treatment processes are operating as designed.

The requirements being proposed are intended to ensure that public health is protected while still allowing for flexibility in design, as it does not prescribe that specific treatment processes must be used. This proposal is timely because several states have recently moved forward to adopt the risk-based framework at the state level. Much of this work has been driven by the work of the National Blue Ribbon Commission for Onsite Non-potable Water Systems, a coalition of public health agencies and water and wastewater utilities committed to advancing the safe, practical, and sustainable implementation of alternate water source systems. As a result of the Commission's work, several states including California, Colorado, Minnesota, Oregon, Washington, and Hawaii are proposing legislation to adopt the risk-based approach. Therefore, institutionalizing the risk-based approach will create further consistency across the country by aligning plumbing and health code requirements for alternate water source systems. Resources: the following resources are provided to develop the proposed text for blackwater treatment systems. These resources provide a technically sound template for the development of requirements for blackwater treatment systems that fit well into the both the scope and format structure of model codes used by WE•Stand.

1. Risk-Based Framework for the Development of Public Health Guidance for Decentralized Non-Potable Water Systems https://www.werf.org/a/ka/Search/ResearchProfile.aspx?ReportId=SIWM10C15
2. A Guidebook for Developing and Implementing Regulations for Onsite Non-potable Water Systems developed by the National Blue Ribbon Commission for Onsite Non-Potable Water Systems https://sfwater.org/Modules/ShowDocument.aspx?documentID=11586
3. San Francisco Department of Public Health Director's Rules and Regulations Regarding the Operation of Alternate Water Source Systems https://www.sfdph.org/dph/files/EHSdocs/ehsWaterdocs/NonPotable/SFHC_12C_Rules.pdf

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 67

Proponent: Enrique Gonzalez

Representing: IAPMO

Mailing Address: 4750 East Philadelphia Ave

City: Ontario State: CA Zip: 91761

Phone: 909-230-5535 E-mail: Enrique.gonzalez@iapmo.org

Date: February 28, 2025

IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Amend section with this editorial change

_____ Change subsection to read as follows

_____ Delete subsection and substitute as follows

___X__ Add new subsection to read as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: Appendix G WEStand Excerpts

Add the following WEStand Excerpts to Appendix G. Renumber the sections corresponding to Appendix G.

Onsite Gray Water Treatment Systems

901.0 General.

901.1 Applicability. The provisions of this chapter shall apply to the design, installation, construction, and maintenance of residential and commercial onsite gray water treatment systems for non-potable reuse.

901.2 Allowable Use of Gray Water. Where approved or required by the Authority Having Jurisdiction, treated gray water shall be permitted to be used in lieu of potable water for uses such as, but not limited to, cooling towers, water closets, urinals, clothes washers, and surface irrigation. Potable water shall be supplied to personal hygiene devices (bidet and bidet seats). Gray water systems used for subsoil irrigation shall comply with Section 702.0

902.0 System Design.

902.1 Requirements. Onsite gray water treatment systems shall be designed in accordance with this chapter by a registered design professional. Systems shall meet the design, construction, and performance requirements of Section 902.1.1 or Section 902.1.2.

902.1.1 Listed Devices and Equipment. Devices or equipment used to treat onsite treated gray water in order to maintain the minimum water quality requirements determined by the Authority Having Jurisdiction shall be listed and labeled (third-party certified) by a listing agency (accredited conformity assessment body) or approved for the intended application. Devices

or equipment used to treat onsite treated gray water for use in water closet and urinal flushing, surface irrigation and similar applications shall comply with IAPMO IGC 324, NSF/ANSI 350, or as approved by the Authority Having Jurisdiction.

902.1.2 Alternative Design Systems. Where approved by the Authority Having Jurisdiction, onsite gray water treatment systems for residential and commercial applications shall comply with the provisions of Section 902.2 through Section 905.0.

902.2 Permit. It shall be unlawful for any person to construct, install, alter, or cause to be constructed, installed, or altered any onsite gray water treatment system within a building or on a premises without first obtaining a permit to do such work from the Authority Having Jurisdiction.

902.2.1 Plumbing Plan Submission. No permit for any onsite gray water treatment system shall be issued until complete plumbing plans, with appropriate data satisfactory to the Authority Having Jurisdiction, have been submitted and approved.

902.2.2 System Changes. No changes or connections shall be made to either the onsite gray water treatment system or the potable water system without approval by the Authority Having Jurisdiction.

902.3 Component Identification. System components shall be properly identified as to the manufacturer.

902.4 Material Compatibility. Gray water treatment systems shall be constructed of materials that are compatible with the type of pipe and fitting materials, water treatment, and water conditions in the system.

902.5 Log Reduction Targets. Gray water treatment systems shall be designed to meet the log reduction targets as set forth in Table 902.5. To meet the log reduction in Table 902.5, treatment processes used in gray water systems shall comply with Section 902.7 for validation or be operated according to conditions approved by the Authority Having Jurisdiction.

TABLE 902.5
LOG REDUCTION TARGETS FOR 10^{-4} INFECTIONS PER PERSON PER YEAR BENCHMARKS FOR GRAY WATER TREATMENT SYSTEMS

WATER USE SCENARIO	ENTERIC VIRUSES	PARASITIC PROTOZOA	ENTERIC BACTERIA
Outdoor Use	5.5	4.5	3.5
Indoor Use	6.0	4.5	3.5

902.6 Effluent Water Quality Parameters. Gray water treatment systems shall be designed to meet the effluent water quality parameters for water closet and urinal fixture use listed in Table 902.6.

TABLE 902.6
EFFLUENT WATER QUALITY PARAMETERS FOR WATER CLOSET AND URINAL FIXTURE USE

PARAMETER	MINIMUM	MAXIMUM
Alkalinity	20 ppm	200 ppm
TDS	0 ppm	500 ppm
Turbidity	0 NTU	5 NTU
pH	6.0	9.0
Odor	Non-Offensive	
Oily Film and Foam	Visual Non-detectable	
Free Chlorine Residual	N/A	4 ppm
Combined Chlorine	N/A	4 ppm
Chloramines	N/A	4 ppm

902.7 Validation. Where required by the Authority Having Jurisdiction, treatment processes shall be tested to verify the pathogen reduction performance. The treatment processes shall be validated through third-party component validation or field verification using challenge testing. The results of the third-party component validation and/or challenge testing shall be

summarized in a validation report prepared by a registered design professional. The validation report shall document the treatment technology's log reduction performance, including information on the operating conditions and surrogate parameters.

902.8 Health and Safety. Gray water shall not create a nuisance or odor, nor threaten human health, or damage the quality of surface water or groundwater.

902.9 Monitoring Requirements. Monitoring of gray water treatment systems shall be based on the risk level in accordance with Table 902.9(1). The parameters listed in Table 902.9(2) shall be monitored by sensors placed in the effluent of the system and connected to a smart controller. The smart controller shall activate an alarm when the parameters in Table 902.9(2) are outside the specifications and shall shut the system down when the alarm is not acknowledged after a period of 8 hours has elapsed. For Category 2, quarterly grab samples shall be taken out of the effluent and analyzed by an accredited lab. The sensors' accuracy and response shall be validated upon commissioning of the system by an independent third party.

TABLE 902.9(1)
RISK LEVELS

RISK LEVEL	TREATED WATER USAGE*
1	Surface Irrigation
2	Water closets, urinals, clothes washers

* See Section 901.2 for other uses approved by the Authority Having Jurisdiction.

TABLE 902.9(2)
MONITORING PARAMETERS

CATEGORY	PARAMETERS TO BE MONITORED	VALIDATION PROCEDURE
1	Turbidity ORP UV intensity (if used)	IAPMO IGC 324 - Sensor validation procedure using 5.4.1.1 (a), (b), (c), and (d)., as applicable
2	Turbidity ORP UV intensity (if used) pH Quarterly lab Sample for Total Coliform	

902.10 System Requirements. The design and installation of onsite gray water treatment systems shall meet the requirements of Section 902.10.1 through Section 902.10.8.

902.10.1 Connections to Potable or Reclaimed (Recycled) Water Systems. Gray water treatment systems shall have no direct connection to any potable water supply or reclaimed (recycled) water source system. Potable water or reclaimed (recycled) water shall be permitted to be used as makeup water for a gray water treatment system provided the potable or reclaimed (recycled) water supply connection is protected by an airgap.

902.10.2 Bypass Connection. A bypass shall be provided for the input connection to the gray water treatment system. The bypass shall be a diverter valve normally open to the gray water treatment system. The normally closed port of the diverter valve shall be connected directly to the storm drainage system or combined sewer system according to the plumbing code.

902.10.3 Overflow Connection. Gray water treatment overflow shall be connected directly to the plumbing drainage system. The overflow shall be provided with a backwater valve at the point of connection to the plumbing drainage system. The backwater valve shall be accessible for inspection and maintenance.

902.10.4 Near Underground Potable Water Pipe. Onsite treated gray water pipes run or laid in the same trench as potable water pipes shall have 12 inches (305 mm) minimum vertical and horizontal separation when both pipe materials are approved for use within a building. Where piping materials do not meet this requirement the minimum separation shall be increased to 60 inches (1524 mm). The potable water piping shall be installed at an elevation above the onsite treated gray water piping.

902.10.5 Fail-safe Mechanisms. Gray water treatment systems must be equipped with features that result in a controlled and non-hazardous automatic shutdown of the treatment process in the event of a malfunction.

902.10.6 Flow Meter Totalizer. Buildings with gray water treatment systems shall include a flow meter totalizer on the treated gray water distribution system and a flow meter totalizer on the potable make-up water pipeline to the gray water treatment system.

902.10.7 Cross-connection Inspection and Testing. A cross-connection test is required in accordance with Section G.4.1.11.2. Before the building is occupied or the system is activated, the installer shall perform the initial cross-connection test in the presence of the Authority Having Jurisdiction. The test shall be ruled successful by the Authority Having Jurisdiction before final approval is granted.

902.10.8 Water Pressure. Onsite treated non-potable water systems supplying water to water closets, urinals, and trap primers shall be capable of delivering not less than 15 pounds-force per square inch (psi) (103 kPa) residual pressure at the highest and most remote outlet served. Where the water pressure in the onsite treated non-potable water supply system within the building exceeds 80 psi (552 kPa), a pressure reducing valve reducing the pressure to 80 psi (552 kPa) or less to water outlets in the building shall be installed.

903.0 Commissioning.

903.1 General. Onsite gray water treatment systems shall be commissioned in accordance with the requirements of Section 903.1 through Section 903.5.

903.2 Requirements. Commissioning for gray water treatment systems shall be included in the design and construction processes of the project. Commissioning shall be performed by a person who demonstrates competency in commissioning gray water treatment systems as required by the Authority Having Jurisdiction.

903.3 Plan. The construction documents shall include the commissioning plan for the gray water treatment system. The commissioning plan shall be approved by the Authority Having Jurisdiction prior to commissioning the gray water treatment system. The commissioning plan shall include the following:

(1) General project information.
(2) Equipment to be tested, including the test methodology.
(3) Processes to be tested.
(4) Criteria or process for testing.
(5) Criteria or process for acceptance.
(6) Commissioning team contact information.
(7) Commissioning process activities, schedules, and responsibilities.
(8) Plans for the completion of functional performance testing, post construction documentation and training, and the commissioning report.

903.4 Performance Testing. Performance tests shall verify that the installation and operation of the equipment of the gray water treatment system is in accordance with the approved plans and specifications. The performance test report shall include the equipment tested, the testing methods utilized, and proof of proper calibration of the equipment.

903.5 Commissioning Report. The commissioning report shall be submitted to the Authority Having Jurisdiction.

904.0 Operation and Maintenance Manual.

904.1 General. An operation and maintenance manual shall be provided in accordance with Section 701.6 and shall also include the following:

(1) Instructions on operating and maintaining the system, including treatment process operations, instrumentation and alarms, and chemicals storage and handling.
(2) Site equipment inventory and maintenance notes.
(3) Equipment/system warranty documentation and information.
(4) "As-Built" design drawings.
(5) Details on training requirements and qualifications of personnel responsible for operating the system.
(6) Maintenance schedule.

905.0 Inspection.

905.1 General. Field inspections shall take place during and after construction while the contractor is on site to verify that the gray water treatment system components have been properly supplied and installed according to the plans and specifications used for installation. Record drawings shall be maintained with changes to the approved plans by the contractor and available for periodic inspection as needed.

Basis/Reason for Change:

This proposal proposes comprehensive requirements related to the water quality, monitoring, design, construction, commissioning, alteration, repair, and operation requirements of onsite gray water treatment systems for non-potable water reuse. These requirements for a properly designed system, together with appropriate construction, operation, and maintenance, will help ensure onsite gray water treatment systems will be implemented safely and reliably.

This proposes to incorporate health risk-based water quality requirements for onsite gray water treatment systems. The risk-based water quality approach was developed through recent research by the National Water Research Institute (NWRI) and the Water Research Foundation (WRF), culminating in the report Risk-Based Framework for the Development of Public Health Guidance for Decentralized Non-Potable Water Systems. Utilizing similar methodology as is employed in potable reuse and drinking water regulations, the risk-based LRTs align with the Water Safety Plan approach promoted by the World Health Organization. Gray water may contain pathogenic microorganisms that, if not properly treated, can cause infection due to exposure to these waters when recycled and used onsite. The intent of the risk-based framework is to determine the appropriate level of treatment for pathogens that are needed to protect public health, accounting for such factors as the source water quality, specific end use, and acceptable risk of infection from exposure to the treated water. The risk threshold used for this application is the same as has been previously applied in the context of municipal drinking water, i.e. exposure to this water via toilet flushing, irrigation, and other non-potable uses poses no greater risk than drinking municipally supplied drinking water.

Because the amount of pathogen reduction for reuse usually spans orders of magnitude, pathogen treatment requirements are specified in terms of log10 reduction; 1-log10 reduction equates to 90% removal, 2-log10 reduction to 99% removal, 3-log10 reduction to 99.9% removal, and so on. The treatment requirements developed using the risk-based methodology in this case are called log reduction targets, or LRTs. The LRTs were developed using a Quantitative Microbial Risk Assessment (QMRA). QMRA is a scientific approach to estimating the potential human health risks associated with exposure to microbial hazards (in this case, human pathogenic viruses, 151 bacteria, and protozoa). LRTs for gray water reuse for unrestricted irrigation and toilet flushing were developed based on the annual risk level of 10^{-4} infections per person per year. Unit treatment processes that are effective at removing and/or inactivating pathogens can be used to meet the LRTs. In most cases, several unit processes are needed in series to provide sufficient treatment. The ability of unit processes to provide a certain level of treatment is verified through the use of ongoing monitoring and, in some cases, validation. For some unit processes, validation is critical to determine how the process can be used to achieve the LRTs.

This proposes to incorporate a monitoring approach for onsite gray water treatment systems that aligns with the research. The framework for monitoring deviates from traditional approaches of monitoring fecal indicator organisms (FIOs) in grab samples because there are recognized limitations of using FIOs. The primary limitation of FIO monitoring is that it cannot be done continuously to ensure safe water is delivered to the end use at all times. Rather, this is proposing continuous water quality monitoring of surrogate parameters such as turbidity, residual chlorine, ultraviolet transmittance, and others to verify that treatment processes are operating as designed.

This supports the use of a health risk-based approach to guide treatment and design requirements for onsite gray water treatment systems because it ensures that systems implemented using this framework are safe and reliable. The requirements being proposed are intended to ensure that public health is protected while still allowing for flexibility in design, as it does not prescribe that specific treatment processes must be used. It should be noted that several states have recently moved forward to adopt the risk-based framework at the state level. Much of this work has been driven by the work of the National Blue Ribbon Commission for Onsite Non-potable Water Systems, a coalition of public health agencies and water and wastewater utilities committed to advancing the safe, practical, and sustainable implementation of alternate water source systems. As a result of the Commission's work, several states including California, Colorado, Minnesota, Oregon, Washington, and Hawaii are proposing legislation to adopt the risk-based approach. Therefore, institutionalizing the risk-based approach will create further consistency across the country by aligning plumbing and health code requirements for alternate water source systems.

The following resources were used to develop the proposed text for onsite gray water treatment systems:

1. Risk-Based Framework for the Development of Public Health Guidance for Decentralized Non-Potable Water Systems.
   https://www.nwri-usa.org/_files/ugd/632dc3_8831385f1c2f4bb1b2976b06719832ae.pdf?index=true
2. A Guidebook for Developing and Implementing Regulations for Onsite Non-potable Water Systems developed by the National Blue Ribbon Commission for Onsite Non-Potable Water Systems.
   http://uswateralliance.org/sites/uswateralliance.org/files/NBRC%20GUIDEBOOK%20FOR%20DEVELOPING%20ONWS%20REGULATIONS.pdf
3. San Francisco Department of Public Health Director's Rules and Regulations Regarding the Operation of Alternate Water Source Systems.
   https://www.sfdph.org/dph/files/EHSdocs/ehsWaterdocs/NonPotable/SFHC_12C_Rules.pdf

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

National Standard Plumbing Code
2027 Proposed Code Change Form
Deadline: February 28, 2025

27 - 68

Proponent: Enrique Gonzalez

Date: February 28, 2025

Representing: IAPMO

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City: Ontario State: CA Zip: 91761

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IMPORTANT: Please review the attached instruction sheet regarding proposed code changes.

Check All That Apply:

_____ Change subsection to read as follows

___X__ Add new subsection to read as follows

_____ Amend section with this editorial change

_____ Delete subsection and substitute as follows

_____ Delete subsection without substitution

Please submit changes to only one Code Section per Proposed Code Change Form

Code Section: Appendix G WEStand Excerpts

Add the following WEStand Excerpts to Appendix G. Renumber the sections corresponding to Appendix G.

Onsite Stormwater Treatment Systems

1001.0 General.

1001.1 Applicability. The provisions of this chapter shall apply to the water quality, monitoring, design, construction, alteration, repair, and operation requirements of onsite stormwater treatment systems for non-potable use.

1001.2 Allowable Use of Stormwater. Where approved or required by the Authority Having Jurisdiction, stormwater shall be permitted to be used in lieu of potable water for uses such as, but not limited to, water closets, urinals, clothes washers, ornamental plant irrigation, and dust suppression.

1002.0 System Design.

1002.1 Requirements. Onsite stormwater treatment systems shall meet the design, construction, and performance requirements of Section 1002.1.1 or Section 1002.1.2.

1002.1.1 Listed Stormwater Treatment Systems. Onsite stormwater treatment systems shall be listed to ARCSA/ASPE 78, installed according to the manufacturer's instructions, and commissioned in accordance with Section 1003.0.

1002.1.2 Alternative Design Systems. Where approved by the Authority Having Jurisdiction, onsite stormwater treatment systems for residential and commercial applications shall comply with the provisions of Section 1002.2 through Section 1005.0.

1002.2 Permit. It shall be unlawful for any person to construct, install, alter, or cause to be constructed, installed, or altered any stormwater treatment system in a building or on a premise without first obtaining a permit to do such work from the Authority Having Jurisdiction.

1002.3 Component Identification. System components shall be properly identified as to the manufacturer.

1002.4 Material Compatibility. Stormwater treatment systems shall be constructed of materials that are compatible with the type of pipe and fitting materials, water treatment, and water conditions in the system.

1002.5 Log Reduction Targets. Stormwater treatment systems shall be designed to meet the log reduction targets as set forth in Table 1002.5. To meet the log reduction in Table 1002.5, treatment processes used in stormwater systems shall comply with Section 1002.7 for validation or be operated according to conditions approved by the Authority Having Jurisdiction.

1002.6 Effluent Water Quality Parameters. Stormwater treatment systems shall be designed to meet the effluent water quality parameters for water closet and urinal fixture use listed in Table 1002.6.

1002.7 Validation. Where required by the Authority Having Jurisdiction, treatment processes shall be tested to verify the pathogen reduction performance. The treatment processes shall be validated through third-party component validation or field verification using challenge testing. The results of the third-party component validation and/or challenge testing shall be summarized in a validation report prepared by a registered design professional. The validation report shall document the treatment technology's log reduction performance, including information on the operating conditions and surrogate parameters.

TABLE 1002.5
LOG REDUCTION TARGETS FOR 10^{-4} INFECTIONS PER PERSON PER YEAR BENCHMARKS FOR STORMWATER TREATMENT SYSTEMS

WATER USE SCENARIO	ENTERIC VIRUSES	PARASITIC PROTOZOA	ENTERIC BACTERIA
Stormwater greater than 0.1% fecal contamination contribution[2]			
Ornamental plant irrigation[1]/dust suppression	5.0	4.5	4.0
Indoor Use	5.5	5.5	5.0
Stormwater with less than or equal to 0.1% fecal contamination contribution[2]			
Ornamental plant irrigation[1]/dust suppression	3.0	2.5	2.0
Indoor Use	3.5	3.5	3.0

Notes:
[1] Non-food
[2] Stormwater can contain some quantity of fecal contamination. The extent of fecal contamination present will depend on site-specific conditions. The appropriate LRT to apply for a stormwater treatment system depend on the site-specific extent of likely contamination of stormwater with fecal contamination.

TABLE 1002.6
EFFLUENT WATER QUALITY PARAMETERS FOR WATER CLOSET AND URINAL FIXTURE USE

PARAMETER	MINIMUM	MAXIMUM
Alkalinity	20 ppm	200 ppm
TDS	0 ppm	500 ppm
Turbidity	0 NTU	5 NTU
pH	6.0	9.0
Odor	Non-Offensive	
Oily Film and Foam	Visual Non-detectable	
Free Chlorine Residual	NA	4 ppm
Combined Chlorine	NA	4 ppm
Chloramines	NA	4 ppm

1) Proposed Code Changes gaining acceptance will appear in the 2027 NSPC. *Rev.2.1.24*
2) Proponent must submit, upon committee request, 20 copies of Supporting Data for review by the NSPC Committee.

1002.8 Health and Safety. Treated stormwater shall not create a nuisance or odor, nor threaten human health, or damage the quality of surface water or groundwater.

1002.9 Monitoring Requirements. Monitoring of stormwater treatment systems shall be based on the risk level in accordance with Table 1002.9(1). The parameters listed in Table 1002.9(2) shall be monitored by sensors placed in the effluent of the system and connected to a smart controller. The smart controller shall activate an alarm when the parameters in Table 1002.9(2) are outside the specifications and shall shut the system down when the alarm is not acknowledged after a period of 8 hours has elapsed. For Category 2, quarterly grab samples shall be taken out of the effluent and analyzed by an accredited lab. The sensors' accuracy and response shall be validated upon commissioning of the system by an independent third party.

TABLE 1002.9(1)
RISK LEVELS

RISK LEVEL	TREATED WATER USAGE*
1	Ornamental plant irrigation and dust suppression
2	Water closets, urinals, clothes washers

* See Section 1001.2 for other uses approved by the Authority Having Juris- diction.

TABLE 1002.9(2)
MONITORING PARAMETERS

CATEGORY	PARAMETERS TO BE MONITORED	VALIDATION PROCEDURE
1	Turbidity ORP UV intensity (if used)	IAPMO IGC 324 - Sensor validation procedure using 5.4.1.1 (a), (b), (c), and (d)., as applicable
2	Turbidity ORP UV intensity (if used) pH Quarterly lab Sample for Total Coliform	

1002.10 System Requirements. The design and installation of onsite stormwater treatment systems shall meet the requirements of Section 1002.10.1 through Section 1002.10.6.

1002.10.1 Connections to Potable or Reclaimed (Recycled) Water Systems. Stormwater treatment systems shall have no direct connection to any potable water supply or reclaimed (recycled) water source system. Potable water or reclaimed (recycled) water shall be permitted to be used as makeup water for a stormwater treatment system provided the potable or reclaimed (recycled) water supply connection is protected by an airgap.

1002.10.2 Bypass Connection. A bypass shall be provided for the input connection to the stormwater treatment system. The bypass shall be a diverter valve normally open to the stormwater treatment system. The normally closed port of the diverter valve shall be connected directly to the storm drainage system or combined sewer system according to the plumbing code.

1002.10.3 Overflow Connection. Stormwater treatment overflow shall be connected directly to the storm drainage or combined sewer system according to the plumbing code. The overflow shall be provided with a backwater valve at the point of connection to the storm drainage or combined sewer system. The backwater valve shall be accessible for inspection and maintenance.

1002.10.4 Fail-safe Mechanisms. Stormwater treatment systems must be equipped with features that result in a controlled and non-hazardous automatic shutdown of the treatment process in the event of a malfunction.

1002.10.5 Flow Meter Totalizer. Buildings with stormwater treatment systems shall include a flow meter totalizer on the treated stormwater distribution system and a flow meter totalizer on the potable make-up water pipeline to the stormwater treatment system.

1002.10.6 Cross-connection Inspection and Testing. A cross-connection test is required in accordance with Section G.4.1.11.2. Before the building is occupied or the system is activated, the installer shall perform the initial cross-connection test in the presence of the Authority Having Jurisdiction. The test shall be ruled successful by the Authority Having Jurisdiction before final approval is granted.

1003.0 Commissioning.

1003.1 General. Onsite stormwater treatment systems shall be commissioned in accordance with the requirements of Section 1003.1 through Section 1003.5.

1003.2 Requirements. Commissioning for stormwater treatment systems shall be included in the design and construction processes of the project. Commissioning shall be performed by a person who demonstrates competency in commissioning stormwater treatment systems as required by the Authority Having Jurisdiction.

1003.3 Plan. The construction documents shall include the commissioning plan for the stormwater treatment system. The commissioning plan shall be approved by the Authority Having Jurisdiction prior to commissioning the stormwater treatment system. The commissioning plan shall include the following:

(1) General project information.
(2) Equipment to be tested, including the test methodology.
(3) Processes to be tested.
(4) Criteria or process for testing.
(5) Criteria or process for acceptance.
(6) Commissioning team contact information.
(7) Commissioning process activities, schedules, and responsibilities.
(8) Plans for the completion of functional performance testing, post construction documentation and training, and the commissioning report.

1003.4 Performance Testing. Performance tests shall verify that the installation and operation of the equipment of the stormwater treatment system is in accordance with the approved plans and specifications. The performance test report shall include the equipment tested, the testing methods utilized, and proof of proper calibration of the equipment.

1003.5 Report. The commissioning report shall be submitted to the Authority Having Jurisdiction.

1004.0 Operation and Maintenance Manual.

1004.1 General. An operation and maintenance manual shall be provided in accordance with Section 701.6 and shall also include the following:

(1) Instructions on operating and maintaining the system, including treatment process operations, instrumentation and alarms, and chemicals storage and handling.
(2) Site equipment inventory and maintenance notes.
(3) Equipment/system warranty documentation and information.
(4) "As-Built" design drawings.
(5) Details on training requirements and qualifications of personnel responsible for operating the system.
(6) Maintenance schedule.

1005.0 Inspection.

1005.1 General. Field inspections shall take place during and after construction while the contractor is on site to verify that the stormwater treatment system components have been properly supplied and installed according to the plans and specifications used for installation. Record drawings shall be maintained with changes to the approved plans by the contractor and available for periodic inspection as needed.

Basis/Reason for Change:

This proposal proposes comprehensive requirements related to the water quality, monitoring, design, construction, commissioning, alteration, repair, and operation requirements of stormwater systems for non-potable water reuse. These

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requirements for a properly designed system, together with appropriate construction, operation, and maintenance, will help ensure stormwater systems will be implemented safely and reliably. The treatment threshold is a Risk-Based Framework for the Development of Public Health Guidance for Decentralized Non-Potable Water Systems. The risk-based water quality approach was developed through recent research by the National Water Research Institute (NWRI) and the Water Research Foundation (WRF), culminating in the report Risk-Based Framework for the Development of Public Health Guidance for Decentralized Non-Potable Water Systems. Utilizing similar methodology as is employed in potable reuse and drinking water regulations, the risk-based LRTs align with the Water Safety Plan approach promoted by the World Health Organization. Stormwater may contain pathogenic microorganisms that, if not properly treated, can cause infection due to exposure to these waters when recycled and used onsite. The intent of the risk-based framework is to determine the appropriate level of treatment for pathogens that is needed to protect public health, accounting for such factors as the source water quality, specific end use, and acceptable risk of infection from exposure to the treated water. The risk threshold used for this application is the same as has been previously applied in the context of municipal drinking water, i.e. exposure to this water via toilet flushing, irrigation, and other non-potable uses poses no greater risk than drinking municipally supplied drinking water. Because the amount of pathogen reduction for reuse usually spans orders of magnitude, pathogen treatment requirements are specified in terms of log10 reduction; 1-log10 reduction equates to 90% removal, 2-log10 reduction to 99% removal, 3-log10 reduction to 99.9% removal, and so on. The treatment requirements developed using the risk-based methodology in this case are called log reduction targets, or LRTs. The LRTs were developed using a Quantitative Microbial Risk Assessment (QMRA). QMRA is a scientific approach to estimating the potential human health risks associated with exposure to microbial hazards (in this case, human pathogenic viruses, bacteria, and protozoa). LRTs for stormwater and stormwater reuse for unrestricted irrigation and toilet flushing were developed based on the annual risk level of 10^{-4} infections per person per year. Unit treatment processes that are effective at removing and/or inactivating pathogens can be used to meet the LRTs. In most cases, several unit processes are needed in series to provide sufficient treatment. The ability of unit processes to provide a certain level of treatment is verified through the use of ongoing monitoring and, in some cases, validation. For some unit processes, validation is critical to determine how the process can be used to achieve the LRTs. This also proposes to incorporate a monitoring approach for stormwater systems that aligns with the research. The framework for monitoring deviates from traditional approaches of monitoring fecal indicator organisms (FIOs) in grab samples because there are recognized limitations of using FIOs. The primary limitation of FIO monitoring is that it cannot be done continuously to ensure safe water is delivered to the end use at all times. Rather, this is proposing continuous water quality monitoring of surrogate parameters such as turbidity, residual chlorine, ultraviolet transmittance, and others to verify that treatment processes are operating as designed.

The requirements being proposed are intended to ensure that public health is protected while still allowing for flexibility in design, as it does not prescribe that specific treatment processes must be used. This proposal is timely because several states have recently moved forward to adopt the risk-based framework at the state level. Much of this work has been driven by the work of the National Blue Ribbon Commission for Onsite Non-potable Water Systems, a coalition of public health agencies and water and wastewater utilities committed to advancing the safe, practical, and sustainable implementation of alternate water source systems. As a result of the Commission's work, several states including California, Colorado, Minnesota, Oregon, Washington, and Hawaii are proposing legislation to adopt the risk-based approach. Therefore, institutionalizing the risk-based approach will create further consistency across the country by aligning plumbing and health code requirements for alternate water source systems. Resources: the following resources are provided to develop the proposed text for stormwater treatment systems. These resources provide a technically sound template for the development of requirements for stormwater treatment systems that fit well into the both the scope and format structure of model codes used by WE•Stand.
1. Risk-Based Framework for the Development of Public Health Guidance for Decentralized Non-Potable Water Systems
https://www.werf.org/a/ka/Search/ResearchProfile.aspx?ReportId=SIWM10C15
2. A Guidebook for Developing and Implementing Regulations for Onsite Non-potable Water Systems developed by the National Blue Ribbon Commission for Onsite Non-Potable Water Systems
https://sfwater.org/Modules/ShowDocument.aspx?documentID=11586
3. San Francisco Department of Public Health Director's Rules and Regulations Regarding the Operation of Alternate Water Source Systems https://www.sfdph.org/dph/files/EHSdocs/ehsWaterdocs/NonPotable/SFHC_12C_Rules.pdf

Vote: ___ Accept ___ Accept as Amended

___ Accept in Part ___ Accept in Principle ___ Accept in Part and Principle

___ Defeated ___Failed Lack of Second ___ Tabled ___ Withdrawn ___ Other

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