IPC

2024 GROUP A PROPOSED CHANGES TO THE I-CODES

April 7 – 16, 2024
Doubletree by Hilton
Universal Orlando - Orlando, FL

First Printing

Publication Date: March 2024

PRINTED IN THE U.S.A.

2024 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL PLUMBING CODE

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TENTATIVE ORDER OF DISCUSSION
2021 PROPOSED CHANGES TO THE
INTERNATIONAL PLUMBING CODE

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some P code change proposals may not be included on this list, as they are being heard by another committee.

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P1-24

IPC: SECTION 202

Proponents: Guy McMann, Jefferson County Colorado, CAPMO (gmcmann@jeffco.us)

2024 International Plumbing Code

Revise as follows:

BATHROOM GROUP. A group of fixtures consisting of a water closet, urinal, lavatory, bathtub or shower, including or excluding a bidet, an *emergency floor drain* or both. Such fixtures are located together on the same floor level.

Reason: There doesn't seem to be a technical reason to not include a urinal in a wet vented bathroom group. Currently, the fixture can't be included and is dealt with separately.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Decrease in cost will be realized by not having to plumb the fixture separately .The estimated cost savings for a typical urinal installation is $100 to $250

Estimated Immediate Cost Impact Justification (methodology and variables):

.Material (pipe and fittings) $15 to $100 and the labor is $60 to $120 depending on the salary of the installer.

P1-24

P2-24

IPC: SECTION 202

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

Revise as follows:

WATER DISPENSER. A plumbing fixture that is manually controlled by the user for the purpose of dispensing potable drinking water into a receptacle such as a cup, glass or bottle. Such fixture is connected to the potable water distribution system of the premises.
Such fixtures include bottle filling stations.

Reason: With the onset of the worldwide pandemic of 2021, most people stopped using drinking fountains out of fear of catching the disease or, in many cases, the local jurisdictions mandated disabling the fountains to prevent their use. The use of refillable and single use water bottles became widely prevalent during the pandemic years. These water use habits have continued as now a large part of the populous no longer trust drinking fountains as a "safe" location to obtain a drink of water. To service this different way that people now obtain drinking water, the code should encourage the installation of bottle filling stations. In fact, the code already allows substitution of water dispensers in Section 410.3. The problem is that many code users did not realize that bottle filling stations are water dispensers in order to make the substitution for some drinking fountains. Therefore, the definition is being amended to add clarity to the topic in hopes that more designers will realize that substitution is allowed.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no change in technical requirement as it is a designer's choice to substitute water dispensers for drinking fountains.

P2-24

P3-24

IPC: 303.6 (New), 303.6.1 (New)

Proponents: Marcelo Hirschler, GBH International, GBH International (mmh@gbhint.com)

2024 International Plumbing Code

Add new text as follows:

303.6 Noncombustible materials. Noncombustible materials shall be those materials that comply with Section 703.3.1 of the International Building Code.

303.6.1 Inherently noncombustible materials..
Inherently noncombustible materials, such as concrete and steel, shall not be required to be tested to be acceptable as noncombustible materials.

Reason: The term noncombustible material is used multiple times in the IPC and, thus, an explanation/requirement is needed. The proposed requirement is identical to what is being proposed for the IFC (by FCAC), the IMC, and the IFGC and is consistent with the IBC requirements.

ICC definitions should not contain requirements. Therefore, this proposal adds a requirement into chapter 3 (general requirements) for how to classify a material as a noncombustible material, consistent with how the IBC does such a classification.

The 2021 edition of the IPC had a definition or "noncombustible materials" that was actually a requirement and was based on an old (now obsolete) set of criteria in ASTM E136. That definition has now been deleted but clarification on the concept is still needed.

The proposed text provides necessary clarification indicating that such materials are not required to be tested. "In the area of material regulation, materials that pass ASTM E136 have long been considered to be those that are noncombustible materials. Note that ASTM E136 is one of the very few ASTM fire test standards that has acceptance criteria. The acceptance criteria are different from the theoretical definition of a noncombustible material.

The IBC includes in Chapter 7 (section 703.3.1) added details on how to classify materials as noncombustible materials, but, appropriately, not a definition.

If no requirement exists experience indicates that some material manufacturers have claimed that their material is noncombustible when it simply exhibits improved fire performance. When searching the internet, multiple web sites offer materials or products that are alleged to be noncombustible when that claim is incorrect. There is often confusion in the public mind regarding materials that perform better than typical combustible materials, but that are not good enough for the material to be considered noncombustible in typical use. Including a correct requirement for what is a noncombustible material does not mean that clearly noncombustible materials, such as steel, concrete, or masonry need to be tested.

The language in section 703.3.1 of the IBC reads as follows:

703.3.1 Noncombustible materials. Materials required to be noncombustible shall be tested in accordance with ASTM E136. Alternately, materials required to be noncombustible shall be tested in accordance with ASTM E2652 using the acceptance criteria prescribed by ASTM E136.

Exception: Materials having a structural base of noncombustible material as determined in accordance with ASTM E136, or with ASTM E2652 using the acceptance criteria prescribed by ASTM E136, with a surfacing of not more than 0.125 inch (3.18 mm) in thickness having a flame spread index not greater than 50 when tested in accordance with ASTM E84 or UL 723 shall be acceptable as noncombustible.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The code proposal simply connects with the IBC.

P4-24 Part I

IPC: 305.4

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

305.4 Freezing. Water, soil and waste pipes shall not be installed outside of ~~a~~ the building~~, in attics or crawl spaces, concealed in outside walls, or in any other place subjected to freezing temperatures unless adequate provision is made to protect such pipes from freezing by insulation or heat or both~~ thermal envelope. Exterior water supply system piping shall be installed not less than 6 inches (152 mm) below the frost line and not less than 12 inches (305 mm) below grade.

P4-24 Part I

P4-24 Part II

IRC: P2603.5

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Residential Code

Revise as follows:

P2603.5 Freezing.
In localities having a winter design temperature of 32°F (0°C) or lower as shown in Table R301.2 of this code, a water, soil or waste pipe shall not be installed outside of ~~a~~ the *building*~~, in exterior walls, in~~ ~~*attics*~~ ~~or~~ ~~*crawl spaces*~~~~, or in any other place subjected to freezing temperature unless adequate provision is made to protect it from freezing by insulation or heat or both~~ thermal envelope. Water service pipe shall be installed not less than 12 inches (305 mm) deep and not less than 6 inches (152 mm) below the frost line.

Reason: The current code text is misleading to many including owners, contractors, and even design professional. Providing "heat, insulation, or both" give them the impression that there is a choice when the reality is the piping must remain in a space that has adequate heat to prevent freezing. Insulation can serve 1 of 2 purposes, it is used to prevent the loss of heat from a space or it is used to prevent the infiltration of heat into a space. The current text technically informs users that they could just provide insulation. More importantly, without direction that the piping must remain inside the thermal envelope, we have seen installations where heat and insulation were provided yet water lines still froze. In this situation, there was a bathroom that cantilevered over a portion of a an attached garage. The portion below the bathroom was provided with adequate space for insulation and was provided with a "heat run" into that space. It was discovered later after 2 consecutive years of freezing that the entire space had been filled with insulation, leaving no way for the heat to reach the pipe to keep them from freezing. Insulation along the perimeter and the bottom portion of the space would have kept the pipes within the building thermal envelope where they would not have frozen.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal just simplifies the language in the code and will not negatively or positively affect cost of construction.

P4-24 Part II

P5-24

IPC: 305.8, 305.8.1, 305.8.2

Proponents: Brandon Adams, Image Engineering Group, self (brandon.adams@iegmep.com)

2024 International Plumbing Code

305.8 Expansive soil.
Where expansive soil is identified under buildings in accordance with Section 1803.5.3 of the *International Building Code*, but not removed in accordance with Section 1808.6.3 of the *International Building Code*, plumbing shall be protected in accordance with Section 305.8.1 or 305.8.2.

305.8.1 Nonisolated foundations.
Under foundations with slabs that are structurally supported by a subgrade, buried plumbing shall be permitted.

Revise as follows:

305.8.2 Isolated foundations.
Under foundations with a slab or framing that structurally spans over an under-floor space that isolates the slab or framing from the effects of expansive soil swelling and shrinking in accordance with Section 1808.6.1 of the *International Building Code*, the plumbing shall be suspended so that plumbing, hangers and supports are isolated, by a voidspace, from the effects of expansive soil swelling and shrinking.

Exception: Plumbing shall be permitted to be buried where it provides drainage of an under-floor space.

To protect the voidspace, soil shall be sloped, benched or retained in accordance with an *approved* design methodology. Plumbing, hangers and supports below the slab or framing shall not be permitted to be in contact with the soil or any assemblage of materials that is in contact with soil in the active zone. A slab and plumbing shall not be permitted to be lifted as an assembly to create the voidspace unless the under-floor space is a crawl space with access to allow inspection of plumbing after lifting.

Exception: Plumbing shall be permitted to be buried where it provides provides drainage of an under-floor space.

Organic materials subject to decay shall not be used for hangers, supports and soil retention systems. Materials subject to corrosion shall not be used for hangers, supports and soil retention systems unless protected in an *approved* manner. Where plumbing transitions to a buried condition beyond the perimeter of the foundation, an adequately flexible expansion joint shall be provided in the plumbing system to accommodate the effects of expansive soil swelling and shrinking. <u>Where plumbing transitions to a buried condition, the difference in flow line elevations at each end of horizontal flexible expansion joints for horizontal drainage piping shall not be less than the sum of the minimum specified vertical dimension of the voidspace under plumbing and the product of the minimum slope required by Section 704.1 multiplied by the length of the flexible expansion joint.</u>

Attached Files

- **ASPE Tech Symposium_Failures reduced.pdf**
  https://www.cdpaccess.com/proposal/10447/30163/files/download/4705/
- **BPI Presentation on Protection of Plumbing reduced.pdf**
  https://www.cdpaccess.com/proposal/10447/30163/files/download/4704/
- **Protection of Plumbing reduced.pdf**
  https://www.cdpaccess.com/proposal/10447/30163/files/download/4703/

Reason: This is a necessary clarification of the code to assist in code enforcement protecting the life, safety and welfare of occupants. This adds no cost whatsoever. The code already requires flexible expansion joints be designed to accommodate the swell and shrink potential of expansive soil. However, some engineers have incorrectly interpreted the 2024 IPC language to simply require a flexible expansion joint in Section 305.8.2 and they will specify that the slope of the flexible expansion joint simply meet the minimum slopes in Section 704.1, as if the fact that the flexible expansion joint can telescope and rotate at each end will "accommodate" the movement.

Doing so would certainly not accommodate the movement because it leads to a primary problem that the code language added to the 2024 IPC was resolving. For horizontal drainage plumbing draining away from a building, when expansive soil swelling causes buried plumbing outside of a building to rise, it is absolutely essential for the fixed elevation of the isolated plumbing on one end of a flexible expansion joint to be high enough above the lower end so that the slope of the flexible expansion joint will still meet the minimum slope requirements of Section 704.1 after the upward vertical expansive soil movement occurs where the plumbing is buried. For the less common case of horizontal drainage plumbing draining toward a building (e.g. a sanitary sewer line from another building that runs under a proposed building), when expansive soil shrinkage causes buried plumbing outside of a building to drop, it is absolutely essential for the fixed elevation of the isolated plumbing on one end of a flexible expansion joint to be low enough below the upper end so that the slope of the flexible expansion joint will still meet the minimum slope requirements of Section 704.1 after the downward vertical expansive soil movement occurs where the plumbing is buried. The clarification language proposed herein is written to be applicable for both of these cases. I have personally seen multiple crawlspace foundations where the buried end of DWV plumbing rises because of expansive soil and the vast majority of the suspended plumbing (that is attached to the bottom of the slab) is now too "low" for any of it to function properly because the downstream plumbing has risen up in elevation, making the suspended upstream system sometimes 6 or 12 inches too "low". If there is not sufficient slope in the flexible expansion joint at the time of initial construction, no amount of "maintenance" by replacing broken pipes can solve the problem. A major capital improvements project is required. This proposed code change is not going to change the cost of construction at all. This is a common sense application of the current code when you understand the basic problems that expansive soil presents to DWV plumbing. The multi-million dollar problems (e.g. $23M damage claim on a 100,000 square foot building footprint in one published Geoprofessional Business Association, GBA, case study) that expansive soil inflicts on plumbing and design approaches that can appropriately address these challenges are well documented today. The architecture and engineering community overall is very appreciative of the new language in the 2024 IPC that avoids any confusion over what minimum expectations are for plumbing under buildings where expansive soil is identified in a soil report. Various Plumbing Engineers, Geotechnical Engineers and Structural Engineers have been presenting nationally on this topic in the last few years since the new language in the 2024 IPC was adopted, one including another engineer from my MEP design firm. Attached are three (3) of these presentations that discuss the reasons why this is a necessary code clarification to the 2024 IPC language. Because understanding this issue involved different engineering design disciplines, each presentation was presented by a unique team consisting of a Plumbing (Mechanical) Engineer, a Geotechnical Engineer and a Structural Engineer. The three (3) presentations attached are therefore a representation from nine (9) different engineering design firms. The three (3) presentations look similar because content was shared among peers with the permission of the original presenters. However, each presentation was tailored to a different audience at a different time and so there are some substantive differences but all of the content in the presentations is supportive of this code change proposal.

Bibliography: Hendrix, B.; Roland, M.; Mushmann, J; September 2023; "Failures of Non-Isolated Plumbing in Expansive Soil", American Society of Plumbing Engineers 2023 Tech Symposium; Bellevue, Washington.

Podojil, R.; Grammer, A.; Janish, T.; November 15, 2022, "Isolation of Plumbing Under Isolated Slabs", Structural Engineers Association of Texas Dallas Chapter Meeting; Dallas, Texas.

Focht, J.; Penn, D.; Lee, M.; July 13, 2022, "Protection of Plumbing from Expansive Soils Under Foundations", North Texas Building Professional Institute; Irving, Texas.

Penn, D.; July 4, 2022; "Protection of Plumbing from Expansive Soil", Plumbing Engineer Magazine.

Geoprofessional Business Association, 2021, "Case Study 108", Geo-Omaha.

American Society of Plumbing Engineers; ASPE Plumbing Design Handbook; Vol. 4, Chapter 6, "Hanger and Support Conditions", "Natural Environmental Conditions".

American Standard National Plumbing Code, ASA A40.8, 1955, Basic Principles.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposed code change only defines what the minimum slope needs to be for flexible expansion joints that are already required by the 2024 IPC, providing clarity that assists in enforcement, because the minimum slopes in Section 704.1 are not sufficient for this application.

P6-24

IPC: 306.2, 306.3, 306.5 (New)

Proponents: Brian Conner, Charlotte Pipe and Foundry (bconner@charlottepipe.com)

2024 International Plumbing Code

Revise as follows:

306.2 Trenching and bedding.
Where trenches are excavated such that the bottom of the trench forms the bed for the pipe, solid and continuous load-bearing support shall be provided between joints. Bell holes, hub holes and coupling holes shall be provided at points where the pipe is joined. Such pipe shall not be supported on blocks to grade. <u>Plastic drainage and sewer piping shall have a trench width not less than the outside diameter of the pipe plus 16 inches (406 mm) or a trench width of not less than 1.25 times the outside diameter plus 12 inches (305 mm). Bedding for plastic drainage and sewer piping shall be not less than 4 inches (102 mm) in depth.</u> In instances where the material manufacturer's installation instructions are more restrictive than those prescribed by the code, the material shall be installed in accordance with the more restrictive requirement.

306.3 Backfilling.
Backfill shall be free from discarded construction material and debris. Loose earth free from rocks, broken concrete and frozen chunks shall be placed in the trench in 6-inch (152 mm) layers and tamped in place until the crown of the pipe is covered by 12 inches (305 mm) of tamped earth. The backfill under and beside the pipe shall be compacted for pipe support. Backfill shall be brought up evenly on both sides of the pipe so that the pipe remains aligned. <u>Backfill for plastic drainage and sewer piping shall be compacted to a minimum 85 percent (%) standard proctor density</u>. In instances where the manufacturer's instructions for materials are more restrictive than those prescribed by the code, the material shall be installed in accordance with the more restrictive requirement.

Add new text as follows:

<u>**306.5 Special Inspection Required.** Special inspection required of plastic drainage and sewer piping trenching, bedding, backfill, and compaction shall be performed by a third-party approved by the code official. Inspections shall be in accordance with Sections 306.2 and 306.3 of the code.</u>

Reason: This section provides the minimum prescriptive requirements for piping installations underground. This section is being revised to contain minimum requirements for plastic drainage piping, as plastic drainage piping for drainage and sewer applications are reliant upon the soil and proper installation to maintain the sanitary nature of the installed piping system. Plastic drainage piping materials are in a failed state when they are deflected in excess of 5-7.5%. When the trenching, bedding, backfill or compaction process is not completed properly and to the correct levels, failure opportunity substantially increases. Many manufacturers of plastic drainage piping provide manufacturer's installation instruction that exceed these prescriptive requirements. Their installation instructions would be the more restrictive requirement. There are manufacturers that do not provide manufacturer installation instructions or guidance for underground installation; therefore, the products could be installed with less than necessary soil compaction, trench width, little or no bedding, or even improper backfill procedures. All of which plastic piping systems are reliant upon for their underground integrity. The special inspection section has been added in this proposal due to the backfilling and compaction requirements being outside of the normal schedule of inspections for most AHJ's. These are crucial steps to ensure that the plastic piping installation is adequate to maintain its integrity and function as intended. If the enforcement component is not done, the critical installation steps may not be completed properly, leading to sewage exfiltration into the ground, contamination, possible structural issues and costly repairs. There have been failures and issues due to improper installation occurring in a similar fashion as the code currently states, rather than the proper minimum installation as it is being revised to. This code change provides a minimum prescriptive base level of proper installation and the enforcement component to guide all users of this code to ensure safety of occupants and our environment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

All of the steps of installation are already being performed by the installer (many times, incorrectly). Installing the pipe and fitting systems correctly in accordance with these changes will not add to the cost of construction.

P6-24

P7-24

IPC: 306.2.4

Proponents: Guy McMann, Jefferson County Colorado, CAPMO (gmcmann@jeffco.us)

2024 International Plumbing Code

Revise as follows:

306.2.4 Tracer wire.
For plastic sewer piping, an insulated copper tracer wire or other *approved* conductor shall be installed adjacent to and over the full length of the piping. Access shall be provided to the tracer wire or the tracer wire shall terminate at the cleanout between the *building drain* and *building sewer*. The tracer wire size shall be not less than ~~14~~ 18 American Wire Gauge (2.5 mm^2), shall be green in color and the insulation type shall be listed for direct burial.

Reason: Its overkill to require a 14-gauge wire when a 18 gauge wire will do the same job and is less expensive. This is consistent with what's required in the IFGC. The American Public Works Association provides color guidance for sewer pipe including blue for potable water and yellow for gas.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This will decrease the cost of construction requiring a smaller gauge wire that is less expensive than a 14 gauge wire. “The cost savings is $15 for 100 feet of tracer wire..

Estimated Immediate Cost Impact Justification (methodology and variables):

.

There is not a difference in labor to install. The current price of 18 gauge wire is $0.09 per foot and for 14 gauge wire, $0.11 per foot.

P7-24

P8-24

IPC: 308.5, MSS Chapter 15 (New)

Proponents: Lance MacNevin, Director of Engineering, The Plastics Pipe Institute, The Plastics Pipe Institute (lmacnevin@plasticpipe.org)

2024 International Plumbing Code

Revise as follows:

308.5 Interval of support. Pipe shall be supported in accordance with Table 308.5 or in accordance with ANSI/MSS SP-58.

Exception: The interval of support for piping systems designed to provide for expansion/contraction shall conform to the engineered design in accordance with Section 316.1.

Add new standard(s) as follows:

MSS

Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.
127 Park St. NE
Vienna, VA 22180-4602

SP-58-2018	Pipe Hangers and Supports-Materials, Design, Manufacture, Selection, Applications, and Installation (ANSI-approved American National Standard) which includes Amendment 1 Issued 10-17-2019.

Staff Analysis: A review of the standard proposed for inclusion in the code, SP-58-2018 *Pipe Hangers and Supports-Materials, Design, Manufacture, Selection, Applications, and Installation (ANSI-approved American National Standard) which includes Amendment 1 Issued 10-17-2019*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal will harmonize requirements for the intervals of pipe supports with the 2024 IMC Section 305.4 by allowing interval spacing for pipes to also be in accordance with ANSI/MSS SP-58 *Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation*.

According to the ANSI press release on this standard, “ANSI/MSS SP-58 2018 is an extensive standard with information on a multitude of topics involving pipe hangers and supports. Not only does it serve as “an industry accepted basis” for those involved in the different aspects of pipe hangers and supports, but it also establishes the minimum guidelines for materials, allowable stresses, product design, testing, and load ratings for pipe hanger and support assemblies for standard and unique pipe hangers and supports.”

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will harmonize requirements for the intervals of pipe supports with the 2024 IMC Section 305.4 by allowing interval spacing for pipes to also be in accordance with ANSI/MSS SP-58 *Pipe Hangers and Supports – Materials, Design, Manufacture, Selection, Application, and Installation*. The selection of pipe support spacing according to either of these resources is a designer choice, and this proposal simply adds options.

P8-24

P9-24

IPC: 308.6

Proponents: James Walls, Cast Iron Soil Pipe Institute, Cast Iron Soil Pipe Institute (jwalls@cispi.org)

2024 International Plumbing Code

Revise as follows:

308.6 Sway bracing.
Where *horizontal pipes* 4 inches (102 mm) and larger convey drainage ~~or waste,~~ and where a pipe fitting in that piping changes the flow direction greater than 45 degrees (0.79 rad), rigid bracing or other rigid support arrangements shall be installed to resist movement of the upstream pipe in the direction of pipe flow. A change of flow direction into a vertical pipe shall not require the upstream pipe to be braced.

Reason: The term “waste” is being removed as it is redundant and a component of the term “drainage.” This change clarifies the language to users of the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change will have no impact on the cost of construction. The change is editorial and simply the removal of the term "or waste" that is already encompassed by the existing term "drainage".

P9-24

P10-24

IPC: SECTION 202 (New), 308.7, 308.7.1

Proponents: James Walls, Cast Iron Soil Pipe Institute, Cast Iron Soil Pipe Institute (jwalls@cispi.org)

2024 International Plumbing Code

Add new definition as follows:

JOINT RESTRAINT. A restraint assembly to resist axial movement at a joint in a piping system.

Revise as follows:

308.7 ~~Anchorage~~ Joint restraint. ~~Anchorage~~ Joint restraint shall be provided to restrain drainage piping from axial movement.

308.7.1 Location. For ~~pipe sizes~~ *horizontal pipes* 4 inches (102 mm) and larger that convey drainage ~~greater than 4 inches (102 mm),~~ joint restraints shall be provided ~~for drain pipes~~ at all changes in direction. ~~and~~ Joint restraints shall be provided for *horizontal pipes* 4 inches (102 mm) and larger that convey drainage at all changes in diameter greater than two pipe sizes. Braces, blocks, rodding and other suitable methods as specified by the coupling manufacturer shall be utilized.

Reason: There has been a great deal of confusion between sway bracing, joint restraint, and the current code term “anchorage.” This proposal replaces the current term anchorage and replaces it with what the code is prescribing, which is joint restraint. This proposal provides a clear distinction for the users of the code as well as what is required of each. These items are specifically for drainage piping systems and the current proposal is reflective of that fact. Additionally, the language has been made consistent with related section 308.6, utilizing the language “*horizontal pipes* that convey drainage” The addition of further clarification as to change of direction as well as separating and clarifying the two distinct applications of joint restraint locations has been made. This clarifies the distinction between the two items and the requirements to accomplish each to the code official, installer, and other users of this code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is is a clarification and has no cost impact on the cost of construction.

P10-24

P11-24

IPC: 312.1, 312.6

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Plumbing Code

Revise as follows:

312.1 Required tests.
The permit holder shall make the applicable tests prescribed in Sections 312.2 through 312.11 to determine compliance with the provisions of this code. The permit holder shall give reasonable advance notice to the code official when the plumbing work is ready for tests. The equipment, material, power and labor necessary for the inspection and test shall be furnished by the permit holder and he or she shall be responsible for determining that the work will withstand the test pressure prescribed in the following tests. ~~Plumbing system piping shall be tested with either water or, for piping systems other than plastic, by air.~~ After the plumbing fixtures have been set and their traps filled with water, the entire drainage system shall be submitted to final tests. The code official shall require the removal of any cleanouts if necessary to ascertain whether the pressure has reached all parts of the system.

312.6 Water supply system test.
Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested and proved tight under a water pressure not less than the working pressure of the system; or, for piping systems other than plastic, by an air test of not less than 50 psi (344 kPa). This pressure shall be held for not less than 15 minutes. The water utilized for tests shall be obtained from a potable source of supply. The required tests shall be performed in accordance with this section and Section 111.

> **Exception:** For plastic piping systems, testing with a compressed gas shall be an alternative to hydrostatic testing where compressed air or other gas pressure testing is specifically authorized by the manufacturer's instructions for the pipe and fittings products installed at the time the system is being tested, and compressed air or other gas testing is not otherwise prohibited by applicable codes, laws or regulations outside of this code.

Reason: Language in the general section 312.1 does not allow for air testing plastic systems, but there are existing conditions in the later testing sections (Sections 312.2 through 312.11) where it is permitted, typically with products such as PEX and PERT. The restriction is therefore, deleted in 312.1, and a specific exception is placed in the supply line section, where these types of materials may also be used.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This proposal offers an alternative for pressure testing PEX and PE-RT tubing materials using compressed gas, potentially reducing the cost of testing pipes in these systems by $1 to $10,000. In situations with available water and no freezing risk, the cost decrease may be minimal, around $1 or less, as compressed gas testing is unnecessary.

If water is unavailable during pipe installation, the cost reduction could range from $1 to $1,000 by eliminating the need to transport water for testing.

In cold weather, when compressed air isn't an option, providing temporary heat to prevent freezing may cost $100 to $10,000, depending on building size and completion status. For instance, if a partially enclosed building requires temporary insulation during cold-weather testing, allowing the use of compressed gas could yield a $10,000 cost reduction.

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal offers an alternative for pressure testing PEX and PE-RT tubing materials using compressed gas, potentially reducing the cost of testing pipes in these systems by $1 to $10,000. In situations with available water and no freezing risk, the cost decrease may be minimal, around $1 or less, as compressed gas testing is unnecessary.

If water is unavailable during pipe installation, the cost reduction could range from $1 to $1,000 by eliminating the need to transport water for testing.

In cold weather, when compressed air isn't an option, providing temporary heat to prevent freezing may cost $100 to $10,000, depending on building size and completion status. For instance, if a partially enclosed building requires temporary insulation during cold-weather testing, allowing the use of compressed gas could yield a $10,000 cost reduction.

Estimated Life Cycle Cost Impact:

There is no cost impact of air vs. water testing over the life cycle.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

None.

P11-24

P12-24 Part I

IPC: 312.3

Proponents: Joseph Summers, Mashantucket Pequot Tribal Nation, Building Code Enforcement

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

312.3 Drainage and vent air test.
Plastic piping shall not be tested using air. An air test shall be made by forcing air into the system until there is a uniform gauge pressure of 5 psi (34.5 kPa) or sufficient to balance a 10-inch (254 mm) column of mercury. <u>Test assemblies shall be equipped with a pressure regulator and pressure relief device to limit the maximum pressure to 6 psi.</u> This pressure shall be held for a test period of not less than 15 minutes. Any adjustments to the test pressure required because of changes in ambient temperatures or the seating of gaskets shall be made prior to the beginning of the test period.

Reason: Pages 57-58 of the Cast Iron Pipe Institute handbook outlines the test procedures acceptable for the testing of cast iron piping which are not addressed in 312.3 such as limiting an air test to 6 psi max and having a pressure regulator and relief devices installed. Fernco's only listed for a little over 4 psi.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is giving the installer another option and provides safeguards during the testing of piping by regulating the maximum amount of pressure that can be introduced into the pipe.

P12-24 Part I

P12-24 Part II

IRC: P2503.5.1

Proponents: Joseph Summers, Mashantucket Pequot Tribal Nation, Building Code Enforcement

2024 International Residential Code

Revise as follows:

P2503.5.1 Rough plumbing.
DWV systems shall be tested on completion of the rough piping installation by water, by air for piping systems other than plastic, or by a vacuum of air for plastic piping systems, without evidence of leakage. The test shall be applied to the drainage system in its entirety or in sections after rough-in piping has been installed, as follows:

1. Water test. Each section shall be filled with water to a point not less than 10 feet (3048 mm) above the highest fitting connection in that section, or to the highest point in the completed system. Water shall be held in the section under test for a period of 15 minutes. The system shall prove leak free by visual inspection.
2. Air test. The portion under test shall be maintained at a gauge pressure of 5 pounds per square inch (psi) (34 kPa) or 10 inches of mercury column (34 kPa). This pressure shall be held without introduction of additional air for a period of 15 minutes. <u>Test assemblies shall be equipped with a pressure regulator and pressure relief device to limit the maximum pressure to 6 psi.</u>
3. Vacuum test. The portion under test shall be evacuated of air by a vacuum-type pump to achieve a uniform gauge pressure of -5 pounds per square inch or a negative 10 inches of mercury column (-34 kPa). This pressure shall be held without the removal of additional air for a period of 15 minutes. <u>Test assemblies shall be equipped with a pressure regulator and pressure relief device to limit the maximum pressure to -6 psi.</u>

Reason: Pages 57-58 of the Cast Iron Pipe Institute handbook outlines the test procedures acceptable for the testing of cast iron piping which are not addressed in 312.3 such as limiting an air test to 6 psi max and having a pressure regulator and relief devices installed. Fernco’s only listed for a little over 4 psi.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This provides the installer with an additional level of safety with using air by limiting the pressure into the system.

P12-24 Part II

P13-24 Part I

IPC: 312.6

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

312.6 Water supply system test.
Upon completion of a section of or the entire water supply system, the system, or portion completed, shall be tested and proved tight under a water pressure not less than the working pressure of the system; or, for piping systems other than plastic, by an air test of not less than 50 psi (344 kPa). This pressure shall be held for not less than 15 minutes. The water utilized for tests shall be obtained from a potable source of supply. The required tests shall be performed in accordance with this section and Section 111.

> <u>**Exception:** For PEX and PE-RT piping systems, testing with a compressed gas shall be an alternative to hydrostatic testing where compressed air or other gas pressure testing is specifically authorized by the manufacturer's instructions for the PEX or PE-RT pipe and fittings products installed at the time the system is being tested, and compressed air or other gas testing is not otherwise prohibited by applicable codes, laws or regulations outside of this code.</u>

P13-24 Part I

P13-24 Part II

IRC: P2503.7

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

P2503.7 Water-supply system testing.
Upon completion of the water-supply system or a section of it, the system or portion completed shall be tested and proved tight under a water pressure of not less than the working pressure of the system or, for piping systems other than plastic, by an air test of not less than 50 psi (345 kPa). This pressure shall be held for not less than 15 minutes. The water used for tests shall be obtained from a potable water source.

Exception: For PEX and PE-RT piping systems, testing with a compressed gas shall be an alternative to hydrostatic testing where compressed air or other gas pressure testing is specifically authorized by the manufacturer's instructions for the PEX or PE-RT pipe and fittings products installed at the time the system is being tested, and compressed air or other gas testing is not otherwise prohibited by applicable codes, laws or regulations outside of this code.

P13-24 Part II

P13-24 Part III

IMC®: 1208.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

Revise as follows:

1208.1 General. Hydronic piping systems shall be tested hydrostatically at one and one-half times the maximum system design pressure, but not less than 100 psi (689 kPa). The duration of each test shall be not less than 15 minutes.

Exception: For PEX and PE-RT piping systems, testing with a compressed gas shall be an alternative to hydrostatic testing where compressed air or other gas pressure testing is specifically authorized by all of the manufacturers' instructions for the PEX or PE-RT pipe and fitting products installed at the time the system is being tested, and compressed air or other gas testing is not otherwise prohibited by applicable codes, laws or regulations outside of this code.

Reason: PART I: The IRC currently allows pressure testing of PEX piping systems with compressed gas in P2503.7 via an Exception. The Exception should be added to the IPC for consistency, and the Exception should apply to both PEX and PE-RT flexible piping materials.

The Exception found in IRC P2503.7 Water Supply System Testing is technically appropriate, is safe, and is supported by the plastic piping industry. In fact, this Exception should also be expanded to apply to PE-RT piping materials. A separate code change request has been submitted for that purpose. Like PEX, PE-RT is also produced from HDPE material and does not fail via brittle failure or separation of shards. The Plastics Pipe Institute's *Recommendation F* was updated in 2022 to also apply to PE-RT tubing, and is now titled "Testing PEX and PE-RT Tubing Systems with Compressed Air or Inert Gas" Recommendation F.pdf (plasticpipe.org).

PART II: The IRC currently allows pressure testing of PEX piping systems with compressed gas in P2503.7 Water Supply System Testing via an Exception. The Exception should be revised to also apply to PE-RT piping systems. Like PEX, PE-RT tubing is also produced from HDPE material and does not fail via brittle failure or separation of shards. The Plastics Pipe Institute's *Recommendation F* was updated in 2022 to also apply to PE-RT tubing, and is now titled "Testing PEX and PE-RT Tubing Systems with Compressed Air or Inert Gas" Recommendation F.pdf (plasticpipe.org).

Part III: The IRC currently allows pressure testing of PEX piping systems with compressed gas in P2503.7 via an Exception. The Exception should be added to the IPC for consistency, and the Exception should apply to both PEX and PE-RT flexible piping materials.

The Exception found in IRC P2503.7 Water Supply System Testing is technically appropriate, is safe, and is supported by the plastic piping industry. In fact, this Exception should also be expanded to apply to PE-RT piping materials. A separate code change request has been submitted for that purpose. Like PEX, PE-RT is also produced from HDPE material and does not fail via brittle failure or separation of shards. The Plastics Pipe Institute's *Recommendation F* was updated in 2022 to also apply to PE-RT tubing, and is now titled "Testing PEX and PE-RT Tubing Systems with Compressed Air or Inert Gas" Recommendation F.pdf (plasticpipe.org).

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$1 to $10,000

Estimated Immediate Cost Impact Justification (methodology and variables):

By providing the alternative to pressure test PEX and PE-RT tubing materials with compressed gas, this code change proposal may decrease the cost of pressure testing pipes in these types of systems over a range from $1 to $10,000. In situations where water is readily available and there is no risk of freezing, the cost decrease can be $1 or less, because the compressed gas test method is not used. In situations where water is not available on the jobsite at the time when pipes are installed and ready for test, the cost decrease can be $1 to $1,000 by preventing the need to transport potable water to the jobsite for testing. In cold weather situations, without the option of using compressed air for testing, the cost to provide temporary heat to the building to prevent freezing of water in pipes during testing is significant and could range from $100 to $10,000 depending on the size of the building and its level of completion during the pressure test period. For example, if the building is not yet fully enclosed and must be wrapped with temporary insulation during the use of temporary heat for a pressure test in cold weather, the cost decrease of allowing the use of compressed gas can be as high as $10,000.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

P13-24 Part III

P14-24

IPC: 403.1, 403.1.1, TABLE 403.1, 403.1.2; IBC: [P] 2902.1, [P] 2902.1.1, TABLE 2902.1, [P] 2902.1.2

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2024 International Plumbing Code

Revise as follows:

403.1 Minimum number of fixtures.
Plumbing fixtures shall be provided in the minimum number as shown in Table ~~403.1~~ 403.1.1, based on the actual use of the building or space. Uses not shown in Table ~~403.1~~ 403.1.1 shall be considered individually by the code official. The number of occupants shall be determined by the *International Building Code*.

403.1.1 Fixture calculations.
To determine the occupant load of each sex, the total occupant load shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the occupant load of each sex in accordance with Table ~~403.1~~ 403.1.1. Fractional numbers resulting from applying the fixture ratios of Table ~~403.1~~ 403.1.1 shall be rounded up to the next whole number. For calculations involving multiple *occupancies*, such fractional numbers for each *occupancy* shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total occupant load shall not be required to be divided in half where *approved* statistical data indicate a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user facilities are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total occupant load. In such multiple-user facilities, each fixture type shall be in accordance with ICC A117.1 .

TABLE ~~403.1~~ 403.1.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Section~~s 403.1.1 and~~ 403.2)
Portions of table not shown remain unchanged.

Portions of the table not shown remain unchanged

403.1.2 Fixtures in single-user toilet facilities and bathing rooms.
The plumbing fixtures located in single-user toilet facilities and single-user bathing rooms, including family or assisted-use toilet facilities and bathing rooms, shall contribute toward the total number of required plumbing fixtures for a building or tenant space. The number of fixtures in single-user toilet facilities, single-user bathing rooms and family or assisted-use toilet facilities shall be deducted proportionately from the required gender ratios of Table ~~403.1~~ 403.1.1. Single-user toilet facilities and bathing rooms, and family or assisted-use toilet facilities and bathing rooms shall be identified as being available for use by all persons regardless of their sex.The total number of fixtures shall be based on the required number of separate facilities or based on the aggregate of any combination of single-user or multiple-user facilities.

2024 International Building Code

Revise as follows:

[P] 2902.1 Minimum number of fixtures.
Plumbing fixtures shall be provided in the minimum number as shown in Table ~~2902.1~~ 2902.1.1 based on the actual use of the *building* or space. Uses not shown in Table ~~2902.1~~ 2902.1.1 shall be considered individually by the code official. The number of occupants shall be determined by this code.

[P] 2902.1.1 Fixture calculations. To determine the *occupant load* of each sex, the total *occupant load* shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the *occupant load* of each sex in accordance with Table ~~2902.1~~ 2902.1.1. Fractional numbers resulting from applying the fixture ratios of Table~~2902.1~~ 2902.1.1 shall be rounded up to the next whole number. For calculations involving multiple occupancies, such fractional numbers for each occupancy shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total *occupant load* shall not be required to be divided in half where *approved* statistical data indicates a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user *facilities* are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total *occupant load*. In such multiple-user user *facilities*, each fixture type shall be in accordance with ICC A117.1 .

TABLE ~~2902.1~~ 2902.1.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Section~~s 2902.1.1 and~~ 2902.2)
Portions of table not shown remain unchanged.

Table removed as no changes are made

[P] 2902.1.2 Fixtures in single-user toilet facilities and bathing rooms. The plumbing fixtures located in single-user toilet *facilities* and single-user rooms, including family or assisted-use toilet *facilities* and bathing rooms, shall contribute toward the total number of required plumbing fixtures for a *building* or tenant space. The number of fixtures in single-user toilet *facilities*, single-user bathing rooms and family or assisted-use toilet *facilities* shall be deducted proportionately from the required gender ratios of Table ~~2902.1~~ 2902.1.1 . Single-user toilet facilities and bathing rooms, and family or assisted-use toilet facilities and bathing rooms shall be identified as being available for use by all *persons* regardless of their sex. The total number of fixtures shall be based on the required number of separate *facilities* or based on the aggregate of any combination of single-user or separate *facilities*.

Reason: What I have attempted to do is to renumber the fixture table so that it appears in the order in which one would apply the required number of fixtures. IPC Section 403.1 and IBC Section 2902.1 explain that fixtures are to be provided based on the table.

Why would the table come before the directions? Wouldn't the directions be first, then the table? All this code change is doing is providing for more of a logical flow as to how to determine the fixture counts. Having the table before the directions is somewhat counterintuitive.

I have also removed the reference in the table to IPC Section 403.1.1 and IBC Section 2902.1.1 since the table would now become part of that same section. By moving the table to appear after IPC Section 403.1.1 and IBC Section 2901.1.1, the reference from the table to that section can be removed, so only IPC Section 403.2 and IBC Section 2902.2 need to be referenced.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change only changes the number of the fixture table to be more consistent in the order of the content needed to determine plumbing fixture counts.

P14-24

P15-24

IPC: TABLE 403.1; IBC: TABLE 2902.1

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com)

2024 International Plumbing Code

Revise as follows:

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)

NO.	CLASSIFICATION	DESCRIPTION		WATER CLOSETS (URINALS: SEE SECTION 424.2) MALE	WATER CLOSETS (URINALS: SEE SECTION 424.2) FEMALE	LAVATORIES MALE	LAVATORIES FEMALE	BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
1	Assembly	Theaters and other buildings for the performing arts and motion pictures[d]		1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Nightclubs, bars, taverns, dance halls and buildings for similar purposes[d]		1 per 40 ~~1 per 40~~		1 per 75		—	1 per 500	1 service sink
		Restaurants, banquet halls and food courts[d]		1 per 75 ~~1 per 75~~		1 per 200		—	1 per 500	1 service sink
		Casino gaming areas		1 per 100 for the first 400 and 1 per 250 for the remainder exceeding 400	1 per 50 for the first 400 and 1 per 150 for the remainder exceeding 400	1 per 250 for the first 750 and 1 per 500 for the remainder exceeding 750		—	1 per 1,000	1 service sink
		Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades and gymnasiums[d]		1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Passenger terminals and transportation facilities[d]		1 per 500 ~~1 per 500~~		1 per 750		—	1 per 1,000	1 service sink
		Places of worship and other religious services[d]		1 per 150	1 per 75	1 per 200		—	1 per 1,000	1 service sink
		Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities [f]		1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities[f]		1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
2	Business	Buildings for the transaction of business, nonmedical professional services, other services involving merchandise, office buildings, banks, light industrial and similar uses		1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50		1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80		—	1 per 100	1 service sink[e]
		Ambulatory care facilities and outpatient clinics		1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50 ~~1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50~~		1 per 50		—	1 per 100	1 service sink per floor
3	Educational	Educational facilities		1 per 50		1 per 50		—	1 per 100	1 service sink
4	Factory and industrial	Structures in which occupants are engaged in work fabricating, assembly or processing of products or materials		1 per 100		1 per 100		—	1 per 400	1 service sink
5	Institutional	Alcohol and drug centers[b] Congregate care facilities[b] Group homes[b] Halfway houses[b] Social rehabilitation facilities[b] Foster care facilities[b]		1 per 10 care recipients		1 per 10 care recipients		1 per 8 care recipients	—	—
		Assisted living and residential board and care facilities with care recipients who receive custodial care	Sleeping units for care recipient[c]	1 per 2 sleeping units		1 per 2 sleeping units		1 per 8 sleeping units		
			Dwelling units for care recipients	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit
			Employee facilities	1 per 60 care recipient units		1 per 60 care recipient units		—	1 per 100	1 service sink per floor
			Visitor facilities	1 per 75 care recipient units.		1 per 75 care recipient units		—	—	—
		Nursing homes[b]	Sleeping units for care recipients[c]	1 per 2 care recipient sleeping units		1 per 2 care recipient sleeping units		1 per 8 care recipient sleeping units	—	—

NO.	CLASSIFICATION	DESCRIPTION		WATER CLOSETS (URINALS: SEE SECTION 424.2) MALE	FEMALE	LAVATORIES MALE	FEMALE	BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			Employee facilities	1 per 60 care recipient units		1 per 60 care recipient sleeping units		—	1 per 100	1 service sink per floor
			Visitor facilities	1 per 75 care recipient units		1 per 75 care recipient sleeping rooms		—	—	—
		Hospitals	Sleeping units for care recipients	1 per care recipient sleeping unit		1 per c are recipient sleeping unit		1 per100 care recipient sleeping units	—	
			Care recipient treatment areas	1 per 25 care recipient treatment rooms		1 per 50 care recipient treatment room s		--	1 per 100	—
			Employee facilities	1 per 25 care recipient sleeping units or treatment room ~~1 per 25 care recipient sleeping units or treatment room~~		1 per 50 care recipient sleeping room or treatment room			1 per 100	1 service sink per floor
			Visitor facilities	1 per 75 care recipient sleeping units or treatment room ~~1 per 75 care recipient sleeping units or treatment room~~		1 per 50 care recipient sleeping room or treatment room			1 per 500	—
Prisons[b]				1 per cell	1 per cell	1 per 15	1 per 100	1 service sink		
Reformatories, detention centers and correctional centers[b]	Cells			1 per 15	1 per 15	1 per 15	1 per 100	1 service sink		
	Congregate Living Facilities			1 per 15	1 per 15	1 per 15	1 per 100	1 service sink		
	Employees			1 per 25	1 per 35	—	1 per 100	—		
Adult day care and child day care				1 per 15	1 per 15	1	1 per 100	1 service sink		
6	Mercantile	Retail stores, service stations, shops, salesrooms, markets and shopping centers		1 per 500		1 per 750		—	1 per 1,000	1 service sink[e]
7	Residential	Hotels, motels, boarding houses (transient)		1 per dwelling or sleeping unit		1 per dwelling or sleeping unit		1 per dwelling or sleeping unit	—	1 service sink
		Dormitories, fraternities, sororities and boarding houses (not transient)		1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		Apartment house		1 per dwelling unit or sleeping unit		1 per dwelling unit or sleeping unit		1 per dwelling unit or sleeping unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units
		Congregate living facilities with 16 or fewer care recipients receiving custodial care		1 per 10		1 per 10		1 per 8	1 kitchen sink	
		One- and two-family dwellings and lodging houses with five or fewer guestrooms		1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per dwelling unit
8	Storage	Structures for the storage of goods, warehouses, storehouse and freight depots. Low and Moderate Hazard.		1 per 100		1 per 100		—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-user toilet facility with one water closet and one lavatory serving not more than two adjacent care recipient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor public swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

2024 International Building Code

Revise as follows:

TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)

NO.	CLASSIFICATION	DESCRIPTION		WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
				MALE	FEMALE	MALE	FEMALE			
1	Assembly	Theaters and other buildings for the performing arts and motion pictures[d]		1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Nightclubs, bars, taverns, dance halls and buildings for similar purposes[d]		1 per 40 ~~1 per 40~~		1 per 75		—	1 per 500	1 service sink
		Restaurants, banquet halls and food courts[d]		1 per 75 ~~1 per 75~~		1 per 200		—	1 per 500	1 service sink
		Casino gaming areas		1 per 100 for the first 400 and 1 per 250 for the remainder exceeding 400	1 per 50 for the first 400 and 1 per 150 for the remainder exceeding 400	1 per 250 for the first 750 and 1 per 500 for the remainder exceeding 750		—	1 per 1,000	1 service sink
		Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades and gymnasiums[d]		1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink
		Passenger terminals and transportation facilities[d]		1 per 500 ~~1 per 500~~		1 per 750		—	1 per 1,000	1 service sink
		Places of worship and other religious services[d]		1 per 150	1 per 75	1 per 200		—	1 per 1,000	1 service sink
		Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities [f]		1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities[f]		1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
2	Business	Buildings for the transaction of business, nonmedical professional services, other services involving merchandise, office buildings, banks, light industrial and similar uses		1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50		1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80		—	1 per 100	1 service sink[e]
		Ambulatory care facilities and outpatient clinics		1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50 ~~1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50~~		1 per 50		—	1 per 100	1 service sink per floor
3	Educational	Educational facilities		1 per 50		1 per 50		—	1 per 100	1 service sink
4	Factory and industrial	Structures in which occupants are engaged in work fabricating, assembly or processing of products or materials		1 per 100		1 per 100		—	1 per 400	1 service sink
5	Institutional	Alcohol and drug centers[b] Congregate care facilities[b] Group homes[b] Halfway houses[b] Social rehabilitation facilities[b] Foster care facilities[b]		1 per 10 care recipients		1 per 10 care recipients		1 per 8 care recipients	—	—
		Assisted living and residential board and care facilities with care recipients who receive custodial care	Sleeping units for care recipient[c]	1 per 2 sleeping units		1 per 2 sleeping units		1 per 8 sleeping units		
			Dwelling units for care recipients	1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit
			Employee facilities	1 per 60 care recipient units		1 per 60 care recipient units		—	1 per 100	1 service sink per floor
			Visitor facilities	1 per 75 care recipient units.		1 per 75 care recipient units		—	—	—
		Nursing homes[b]	Sleeping units for care recipients[c]	1 per 2 care recipient sleeping units		1 per 2 care recipient sleeping units		1 per 8 care recipient sleeping units	—	—
			Employee facilities	1 per 60 care recipient units		1 per 60 care recipient sleeping units		—	1 per 100	1 service sink per floor
			Visitor facilities	1 per 75 care recipient units		1 per 75 care recipient sleeping rooms		—	—	—
		Hospitals[b]	Sleeping units for care recipients	1 per care recipient sleeping unit		1 per c are recipient sleeping unit		1 per100 care recipient sleeping units		—

NO.	CLASSIFICATION	DESCRIPTION		WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
				MALE	FEMALE	MALE	FEMALE			
			Care recipient treatment areas	1 per 25 care recipient treatment rooms		1 per 50 care recipient treatment room s		—	1 per 100	—
			Employee facilities	1 per 25 care recipient sleeping units or treatment room ~~1 per 25 care recipient sleeping units or treatment room~~		1 per 50 care recipient sleeping room or treatment room		—	1 per 100	1 service sink per floor
			Visitor facilities	1 per 75 care recipient sleeping units or treatment room ~~1 per 75 care recipient sleeping units or treatment room~~		1 per 50 care recipient sleeping room or treatment room		—	1 per 500	—
								—		—
								—		—
		Prisons[b]		1 per cell		1 per cell		1 per 15	1 per 100	1 service sink
		Reformatories, detention centers and correctional centers[b]	Cells	1 per 15		1 per 15		1 per 15	1 per 100	1 service sink
			Congregate Living Facilities	1 per 15		1 per 15		1 per 15	1 per 100	1 service sink
			Employees	1 per 25		1 per 35		—	1 per 100	—
		Adult day care and child day care		1 per 15		1 per 15		1	1 per 100	1 service sink
6	Mercantile	Retail stores, service stations, shops, salesrooms, markets and shopping centers		1 per 500		1 per 750		—	1 per 1,000	1 service sink[e]
7	Residential	Hotels, motels, boarding houses (transient)		1 per dwelling or sleeping unit		1 per dwelling or sleeping unit		1 per dwelling or sleeping unit	—	1 service sink
		Dormitories, fraternities, sororities and boarding houses (not transient)		1 per 10		1 per 10		1 per 8	1 per 100	1 service sink
		Apartment house		1 per dwelling unit or sleeping unit		1 per dwelling unit or sleeping unit		1 per dwelling unit or sleeping unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per 20 dwelling units
		Congregate living facilities with 16 or fewer care recipients receiving custodial care		1 per 10		1 per 10		1 per 8		1 kitchen sink
		One- and two-family dwellings and lodging houses with five or fewer guestrooms		1 per dwelling unit		1 per dwelling unit		1 per dwelling unit	—	1 kitchen sink per dwelling unit; 1 automatic clothes washer connection per dwelling unit
8	Storage	Structures for the storage of goods, warehouses, storehouse and freight depots. Low and Moderate Hazard.		1 per 100		1 per 100		—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of *persons* indicated or any fraction of the number of *persons* indicated. The number of occupants shall be determined by this code.

b. Toilet *facilities* for employees shall be separate from *facilities* for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient *sleeping units* shall be permitted, provided that each patient sleeping unit has direct access to the toilet room and provisions for privacy for the toilet room user are provided.

d. The *occupant load* for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of *facilities* required.

e. For business and mercantile classifications with an *occupant load* of 15 or fewer, a service sink shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

Reason: The purpose of this change is to combine the men's and ladies' into a single cell when the numbers are the same for number of water closets required or number of lavatories required. The only time there should be separate male and female listings is when there are different ratios for the number of fixtures required.

The revised cells of the table are shown merged with the extra ratio information deleted. The intent is to simply make one cell to show the ratio applicable to both males and females.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is editorial and has no impact on cost. There is no change to the fixture requirements. The same number of fixtures will be required. With the movement towards all-gender toilet rooms, the code will be easier to interpret.

P15-24

P16-24

IPC: TABLE 403.1; IBC: TABLE 2902.1

Proponents: Ardel Jala, Seattle Dept of Construction & Inspections, Seattle Dept of Construction & Inspections (ardel.jala@seattle.gov); Jenifer Gilliland, Seattle Department of Construction and Inspections, Seattle Department of Construction and Inspections (jenifer.gilliland@seattle.gov)

2024 International Plumbing Code

Revise as follows:

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)

Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
1	Assembly	Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades, occupiable roofs and gymnasiums[d]	1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-user toilet facility with one water closet and one lavatory serving not more than two adjacent care recipient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor public swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

2024 International Building Code

Revise as follows:

TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)

Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
1	Assembly	Auditoriums without permanent seating, art galleries, exhibition halls, museums, lecture halls, libraries, arcades, occupiable roofs and gymnasiums[d]	1 per 125	1 per 65	1 per 200		—	1 per 500	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of *persons* indicated or any fraction of the number of *persons* indicated. The number of occupants shall be determined by this code.

b. Toilet *facilities* for employees shall be separate from *facilities* for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient *sleeping units* shall be permitted, provided that each patient sleeping unit has direct access to the toilet room and provisions for privacy for the toilet room user are provided.

d. The *occupant load* for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of *facilities* required.

e. For business and mercantile classifications with an *occupant load* of 15 or fewer, a service sink shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

Reason: The provisions for an occupied roof have become more comprehensive over the last few code cycles. This code change proposal adds occupied roof to the Assembly classification in the Minimum Plumbing Fixture requirements in IPC Table 403.1 which would also be published as Table 2902.1 in the IBC. This provides clear direction on how to assign a plumbing fixture ratio when the occupied roof has a generic assembly use that is not associated with a restaurant or another more specific use in the table.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change proposal clarifies how to assign minimum plumbing fixtures for an occupied roof used for assembly that is not more closely associated with another use in IPC Table 403.1 and IBC Table 2902.1

P16-24

P17-24

IPC: TABLE 403.1; IBC: TABLE 2902.1

Proponents: Ronald Geren, RLGA Technical Services, LLC, Self (ron@specsandcodes.com)

2024 International Plumbing Code

Revise as follows:

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
8	Storage	Structures for the storage of goods, warehouses, storehouse, ~~and~~ freight depots and self-storage. Low and Moderate Hazard.	1 per 100		1 per 100		—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-user toilet facility with one water closet and one lavatory serving not more than two adjacent care recipient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor public swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

2024 International Building Code

Revise as follows:

TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
7	Residential								
8	Storage	Structures for the storage of goods, warehouses, storehouse, ~~and~~ freight depots, and self storage. Low and Moderate Hazard.	1 per 100		1 per 100		—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of *persons* indicated or any fraction of the number of *persons* indicated. The number of occupants shall be determined by this code.

b. Toilet *facilities* for employees shall be separate from *facilities* for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient *sleeping units* shall be permitted, provided that each patient sleeping unit has direct access to the toilet room and provisions for privacy for the toilet room user are provided.

d. The *occupant load* for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of *facilities* required.

e. For business and mercantile classifications with an *occupant load* of 15 or fewer, a service sink shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.

Reason: Self storage facilities have low occupant loads, and most visitors are only in the facility for short periods of time. Thus, the number of available fixtures needed can be minimal.

According to the Self Storage Association (SSA), the size of a facility can range from 10,000 to 100,000 square feet, with an average size of 56,900 square feet. That amounts to approximately 546 units per facility. Per SSA's "Self Storage Standards and the Modern Community," there is an average of 6.82 trips per day for every 100 units. At 546 units, that would be 30.4 trips per day.

Assuming four occupants per trip, that would total 122 visitors daily. Most self storage facilities operate from 6:00 AM to 10:00 PM (16 hours), which means the average occupancy at any one time is 7.6 occupants, plus 3.5 employees (per SSA statistics), for an average total occupant load of 11. There will likely be peak periods where the number of visitors is higher than average.

At 122 occupants, the minimum number of fixtures would provide at least one water closet and one lavatory for each sex. Using the warehouse occupant load factor of 500 gsf per occupant, a large size self storage facility would have an occupant load of 200, which would still only require one closet and one lavatory for each sex, thus not creating an unnecessary burden on self storage facilities by providing an excessive number of fixtures for such low demand. Without definitive direction in the table, some designers have been directed to utilize the "Business" plumbing fixture ratios since a self storage facility is a "business."

For facilities that include on-site residential units for employees, those units would comply with the requirements for one- and two-family dwellings.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Most self storage facilities utilize the "Storage" plumbing fixture ratios as a default; however, the examples provided do not depict a self storage facility. This could cause apprehension, if not confusion when trying to apply the plumbing fixture requirements to facilities like self-storage. Pushing owners towards ratios that generate higher plumbing fixture counts may actually increase the cost of construction. The inclusion of self storage with the provided examples removes all doubt about plumbing ratios to use; thus, allowing owners to anticipate the number of fixtures and stay within their budgets.

P17-24

P18-24

IPC: TABLE 403.1; IBC: TABLE 2902.1

Proponents: Andrew Klein, A S Klein Engineering, PLLC, Self Storage Association (andrew@asklein.com)

2024 International Plumbing Code

Revise as follows:

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2) MALE	FEMALE	LAVATORIES MALE	FEMALE	BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
8	Storage	Structures for the storage of goods, warehouses, storehouse and freight depots. Low and Moderate Hazard.	1 per 100		1 per 100		—	1 per 1,000	1 service sink
		Self-service storage facilities	1 per 500 units		1 per 500 units		—	1 per 1000 units	—

2024 International Building Code

Revise as follows:

TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2) MALE	FEMALE	LAVATORIES MALE	FEMALE	BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
8	Storage	Structures for the storage of goods, warehouses, storehouse and freight depots. Low and Moderate Hazard.	1 per 100		1 per 100		—	1 per 1,000	1 service sink
		Self-service storage facilities	1 per 500 units		1 per 500 units		—	1 per 1000 units	—

Reason: Self-service storage facilities are low occupancy buildings, where the occupant load is most closely aligned with the number of units rather than the square footage of the building. Such a metric is therefore more appropriate and is being proposed. Service sinks are not needed in self-storage facilities like they are in traditional warehouses.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The average self-storage facility will save the cost of installing a service sink, about $2,000.

Estimated Immediate Cost Impact Justification (methodology and variables):

Restrooms are currently being overdesigned in self-service storage facilities. This code change proposal attempts to provide an appropriate metric for supplying restroom facilities.Currently, the number of fixtures are tied to occupant load at 1 WC & Lavatory per 100 occupants. and 1 drinking fountain per 1,000 occupants. A total of one service sink is required. IBC Table 1004.5, assigns one occupant per 500 gross SF for warehouses. The current code requires only a single water fountain for self-storage facilities up to 500,000 SF (500 SF/occupant X 1,000 occupants) and one WC/lavatory per 50,000 SF (500 SF/occupant X 100 occupants) of building area.

The average self-storage facility is 46,000 SF of rentable space *. Dividing the average net rentable space by the net rentable area percentage results in an average building area of 46,000 - 61,000 gross SF. Dividing the gross building area by 500 SF/occupant results an a building occupancy of 92 - 122 persons in an average building. **The current code, per IPC Table 403.1 therefore requires 1-2 WC/lavs, 1 water fountain, and 1 service sink per average facility.**

The average self-storage unit size is 100 SF *, and net rentable areas for self-storage facilities are between 75% to 100% of the building *. This code change proposal will require a water fountain for each 100,000 - 133,000 SF and a WC/lav for each 50,000 - 67,000 SF of building area.

The average self-storage facility with 46,000 SF of rentable space therefore has 460 units when the rentable area is divided by the average unit size. **This proposal results in the need for 1 WC/lav and 1 water fountain for the average facility, and no service sink.**

The average facility therefore saves on the cost of a service sink (~$1000 [2]) and its installation. Assumed installation cost is 50% of total cost.

[*] SELF STORAGE PRIMER (www.selfstorage.org/LinkClick.aspx?fileticket=AblNHWcUX9w%3D&portalid=0), accessed 1/26/2024

[2] Commercial Service Sink (americanstandard-us.com) (www.americanstandard-us.com/commercial-sinks/commercial-service-sink-list), accessed 1/26/2024

P18-24

P19-24 Part I

IPC: TABLE 403.1; IBC: TABLE 2902.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

THIS IS A 3 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IBC EGRESS CODE COMMITTEE. PART III WILL BE HEARD BY THE ISPSC CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			
1	Assembly	Coliseums, arenas, skating rinks~~, pools~~ and tennis courts for indoor sporting events and activities ~~f~~	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		<u>Indoor and outdoor swimming pools, spas and aquatic recreation facilities f</u>	<u>1 per 200</u>	<u>1 per 100 for the first 400 and 1 per 133 for the remaninder exceeding 400</u>	<u>1 per 400</u>	<u>1 per 300</u>	<u>-</u>	<u>1 per 1,000</u>	<u>1 service sink</u>
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities ~~f~~	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-user toilet facility with one water closet and one lavatory serving not more than two adjacent care recipient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. ~~The required number and type of plumbing fixtures for indoor and outdoor public swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.~~ <u>Plumbing fixture requirements are reduced or eliminated for certain Class C swimming pools. See the International Swimming Pool and Spa Code, Section 321.</u>

2024 International Building Code

Revise as follows:

[P] TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)
Portions of table not shown remain unchanged.

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2)		LAVATORIES		BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
			MALE	FEMALE	MALE	FEMALE			

NO.	CLASSIFICATION	DESCRIPTION	WATER CLOSETS (URINALS: SEE SECTION 424.2) MALE	FEMALE	LAVATORIES MALE	FEMALE	BATHTUBS/ SHOWERS	DRINKING FOUNTAIN (SEE SECTION 410)	OTHER
1	Assembly	Coliseums, arenas, skating rinks, pools and tennis courts for indoor sporting events and activities f	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink
		Indoor and outdoor swimming pools, spas and aquatic recreation facilities f	1 per 200	1 per 100 for the first 400 and 1 per 133 for the remanainder exceeding 400	1 per 400	1 per 300	-	1 per 1,000	1 service sink
		Stadiums, amusement parks, bleachers and grandstands for outdoor sporting events and activities f	1 per 75 for the first 1,500 and 1 per 120 for the remainder exceeding 1,500	1 per 40 for the first 1,520 and 1 per 60 for the remainder exceeding 1,520	1 per 200	1 per 150	—	1 per 1,000	1 service sink

a. The fixtures shown are based on one fixture being the minimum required for the number of *persons* indicated or any fraction of the number of *persons* indicated. The number of occupants shall be determined by this code.

b. Toilet *facilities* for employees shall be separate from *facilities* for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient *sleeping units* shall be permitted, provided that each patient sleeping unit has direct access to the toilet room and provisions for privacy for the toilet room user are provided.

d. The *occupant load* for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of *facilities* required.

e. For business and mercantile classifications with an *occupant load* of 15 or fewer, a service sink shall not be required.

f. ~~The required number and type of plumbing fixtures for indoor and outdoor swimming pools shall be in accordance with Section 609 of the International Swimming Pool and Spa Code.~~ Plumbing fixture requirements are reduced or eliminated for certain Class C swimming pools. See the International Swimming Pool and Spa Code, Section 321.

P19-24 Part I

P19-24 Part II

IBC: TABLE 1004.5, 1004.9 (New); IFC: [BE] TABLE 1004.5, 1004.9 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Building Code

Revise as follows:

TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks~~, swimming pools~~	
Rink ~~and pool~~	50 gross
~~Decks~~ Skating rink decks	15 gross
Stages and platforms	15 net
Swimming pools	
Swimming pool areas with water depth exceeding 5 feet	150 gross
Spa areas	10 gross
Catch pool areas	See Section 1004.9
All other swimming pool areas and decks	24 gross
Warehouses	500 gross

For SI: 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2.

a. Floor area in square feet per occupant.

Add new text as follows:

1004.9 Catch Pools . The *occupant load* of catch pools and designated sections of pools used as a terminus for a water slide flume shall be sum of the maximum number of users that can ride each slide that terminates in that pool or pool area at one time.

2024 International Fire Code

Revise as follows:

[BE] TABLE 1004.5 MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR[a]
Accessory storage areas, mechanical equipment room	300 gross
Agricultural building	300 gross
Aircraft hangars	500 gross
Airport terminal	
Baggage claim	20 gross
Baggage handling	300 gross
Concourse	100 gross
Waiting areas	15 gross
Assembly	
Gaming floors (keno, slots, etc.)	11 gross
Exhibit gallery and museum	30 net
Assembly with fixed seats	See Section 1004.6
Assembly without fixed seats	
Concentrated (chairs only—not fixed)	7 net
Standing space	5 net
Unconcentrated (tables and chairs)	15 net
Bowling centers, allow 5 persons for each lane including 15 feet of runway, and for additional areas	7 net
Business areas	150 gross
Concentrated business use areas	See Section 1004.8
Courtrooms—other than fixed seating areas	40 net
Day care	35 net
Dormitories	50 gross
Educational	
Classroom area	20 net
Shops and other vocational room areas	50 net
Exercise rooms	50 gross
Group H-5 fabrication and manufacturing areas	200 gross
Industrial areas	100 gross
Information technology equipment facilities	300 gross
Institutional areas	
Inpatient treatment areas	240 gross
Outpatient areas	100 gross
Sleeping areas	120 gross
Kitchens, commercial	200 gross
Library	
Reading rooms	50 net
Stack area	100 gross
Locker rooms	50 gross
Mall buildings—covered and open	See Section 402.8.2 of the International Building Code
Mercantile	60 gross
Storage, stock, shipping areas	300 gross
Parking garages	200 gross
Residential	200 gross
Skating rinks~~, swimming pools~~	
Rink ~~and pool~~	50 gross
~~Decks~~ Skating rink decks	15 gross
Stages and platforms	15 net
Swimming pools	
Swimming pool areas with water depth exceeding 5 feet	150 gross
Spa areas	10 gross
Catch pool areas	See Section 1004.9
All other swimming pool areas and decks	24 gross

FUNCTION OF SPACE	OCCUPANT LOAD FACTOR
Warehouses	500 gross

For SI: 1 square foot = 0.0929 m^2, 1 foot = 304.8 mm.

a. Floor area in square feet per occupant.

Add new text as follows:

1004.9 Catch Pools. The *occupant load* of catch pools and designated sections of pools used as a terminus for a water slide flume shall be sum of the maximum number of users that can ride each slide that terminates in that pool or pool area at one time.

P19-24 Part II

P19-24 Part III

ISPSC: SECTION 202 (New), 202 (New), SECTION 321 (New), 321.1 (New), 321.2 (New), 321.2.1 (New), 321.2.1.1 (New), 321.2.1.2 (New), 321.3 (New), 321.3.1 (New), 321.4 (New), 321.4.1 (New), 321.4.2 (New), 321.5 (New), 321,6 (New), 321.7 (New), 321.8 (New), 321.9 (New), SECTION 410, 410.1, SECTION 608, 608.1, TABLE 608.1, 608.2, SECTION 609, 609.1, 609.2, 609.2.1, 609.2.2, 609.3, 609.3.1, 609.3.2, 609.3.3, 609.4, 609.4.1, 609.4.2, 609.5, 609.6, 609.7, 609.8, 609.9

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org); Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org)

2024 International Swimming Pool and Spa Code

Add new definition as follows:

SHOWER. A device that sprays water on the body.

Cleansing.
A shower located within a hygiene facility using warm water and soap. The purpose of showers is to remove contaminants including perianal fecal material, sweat, skin cells, personal care products, and dirt before bathers enter the aquatic venue.

Rinse. A shower typically located in the pool deck area with ambient temperature water. The main purpose is to remove dirt, sand, or organic material prior to entering the aquatic venue to reduce the introduction of contaminants and the formation of disinfection byproduct.

Add new text as follows:

SECTION 321
DRESSING AND SANITARY FACILITIES

321.1 General. Dressing and sanitary facilities for public pools, public spas and aquatic recreation facilities shall be provided in accordance with the minimum requirements of the *International Building Code*, the *International Plumbing Code* and Sections 321.2 through 321.9. These facilities shall be located within a 300 foot path of travel from the pool area.

321.2 Number of fixtures. The minimum number of required water closets, urinals, lavatories, and drinking fountains fixtures shall be provided in accordance with the minimum requirements of the *International Building Code* and the *International Plumbing Code*.

Exception: For Class C swimming pools, fixtures dedicated to the pool area shall not be required where all dwelling units meet all of the following requirements:

1. The dwelling units have private facilities.
2. The dwelling units are within a 300 feet path of travel from the pool area.
3. The dwelling units are not more than one story above or below the pool area.

For Class C swimming pools where some but not all dwelling units meet the requirements of this exception, the minimum occupant load used to calculate the minimum fixture requirements shall be reduced by a factor equal to the number of dwelling units meeting these requirements, divided by the total number of dwelling units served by the pools.

321.2.1 Dressing facilties and rinsing showers. Dressing facilities and the number of rinse showers shall be provided in accordance with Sections 321.2.1.1 and 321.2.1.2.

321.2.1.1 Dressing Facilities. Public pools, public spas and aquatic recreation facilities shall have dressing facilities.

Exception: This section shall not apply to Class C pools.

321.2.1.2 Rinse shower. In addition to the requirement for cleansing showers in the International Plumbing Code and International

Building Code, not less than one rinse shower shall be provided on the deck of, or at the entrance of, each pool.

321.3 Water heater and mixing valve. Bather access to water heaters and thermostatically controlled mixing valves for showers shall be prohibited.

321.3.1 Temperature. At each cleansing showerhead, hot or tempered water shall be provided as required by the *International Plumbing Code*.

Exception: Water supplied to rinse showers shall not be required to be heated

321.4 Soap dispensers. . Soap dispensers shall be in accordance with Sections 329.4.1 and 329.4.2.

321.4.1 Liquid or powdered soap. Soap dispensers shall be provided at each lavatory and cleansing shower. Soap dispensers shall dispense liquid or powdered soap. Reusable cake soap shall be prohibited. Soap dispensers and soap shall not be provided at rinse showers.

321.4.2 Metal or plastic dispenser. Soap dispensers shall be made of metal or plastic. Glass materials shall be prohibited.

321.5 Toilet tissue holder. A toilet tissue holder shall be provided at each water closet

321,6 Mirrors. Where provided, mirrors shall be shatter resistant

321.7 Sanitary napkin receptacles. Sanitary napkin receptacles shall be provided in each water closet compartment for females and in the cleansing area of the showers for female use only.

321.8 Sanitary napkin dispensers. A sanitary napkin dispenser shall be provided in each toilet facility for females.

321.9 Infant care. Baby-changing tables shall be provided in toilet facilities

SECTION 410
SANITARY FACILITIES

Revise as follows:

410.1 ~~Toilet facilities~~ General. ~~Class A and B pools~~ Public pools and public spas shall be provided with ~~toilet facilities~~ dressing and sanitary facilities ~~having the required number of plumbing fixtures~~ in accordance with Section 321. ~~the *International Building Code* or the *International Plumbing Code*.~~

SECTION 608
NUMBER OF OCCUPANTS

Revise as follows:

608.1 Occupant load. The occupant load for the Class D-1, D-4, and D-6 pools ~~or spas~~ in the facility shall be calculated in accordance with Table 608.1~~.~~ , however the occupant load used for the minimum fixture count shall be calculated in accordance with Table 1004.5 of the International Building Code. The occupant load for all other pools shall be calculated in accordance with Table 1004.5 of the International Building Code.
~~The occupant load shall be the combined total of the number of users based on the pool or spa water surface area and the deck area surrounding the pool or spa. The deck area occupant load shall be based on the occupant load calculated where a deck is provided or based on an assumed 4-foot-wide (1219 mm) deck surrounding the entire perimeter of the pool or spa, whichever is greater.~~

TABLE 608.1 INCREASED OCCUPANT LOAD FOR CLASS D-1, D-4, AND D-6 POOLS

SHALLOW OR WADING ZERO DEPTH AREAS	DEEP AREA ~~(NOT INCLUDING THE DIVING AREA)~~	~~DIVING AREA (PER EACH DIVING BOARD)~~	DRY DECK AREA	
Vessel water surface area	8 sq. ft per user	~~10 sq. ft. per user~~	300 sq. ft. per user	—
Deck area	—	~~—~~	—	1 user per 15 sq. ft.

For SI: 1 square foot = 0.0929 m^2.

Delete without substitution:

~~**608.2 Facility capacity.** For multiple pools and spas in a single aquatic recreation facility, the total facility occupant capacity shall not be limited by the number of occupants calculated in accordance with Section 608.1.~~

SECTION 609
DRESSING AND SANITARY FACILITIES

Revise as follows:

609.1 General. Dressing and sanitary facilities shall be provided in accordance with the minimum requirements of Section 321. ~~the *International Building Code* and *International Plumbing Code* and Sections 609.2 through 609.9.~~

Delete without substitution:

~~**609.2 Number of fixtures.** The minimum number of required water closets, urinals, lavatory, and drinking fountain fixtures shall be provided as required by the *International Building Code* and *International Plumbing Code* and the dressing facilities and number of cleansing and rinse showers shall be provided in accordance with Sections 609.2.1, 609.2.2, and 609.3.1.~~

~~**609.2.1 Water area less than 7500 square feet.** Facilities that have less than 7500 gross square feet (697 m^2) of water area available for bather access shall have dressing facilities and not less than one cleansing shower for males and one cleansing shower for females.~~

~~**Exception:** This requirement shall not apply to Class C semipublic pools.~~

~~**609.2.2 Water area 7500 square feet or more.** Facilities that have 7500 gross square feet (697 m^2) or more of water area available for bather access shall have dressing facilities and not less than one cleansing shower for males, and one cleansing shower for females for every 7500 square feet (697 m^2) or portion thereof. Where the result of the fixture calculation is a portion of a whole number, the result shall be rounded up to the nearest whole number.~~

~~**609.3 Showers.** Showers shall be in accordance with Sections 609.3.1 through 609.3.3.~~

~~**609.3.1 Rinse shower.** In addition to the requirement for cleansing showers in Sections 609.2.1 and 609.2.2, not less than one rinse showershall be provided on the deck of or at the entrance of each pool.~~

~~**609.3.2 Water heater and mixing valve.** Bather access to water heaters and thermostatically controlled mixing valves for showers shall be prohibited.~~

~~**609.3.3 Temperature.** At each cleansing showerhead, the heated shower water temperature shall be not less than 90°F (32°C) and not greater than 120°F (49°C). Water supplied to rinse showers shall not be required to be heated.~~

~~**609.4 Soap dispensers.** Soap dispensers shall be in accordance with Sections 609.4.1 and 609.4.2.~~

~~**609.4.1 Liquid or powder.** Soap dispensers shall be provided at each lavatory and cleansing shower. Soap dispensers shall dispense liquid or powdered soap. Reusable cake soap is prohibited. Soap dispensers and soap shall not be provided at rinse showers.~~

~~**609.4.2 Metal or plastic.** Soap dispensers shall be made of metal or plastic. Glass materials shall be prohibited.~~

~~**609.5 Toilet tissue holder.** A toilet paper holder shall be provided at each water closet.~~

~~**609.6 Lavatory mirror.** Where mirrors are provided, they shall be shatter resistant.~~

~~**609.7 Sanitary napkin receptacles.** Sanitary napkin receptacles shall be provided in each water closet compartment for females and in the cleansing area of the showers for female use only.~~

~~**609.8 Sanitary napkin dispensers.** A sanitary napkin dispenser shall be provided in each toilet facility for females.~~

~~**609.9 Infant care.** Baby-changing tables shall be provided in toilet facilities having two or more water closets.~~

Reason: Background

The *2024 International Swimming Pool and Spa Code* does not have any restroom fixture requirements for class A, B, or C pools. For Class D pools, the fixture count is deferred to the *2024 International Plumbing Code.* But that code does not divide pools by class, and requires a large number of plumbing fixtures for indoor pools, but none for outdoor pools. The number of plumbing fixtures is an important public health concern as bathrooms being too far away or long lines for the bathroom will encourage some people to urinate in the pool. This is true regardless of the class of the pool and regardless of its location indoors and outdoors. That said, the number of fixtures required for indoor pools has been found to be excessive. The occupants of a pool and deck area will all use the bathroom on their own relaxed schedule. They will not all go at the same time as they might at a coliseum or arena. Therefore we have an obvious need to reduce the fixture requirement for indoor pools, but apply the same requirement for outdoor pools, and make the requirements cover all pools according to their class.

Occupant loads assigned under existing codes

In the *2024 International Building Code*, the current occupant load factors for pools are 50 gross in the pool and 15 gross on the deck. We have found that both requirements are unrealistic for most pools today. Pools today are shallower, many have no deep end at all. As a result, people comfortably congregate in them more closely than they used to. When the deck area and pool area are equal, these factors are equivalent to ignoring the deck area and assigning one user per 12 square feet of water, or assigning one user per 24 square feet of deck and water surface area per occupant.

The *2024 International Swimming Pool and Spa Code* recommends that a *bather load* (this is not the same thing as *occupant load*) be assigned based on various factors that vary from 20 gross to 8 gross. Confusingly, the load factors get smaller as the deck area gets bigger. The result is that the *bather load* stops increasing with deck area once the deck area is equal to twice the pool area. In this case, the maximum bather load is 8 square feet of water surface area per bather, or, equivalently, 24 square feet of deck and water surface per bather. When the deck area is equal to the water surface area, again the math comes out to 24 square feet of deck and water surface area per bather.

For Class D pools only, the *2024 ISPSC* does assign an occupant load. It requires a much larger load, with the load factor varying from 10 gross to 8 gross, this time with deck area considered at 15 gross (this changed in 2015 to harmonize it with IBC Table 1004.5. Previously it was 50 gross). These occupant loads are aggressively larger, but only if the jurisdiction has adopted the *ISPSC.* This increased load might be reasonable for heavily used wave pools and leisure rivers, but other Class D pools can only be used by a few users at a time, for instance floating lily pad walks, climbing walls, water slides, etc, so that increase does not make much sense in these cases.

The *Model Aquatic Health Code* assigns occupant load factors ranging from 10 to 20 square feet for water surface area, but only one occupant per 50 square feet on the deck. This is roughly a mirror image of the current *International Building Code.*

Justification of changes occupant loads in IBC Table 1004.5 and ISPSC 608.1

- **Swimming pool areas with water depth exceeding 5 ft** – users do not lounge or congregate in these areas because keeping one's head above water requires constant effort. They are doing activities such as lap swimming, diving, synchronized swimming, and water polo. The highest density of these activities is water polo, with a pool area as small as 20 meters by 10 meters being used by two teams of seven players each. The result is one occupant per 150 square feet.
- **Spa areas –** The *Model Aquatic Health Code* and *Florida Building Code* both assign 1 occupant or bather per 10 square feet. It

would not be conservative for the *International Building Code* to ignore this guidance.

· **Catch pools –** The slides are supervised and people are not permitted to go down the slide unless the area is clear.

· **All other swimming pool areas and decks –** Currently these areas are treated very differently. We have observed users congregating in pools tighter than one per 50 square feet. As for the deck, it is reasonable to think that people congregate in deck areas similar to unconcentrated assembly seating or airport terminal waiting areas (which both get a load factor of 15), however, most of these people "reserve" a movable chair for themselves with a towel or purse and then proceed to the pool. Increasing this factor to 24 accounts for the fact that some people stay in this area, but most reserve a space in the area before moving on to another area. Assigning the same factor to both areas is logical when you consider the increased number of tanning ledges that are being installed recently. Such areas are basically used the same as deck, mainly used by people standing or in lounge chairs, yet the load factor is different. The load factor should be the same.

· **Class D-1, D-4, and D-6 pool deep areas –** These bodies of water do not tend to have deep areas, and even when they do, ropes are placed to discourage users from using them. The occupant load factors for shallow areas and decks have been left alone so that the egress requirements for these types of pools will not change. However, in past versions of the code the Class D minimum fixture count was not based on this very high number of occupants. In the 2018 code, a Leisure River with 7500 square feet of water and 7500 square feet of deck would have 1,438 occupants but only require 2 water closets for females. We are proposing that the occupant count would remain 1,438, but that number brought to the proposed revision of Table 2902 computes to 7 water closets for females. That is roughly similar to what the current code would call for on an indoor class A, B, or C pool, and that is too high. So this proposal adds a clause to Section 608 of the *ISPSC* that Table 608 should not be used for fixture count, rather Table 1004.5 of the *IBC* should be used. This way changing a pool from Class C to Class D will have no impact on the minimum fixture count, but it would have an impact on egress and other occupant count related items. The minimum fixture count for the Leisure River mentioned above would be 4 water closets for females.

· **Other Class D pools –** This includes catch pools, activity pools, and vortex pools. These pools are meant to be used by distinct groups of supervised users one at a time. Letting them default back to one occupant per 24 square feet rather than one per 8 square feet is still conservative.

Summary of changes occupant loads resulting from this proposal

The changes to 1004.5 under this proposed change would give:

Class A, B, or C Pool, 5' deep or less, with

deck area *less than* pool area

Slightly *more* occupants

deck area *equal* to pool area

The *same* number occupants

deck area *more than* pool area

Slightly *fewer* occupants

Catch Pools

~ 100x *fewer* occupants

Wave Pools, Leisure Rivers, Interactive Water Features, 5' deep or less

The *same* (very large) number of occupants

Activity Pools, Vortex Pools, Pool areas greater than 5' deep

3x *fewer* occupants

Spa Pools

5x *more* occupants

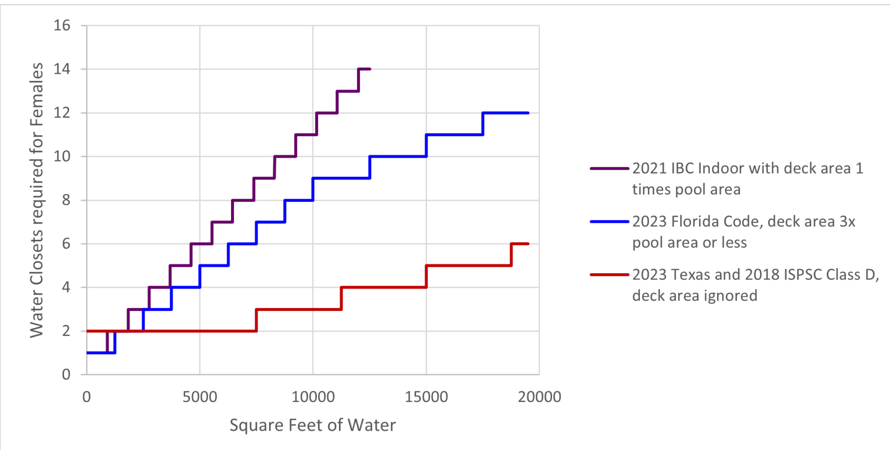
Minimum Fixture Count in 2018 I-codes

The *International Swimming Pool and Spa Code 2018* assigned a minimum fixture count to all Class D pools. This fixture count overruled Table 2902 in the *IBC.* In this code year, the result was a Class D pool would be assigned many more occupants than a Class

A, B, or C pool. But if it was indoors, it would be assigned many fewer minimum restroom fixtures than a similar Class A, B, or C pool. If it was outdoors, it would be assigned the same small number of fixtures, even though a Class A, B, or C pool would not have any minimum number of fixtures. In the 2021 code cycle, section 609 of the *International Swimming Pool and Spa Code* was truncated, leaving only a minimum number of showers, not of toilets or lavatories, for outdoor pools and Class D pools.

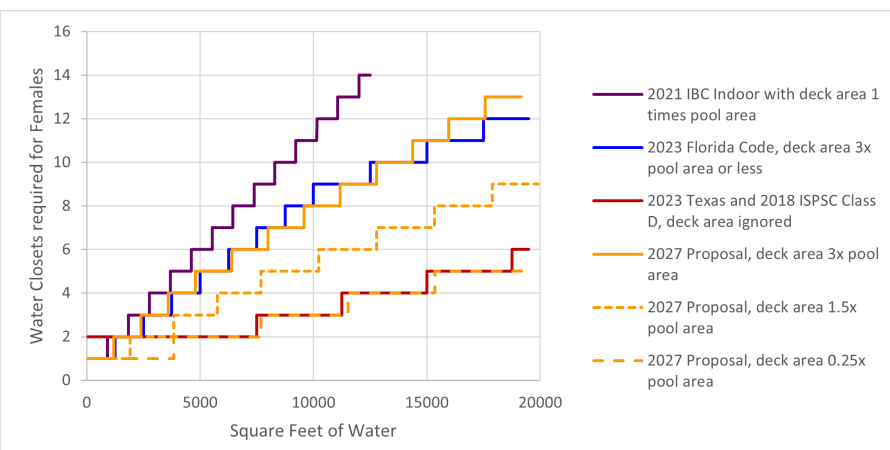
Minimum Fixture Count in current codes

The *International Building Code* assigns fixtures to occupants, of indoor pools, and assigns occupants both to the deck area and the pool water area. No fixtures are assigned to occupants of outdoor pools. In effect, fixtures are assigned both to areas of the deck and areas of the pool. The other state-level codes surveyed in this effort are for Florida and Texas. In Texas, the deck area is ignored entirely. In Florida, it is ignored for all deck area less than 3x of the pool area, which practically includes all pool decks. But in the current *IBC,* for indoor pools only, the deck area becomes a much more important factor than the pool area. The number of fixtures required by this code is already significantly more than Florida would require even when the deck is only 1x of the pool area. The reason is because the occupants of a pool and pool deck are treated the same as the occupants of a stadium or arena in terms of their need to use the bathroom. Meanwhile Texas, ignoring the pool area, their code gives a result that is much lower for the same pool. But Texas didn't make this up, rather, their table comes from section 609 of the 2018 ISPSC.



Justification of new row in IBC Table 2902.1

The intent of adding a new row, rather than using the existing rows for coliseums and arenas, is to reduce the number of fixtures required. The occupants of a pool and deck area will all use the bathroom on their own relaxed schedule. They will not all go at the same time as they might at a coliseum or arena. The calculation results in the new orange lines shown in the graph below, with the existing codes still shown for reference. The new code proposal will agree closely with the Florida Code when the deck is 3x the pool area, and agree closely with the Texas code when only minimal deck is provided.



Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

For indoor pools and Class D pools plumbing fixture requirement will be about the same. Indoor pool plumbing fixture requirements will be reduced. Outdoor pool plumbing fixture requirements will be increased. Overall, the number of plumbing fixtures will be slightly decreased.

P19-24 Part III

P20-24

IPC: 403.1.1, TABLE 403.1; IBC: TABLE 2902.1, [P] 2902.1.1

Proponents: Eirene Knott, BRR Architecture, BRR Architecture (eirene.knott@brrarch.com)

2024 International Plumbing Code

Revise as follows:

403.1.1 Fixture calculations.
To determine the occupant load of each sex, the total occupant load shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the occupant load of each sex in accordance with Table 403.1. Fractional numbers resulting from applying the fixture ratios of Table 403.1 shall be rounded up to the next whole number. For calculations involving multiple *occupancies*, such fractional numbers for each *occupancy* shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total occupant load shall not be required to be divided in half where *approved* statistical data indicate a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user facilities are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total occupant load. In such multiple-user facilities, each fixture type shall be in accordance with ICC A117.1.
3. <u>Where a swimming pool serves only a designated group of residential sleeping or dwelling units and not the general public, poolside sanitary facilities are not required if all such units are within a 250-foot horizontal radius of the nearest water's edge, are not over three stories in height unless serviced by an elevator, and are each equipped with private sanitary facilities.</u>

TABLE 403.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 403.1.1 and 403.2)
Portions of table not shown remain unchanged.

No changes to Table - only footnotes

a. The fixtures shown are based on one fixture being the minimum required for the number of persons indicated or any fraction of the number of persons indicated. The number of occupants shall be determined by the *International Building Code*.

b. Toilet facilities for employees shall be separate from facilities for inmates or care recipients.

c. A single-user toilet facility with one water closet and one lavatory serving not more than two adjacent care recipient sleeping units shall be permitted provided that each patient sleeping unit has direct access to the toilet room and provision for privacy for the toilet room user is provided.

d. The occupant load for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of facilities required.

e. For business and mercantile classifications with an occupant load of 15 or fewer, service sinks shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor public swimming pools shall <u>also</u> be in accordance with Section 609 of the International Swimming Pool and Spa Code.

2024 International Building Code

Revise as follows:

[P] TABLE 2902.1 MINIMUM NUMBER OF REQUIRED PLUMBING FIXTURES[a] (See Sections 2902.1.1 and 2902.2)
Portions of table not shown remain unchanged.

No changes to Table - only footnotes

a. The fixtures shown are based on one fixture being the minimum required for the number of *persons* indicated or any fraction of the number of *persons* indicated. The number of occupants shall be determined by this code.

b. Toilet *facilities* for employees shall be separate from *facilities* for inmates or care recipients.

c. A single-occupant toilet room with one water closet and one lavatory serving not more than two adjacent patient *sleeping units* shall be permitted, provided that each patient sleeping unit has direct access to the toilet room and provisions for privacy for the toilet room user are provided.

d. The *occupant load* for seasonal outdoor seating and entertainment areas shall be included when determining the minimum number of *facilities* required.

e. For business and mercantile classifications with an *occupant load* of 15 or fewer, a service sink shall not be required.

f. The required number and type of plumbing fixtures for indoor and outdoor swimming pools shall <u>also</u> be in accordance with Section 609 of the International Swimming Pool and Spa Code.

[P] 2902.1.1 Fixture calculations.

To determine the *occupant load* of each sex, the total *occupant load* shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the *occupant load* of each sex in accordance with Table 2902.1. Fractional numbers resulting from applying the fixture ratios of Table 2902.1 shall be rounded up to the next whole number. For calculations involving multiple occupancies, such fractional numbers for each occupancy shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total *occupant load* shall not be required to be divided in half where *approved* statistical data indicates a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user *facilities* are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total *occupant load*. In such multiple-user user *facilities*, each fixture type shall be in accordance with ICC A117.1.
3. <u>Where a swimming pool serves only a designated group of residential sleeping or dwelling units and not the general public, poolside sanitary facilities are not required if all such units are within a 250-foot horizontal radius of the nearest water's edge, are not over three stories in height unless serviced by an elevator, and are each equipped with private sanitary facilities.</u>

Reason: The proposed language is attempting to do two things. The first is to clean up what appears to be a circular reference in both the IBC and IPC to the ISPSC on the required facilities for both indoor and outdoor pools. Footnote f to the fixture tables directs the user to the ISPSC for fixtures associated with an indoor or outdoor public swimming pools. However, the section referenced in the table (ISPSC 609) refers to the IBC/IPC for the toilet facilities and the ISPSC then addresses the need for the bathing room. When I amended the footnote to the table last year, my point was to not require the bathing facility for a hotel/motel or apartment/condominium complex. Then I subsequently amended the ISPSC to not require the bathing facility for pools associated with a Class C semipublic pool serving hotels, motels, apartments and condominiums. It was not until I wanted to update the toilet facility with the second part of this change that I realized there was a circular reference occurring.

The second part of the proposed language is an attempt to reduce the number of required plumbing fixtures at a swimming pool associated with a hotel/motel or apartment/condominium complex. Most people in these facilities will use the toilet room associated with their sleeping or dwelling unit rather than use the ones provided at the pool itself. Allowing for the recognition of the toilets provided within each sleeping/dwelling unit will allow for a reduction in the plumbing fixtures required at the pool itself. These pools are limited in use by those staying as guests of the hotel or residents of the apartment/condominium complex; these are not used by the general public. Per the ISPSC, this type of pool is recognized as a Class C semi-public pool, since it is operated solely for and in conjunction with a hotel, motel, apartments or condominiums.

Some concern may be raised about hotels with water parks associated with them. I believe the requirements of the ISPSC would require the bathing facility based on the area of the water area as many of these areas will be over the 7,500 square foot requirement under the

ISPSC for the bathing facility.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$65,000. If a hotel/motel or apartment/condominium facility is not required to provide additional toilet facilities within the pool area due to each guest room being within a reasonable distance to the pool side, this could provide for a reduction in overall costs, especially those associated with long term maintenance of the pool area.

Estimated Immediate Cost Impact Justification (methodology and variables):

To provide two accessible single user toilet rooms, new construction can run around $65,000 based on all associated costs such as plumbing pipe, electrical wiring, metal stud partitions, insulation, sprinkler protection, gypsum wallboard and associated finishes, including water closets, lavatories, drinking fountains, grab bars, and tiled walls. These new construction costs were provided for by a general contractor for a multi user toilet room and a ratio was used based on the square footage associated with the multi user toilet rooms and two accessible, single user toilet rooms.

This cost does not include any maintenance associated with the toilet rooms once they have been constructed. Vandalism is something to consider and the costs associated with replacement of fixtures. Water closets can cost on average to replace at least $250 just for the fixture itself, with a lavatory running slightly less at around $100. The replacement costs are based on a google search and the average pricing found for an ADA water closet and an ADA lavatory.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

P20-24

P21-24

IPC: 403.1.1; IBC: [P] 2902.1.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

Revise as follows:

403.1.1 Fixture calculations.
To determine the occupant load of each sex, the total occupant load shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the occupant load of each sex in accordance with Table 403.1. Fractional numbers resulting from applying the fixture ratios of Table 403.1 shall be rounded up to the next whole number. For calculations involving multiple *occupancies*, such fractional numbers for each *occupancy* shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total occupant load shall not be required to be divided in half where *approved* statistical data indicate a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user facilities are designed to serve all genders, the minimum fixture count shall be calculated ~~100 percent, based~~ on <u>the</u> total occupant load <u>and shall be based on the method outlined in Section 403.1.1</u>. In such multiple-user facilities, each fixture type shall be in accordance with ICC A117.1 .

2024 International Building Code

Revise as follows:

[P] 2902.1.1 Fixture calculations.
To determine the *occupant load* of each sex, the total *occupant load* shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the *occupant load* of each sex in accordance with Table 2902.1. Fractional numbers resulting from applying the fixture ratios of Table 2902.1 shall be rounded up to the next whole number. For calculations involving multiple occupancies, such fractional numbers for each occupancy shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total *occupant load* shall not be required to be divided in half where *approved* statistical data indicates a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user *facilities* are designed to serve all genders, the minimum fixture count shall be calculated ~~100 percent, based~~ on <u>the</u> total occupant load <u>and shall be based on the method outlined in Section 403.1.1.</u> In such multiple-user user *facilities*, each fixture type shall be in accordance with ICC A117.1 .

Reason: The phrase “calculated 100 percent” has caused confusion especially where Table 403.1 has different fixture ratios for males and females. This proposal points the reader to Section 403.1.1 where the standard calculation method is given and well understood.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)
PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This only clarifies how to apply the IPC Table 403.1.

P21-24

P22-24

IPC: 403.1.1; IBC: [P] 2902.1.1

Proponents: Jeffrey Grove, Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Plumbing Code

Revise as follows:

403.1.1 Fixture calculations.
To determine the occupant load of each sex, the total occupant load shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the occupant load of each sex in accordance with Table 403.1. Fractional numbers resulting from applying the fixture ratios of Table 403.1 shall be rounded up to the next whole number. For calculations involving multiple *occupancies*, such fractional numbers for each *occupancy* shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total occupant load shall not be required to be divided in half where *approved* statistical data indicate a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user facilities are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total occupant load. In such multiple-user facilities, ~~each fixture type shall be in accordance with ICC A117.1~~ <u>the required number of accessible fixtures shall be determined in accordance with IBC Section 1110.</u>
.

2024 International Building Code

Revise as follows:

[P] 2902.1.1 Fixture calculations.
To determine the *occupant load* of each sex, the total *occupant load* shall be divided in half. To determine the required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the *occupant load* of each sex in accordance with Table 2902.1. Fractional numbers resulting from applying the fixture ratios of Table 2902.1 shall be rounded up to the next whole number. For calculations involving multiple occupancies, such fractional numbers for each occupancy shall first be summed and then rounded up to the next whole number.

Exceptions:

1. The total *occupant load* shall not be required to be divided in half where *approved* statistical data indicates a distribution of the sexes of other than 50 percent of each sex.
2. Where multiple-user *facilities* are designed to serve all genders, the minimum fixture count shall be calculated 100 percent, based on total *occupant load*. In such multiple-user ~~user~~ *facilities*, ~~each fixture type shall be in accordance with ICC A117.1.~~ <u>the required number of accessible fixtures shall be determined in accordance with IBC Section 1110.</u>

Reason: The removal of; “each fixture type shall be in accordance with ICC A117.1” is necessary for two reasons. First, the term: “each fixture type” does not accurately capture the intent of this provision. The actual intent here should be to reference the minimum “number of accessible fixtures” required, not the type of fixtures present. Second, the term “shall be in accordance with ICC A117.1” also does not accurately capture the intent of this provision because the IBC contains the scoping provisions for accessibility (i.e. the required quantities of accessible fixtures and elements), whereas the ICC A117.1 does not. Additionally, as adopted, the reference to ICC A117.1 here appears to mandate that 100% of all toilet fixtures in multiple-user facilities designed to serve all genders are required to be accessible. That’s because within the ICC A117.1 standard, there are only two (2) available design options for toilets within a multi-user restrooms:

1. A wheelchair accessible toilet compartment (per ICC A117.1 Section 604.9), or
2. An ambulatory accessible toilet compartment (per ICC A117.1 Section 604.10)

In its entirety, IBC Section 1110 fully enumerates the required quantities of accessible fixtures for all fixture types in each of the available toilet/bathing room facility types (i.e. configurations) that could possibly be provided within a building.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Because this proposal is a clarification, it neither increases nor decreases the cost of construction.

P22-24

P23-24

IPC: 403.2; IBC: [P] 2902.2

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2024 International Plumbing Code

Revise as follows:

403.2 Separate facilities.
Where plumbing fixtures are required, separate toilet facilities shall be provided for each sex.

Exceptions:

1. Separate toilet facilities shall not be required for dwelling units and sleeping units.
2. Separate toilet facilities shall not be required in structures or tenant spaces with a total occupant load, including both employees and customers, of 15 or fewer.
3. Separate toilet facilities shall not be required in mercantile *occupancies* in which the maximum occupant load is 100 or fewer.
4. Separate toilet facilities shall not be required in business <u>or residential</u> *occupancies* in which the maximum occupant load is 25 or fewer.
5. Separate toilet facilities shall not be required to be designated by sex where single-user toilet rooms are provided in accordance with Section 403.1.2.
6. Separate toilet facilities shall not be required where rooms having both water closets and lavatory fixtures are designed for use by all persons regardless of sex and privacy is provided for water closets in accordance with Section 405.3.4 and for urinals in accordance with Section 405.3.5.

2024 International Building Code

Revise as follows:

[P] 2902.2 Separate facilities.
Where plumbing fixtures are required, separate *facilities* shall be provided for each sex.

Exceptions:

1. Separate toilet *facilities* shall not be required for *dwelling units* and *sleeping units*.
2. Separate toilet *facilities* shall not be required in *structures* or tenant spaces with a total *occupant load*, including both employees and customers, of 15 or fewer.
3. Separate toilet *facilities* shall not be required in mercantile occupancies in which the maximum *occupant load* is 100 or fewer.
4. Separate toilet *facilities* shall not be required in business <u>or residential</u> occupancies in which the maximum *occupant load* is 25 or fewer.
5. Separate toilet *facilities* shall not be required to be designated by sex where single-user toilet rooms are provided in accordance with Section 2902.1.2.
6. Separate toilet *facilities* shall not be required where rooms having both water closets and lavatory fixtures are designed for use by all *persons* regardless of sex and privacy is provided for water closets in accordance with Section 405.3.4 of the *International Plumbing Code* and for urinals in accordance with Section 405.3.5 of the *International Plumbing Code* .

Reason: Hotels/Motels that do not offer any public amenities should not be required to provide multiple toilet rooms, as a single user toilet room can accommodate the smaller occupant loads associated with these hotels.

Many hotel chains provide the bare minimum for guests and do not provide a breakfast service. For those, they usually only offer a fitness room that's less than 750 square feet and a guest laundry room. Any additional spaces provided are for hotel employees only and are very minimum in nature, usually comprising of a small office space and the front check-in area. In many cases, the total occupant load of all of these spaces can be calculated to be less than 25 occupants. For these hotels/motels, providing two separate sex or two unisex toilet rooms eats into space that would be used to serve these small areas. To provide a single user toilet room would meet the requirement for employees to have access to a toilet room as well as giving hotel guests the convenience of using a toilet room after working out or while doing laundry, but not necessitate the need for two toilet rooms. The code already recognizes that small business spaces with an occupant load of 25 or less need only provide one toilet facility, the same should apply here as well as most of the area in question can be classified as a business occupancy.

Cost Impact: Decrease

- **toiletrooms.pdf**
  https://www.cdpaccess.com/proposal/9235/28623/documentation/134870/attachments/download/4694/

Estimated Immediate Cost Impact:

This could reduce the estimated construction costs by $82,000 by allowing the use of a single user toilet room to serve the hotel/motel employees rather than requiring two toilet rooms to serve each sex as well as not reducing the square footage that could be used for guest amenities such as a fitness center and guest laundry.

Estimated Immediate Cost Impact Justification (methodology and variables):

See attached spreadsheet. The cost of two water closets, two lavatories, assorted accessories (paper towel dispenser, toilet paper dispenser, etc.) along with the potential need for grab bars in each toilet room and the costs of materials to build a second toilet room (studs, gypsum, wall//floor finish). Not requiring the second toilet room would allow for more space that could be rented to provide more income to the building owner.

Estimated Life Cycle Cost Impact:

The additional maintenance to support a second toilet room could be reduced. Not requiring the second toilet room would allow for more space that could be rented to provide more income to the building owner.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

It would be far less expensive to maintain one toilet room versus two used on a very seldom basis. Not requiring the second toilet room would allow for more space that could be rented to provide more income to the building owner.

P23-24

P24-24

IPC: 403.2; IBC: [P] 2902.2

Proponents: Jeanne Rice, NYS DOS, NYS DOS (jeanne.rice@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov)

2024 International Plumbing Code

Revise as follows:

403.2 Separate facilities.
Where plumbing fixtures are required, separate toilet facilities shall be provided for each sex.

Exceptions:

1. Separate toilet facilities shall not be required for dwelling units and sleeping units.
2. Separate toilet facilities shall not be required in structures or tenant spaces with a total occupant load, including both employees and customers, of 15 or fewer.
3. Separate toilet facilities shall not be required in mercantile *occupancies* in which the maximum occupant load is 100 or fewer.
4. Separate toilet facilities shall not be required in business *occupancies* in which the maximum occupant load is 25 or fewer.
5. Separate toilet facilities shall ~~not be required to be designated by sex~~ <u>be identified as being available for use by all persons regardless of sex </u>where single-user toilet rooms are provided in accordance with Section 403.1.2
6. Separate toilet facilities shall not be required where rooms having both water closets and lavatory fixtures are designed for use by all persons regardless of sex and privacy is provided for water closets in accordance with Section 405.3.4 and for urinals in accordance with Section 405.3.5.

2024 International Building Code

Revise as follows:

[P] 2902.2 Separate facilities.
Where plumbing fixtures are required, separate *facilities* shall be provided for each sex.

Exceptions:

1. Separate toilet *facilities* shall not be required for *dwelling units* and *sleeping units*.
2. Separate toilet *facilities* shall not be required in *structures* or tenant spaces with a total *occupant load*, including both employees and customers, of 15 or fewer.
3. Separate toilet *facilities* shall not be required in mercantile occupancies in which the maximum *occupant load* is 100 or fewer.
4. Separate toilet *facilities* shall not be required in business occupancies in which the maximum *occupant load* is 25 or fewer.
5. Separate toilet facilities shall ~~not be required to be designated by sex~~ <u>be identified as being available for use by all persons regardless of sex</u>where single-user toilet rooms are provided in accordance with Section 403.1.2
6. Separate toilet *facilities* shall not be required where rooms having both water closets and lavatory fixtures are designed for use by all *persons* regardless of sex and privacy is provided for water closets in accordance with Section 405.3.4 of the *International Plumbing Code* and for urinals in accordance with Section 405.3.5 of the *International Plumbing Code* .

Reason: Section 403.1.2 requires single-user toilet facilities to be designated as gender neutral, but Section 403.2 merely states that such facilities "may" be designated gender neutral. This change modifies Section 402.3 to match Section 403.1.2. Designating single-user toilet facilities for use by only one sex is inefficient and can cause increased wait times for bathroom use, and is unnecessary since such toilet facilities are intended for use by only one person at a time.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change aligns section 403.2 with section 403.1.2. Since section 403.1.2 already required single-user toilet facilities to be designated as gender neutral, this change does not add any requirements, but simply coordinates the sections to prevent confusion.

P24-24

P25-24

IPC: 403.2; IBC: [P] 2902.2

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com)

2024 International Plumbing Code

Revise as follows:

403.2 ~~Separate~~ Toilet facilities.
~~Where~~ Required plumbing fixtures ~~are required, separate toilet facilities~~ shall be located in all gender toilet rooms or in separate toilet rooms provided for each sex.

~~**Exceptions:**~~

1. ~~Separate toilet facilities shall not be required for dwelling units and sleeping units.~~
2. ~~Separate toilet facilities shall not be required in structures or tenant spaces with a total occupant load, including both employees and customers, of 15 or fewer.~~
3. ~~Separate toilet facilities shall not be required in mercantile *occupancies* in which the maximum occupant load is 100 or fewer.~~
4. ~~Separate toilet facilities shall not be required in business *occupancies* in which the maximum occupant load is 25 or fewer.~~
5. ~~Separate toilet facilities shall not be required to be designated by sex where single-user toilet rooms are provided in accordance with Section 403.1.2.~~
6. ~~Separate toilet facilities shall not be required where rooms having both water closets and lavatory fixtures are designed for use by all persons regardless of sex and privacy is provided for water closets in accordance with Section 405.3.4 and for urinals in accordance with Section 405.3.5.~~

2024 International Building Code

Revise as follows:

[P] 2902.2 ~~Separate~~ Toilet facilities.
~~Where~~ Required plumbing fixtures ~~are required, separate toilet facilities~~ shall be located in all gender toilet rooms or in separate toilet rooms provided for each sex.

~~**Exceptions:**~~

1. ~~Separate toilet *facilities* shall not be required for *dwelling units* and *sleeping units*.~~
2. ~~Separate toilet *facilities* shall not be required in *structures* or tenant spaces with a total *occupant load*, including both employees and customers, of 15 or fewer.~~
3. ~~Separate toilet *facilities* shall not be required in mercantile occupancies in which the maximum *occupant load* is 100 or fewer.~~
4. ~~Separate toilet *facilities* shall not be required in business occupancies in which the maximum *occupant load* is 25 or fewer.~~
5. ~~Separate toilet *facilities* shall not be required to be designated by sex where single-user toilet rooms are provided in accordance with Section 2902.1.2.~~
6. ~~Separate toilet *facilities* shall not be required where rooms having both water closets and lavatory fixtures are designed for use by all *persons* regardless of sex and privacy is provided for water closets in accordance with Section 405.3.4 of the *International Plumbing Code* and for urinals in accordance with Section 405.3.5 of the *International Plumbing Code* .~~

Reason: The change allowing all gender toilet rooms during the last cycle resulted in all of the other exceptions being superfluous. The code allows fixtures to be located in all gender toilet rooms or in separate toilet rooms for each sex. Therefore, rather than confusing and contradictory code text, the code should simply state what it means, you can have all gender toilet rooms, or you can have toilet rooms for each sex. It is purely the designer’s choice.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is editorial in nature and has no impact on cost. There is no increase in the number of fixtures required, nor is there a decrease in the number of fixtures required. The exceptions being deleted only create confusion since all-gender toilet rooms have been accepted in the code. The section should have been updated during the previous cycle.

P25-24

P26-24

IPC: 403.3; IBC: [P] 2902.3

Proponents: Andrew Klein, A S Klein Engineering, PLLC, Self Storage Association (andrew@asklein.com)

2024 International Plumbing Code

Revise as follows:

403.3 Employee and public toilet facilities.
For structures and tenant spaces intended for public utilization, customers, patrons and visitors shall be provided with *public* toilet facilities. Employees associated with structures and tenant spaces shall be provided with toilet facilities. The number of plumbing fixtures located within the required toilet facilities shall be provided in accordance with Section 403 for all users. Employee toilet facilities shall be either separate or combined employee and *public* toilet facilities.

Exception: *Public* toilet facilities shall not be required for:

1. Parking garages and self-service storage facilities operated without ~~parking~~ attendants.
2. Structures and tenant spaces intended for quick transactions, including takeout, pickup and drop-off, having a public access area less than or equal to 300 square feet (28 m^2).

2024 International Building Code

Revise as follows:

[P] 2902.3 Employee and public toilet facilities.
For *structures* and tenant spaces intended for public utilization, customers, patrons and visitors shall be provided with public toilet *facilities*. Employees associated with *structures* and tenant spaces shall be provided with toilet *facilities*. The number of plumbing fixtures located within the required toilet *facilities* shall be provided in accordance with Section 2902 for all users. Employee toilet *facilities* shall be either separate or combined employee and public toilet *facilities*.

Exception: Public toilet *facilities* shall not be required for:

1. Parking garages and self-service storage facilities operated without ~~parking~~ attendants.
2. *Structures* and tenant spaces intended for quick transactions, including takeout, pickup and drop-off, having a public access area less than or equal to 300 square feet (28 m^2).

Reason: Self-service storage facilities are low occupancy. Facilities operating without attendants are often exempted from the restroom requirements by local building code officials for the same reason unattended parking garages are exempted. Codifying this helps maintain continuity in the Code.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

- $20,000 to - $25,000 per restroom not required.

Estimated Immediate Cost Impact Justification (methodology and variables):

A single-unit restroom costs about $20,000 - $25,000.

Restroom privacy and sensible construction - Page 5 of 5 - Construction Specifier (www.constructionspecifier.com/restroom-privacy-and-sensible-construction/5/), accessed 1/26/2024

P26-24

P27-24

IPC: 403.3.3; IBC: [P] 2902.3.3

Proponents: William Koffel, Koffel Associates, Inc., Semiconductor Industry Association (wkoffel@koffel.com)

2024 International Plumbing Code

Revise as follows:

403.3.3 Location of toilet facilities in occupancies other than malls.
In *occupancies* other than covered and open mall buildings, the required *public* and employee toilet facilities shall be located not more than one story above or below the space required to be provided with toilet facilities, and the path of travel to such facilities shall not exceed a distance of 500 feet (152 m).

Exceptions:

1. The location and maximum distances of travel to required employee facilities in manufacturing areas of Group F and H ~~factory and industrial~~ *occupancies* shall be permitted to exceed that required by this section, provided that the location and maximum distances of travel are *approved*.
2. The location and maximum distances of travel to required *public* and employee facilities in Group S *occupancies* shall be permitted to exceed that required by this section, provided that the location and maximum distances of travel are *approved*.

2024 International Building Code

Revise as follows:

[P] 2902.3.3 Location of toilet facilities in occupancies other than malls.
In occupancies other than covered and *open mall buildings*, the required public and employee toilet *facilities* shall be located not more than one *story* above or below the space required to be provided with toilet *facilities*, and the path of travel to such *facilities* shall not exceed a distance of 500 feet (152 m).

Exceptions:

1. The location and maximum distances of travel to required employee *facilities* in manufacturing areas of Group F and H ~~factory and industrial~~ *occupancies* shall be permitted to exceed that required by this section, provided that the location and maximum distances of travel are *approved*.
2. The location and maximum distances of travel to required public and employee *facilities* in Group S *occupancies* shall be permitted to exceed that required by this section, provided that the location and maximum distances of travel are *approved*.

Reason: Factory and industrial type manufacturing areas can also occur in Group H occupancies. The location and travel distance to employee facilities should not be any different from a manufacturing area in a Group F occupancy as compared to a Group H occupancy. The proposal also deletes the legacy language "factory and industrial occupancies" and replaces it with the appropriate IBC language.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 - Fewer employee facilities will be required although the fixture counts will remain the same.

Estimated Immediate Cost Impact Justification (methodology and variables):

Reduced cost associated with constructing additional, separate employee facilities. A portion of the proposal is editorial in nature.

P27-24

P28-24

IPC: 405.3.2; IBC: [P] 2903.1.2

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com)

2024 International Plumbing Code

Revise as follows:

~~405.3.2~~ <u>403.3.7</u> Public lavatories.
~~In~~ <u>Public lavatories for</u> employee and *public* <u>use shall be located in the immediate vicinity of</u> ~~toilet facilities, the required lavatory shall be located in the same room as the required~~ water ~~closet~~ <u>closets and urinals</u>.

2024 International Building Code

Revise as follows:

[P] ~~2903.1.2~~ <u>2903.1.7</u> Public lavatories.
~~In~~ <u>Public lavatories for</u> employee and *public* <u>use shall be located in the immediate vicinity of</u> ~~toilet facilities, the required lavatory shall be located in the same room as the required~~ water ~~closet~~ <u>closets and urinals</u>.

Reason: Section 405.3.2 is misplaced in that fixture requirement locations are found in Section 403. The first proposed modification would be to move this section to the appropriate location in Section 403.

This section is a holdover from when the code required separate men's and ladies' rooms with the assumption that water closets were located in compartments within the same room. This has also resulted in the wording of this section being subject to various interpretations as to what constitutes a room. If a water closet has a separate room that opens into a larger room with a lavatory, is that the same room? Sometimes this is interpreted as being one big room meeting the requirement, other times it is considered two rooms thus mandating a lavatory within the same smaller room as the water closet.

The intent of the section is to mandate the use of a lavatory in the close proximity of the water closet. This may result in exiting a separate room with a water closet and entering an area with a public lavatory. For all gender toilet rooms, it is not uncommon for the lavatory to be located in a general area whereas the water closets are located in separate rooms. This still provides the necessary sanitation.

The current section only addresses "required" water closets. Not all water closets are required, yet for sanitation purposes a lavatory needs to be located in the immediate vicinity. Similarly, the code does not address urinals. A urinal also needs a lavatory to be located in the immediate vicinity of the fixture for sanitation purposes. The revised text deletes "required" and adds urinals as a fixture requiring a lavatory in the immediate vicinity.

The other option would be to delete this section in its entirety since architects, engineers and developers always locate public lavatories in the immediate vicinity of water closets and urinals.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$1,920 to $6,960 for a reduction in floor area of 8 square feet for one lavatory.

Estimated Immediate Cost Impact Justification (methodology and variables):

This change may reduce the cost of construction by lowering the immediate floor area if the section is misinterpreted. If a floor area is reduced by the relocation of a public lavatory to a non-increase area of the building, there would be a savings in floor area of 8 square feet. This would result in a savings in the cost of construction of between $1,920 and $6,960 depending on where the building is constructed in the United States. It should be noted that these values are based on the United States, not the rest of the international world. The justification for these savings is based on a cost of commercial construction ranging from $240 to $870 per square foot. These values were published in an article written by Jennifer Carlson and edited by Kristen Cramer on January 4, 2024. Realize that this savings is per lavatory relocation. If 10 lavatories are required, the cost savings would increase to $19,200 to $69,600. Public lavatories will still be required.

P28-24

P29-24

IPC: 405.3.2; IBC: [P] 2903.1.2

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Self (jbengineer@aol.com)

2024 International Plumbing Code

Delete without substitution:

~~**405.3.2 Public lavatories.**~~
~~In employee and *public* toilet facilities, the required lavatory shall be located in the same room as the required water closet.~~

2024 International Building Code

Delete without substitution:

~~**[P] 2903.1.2 Public lavatories.**~~
~~In employee and public toilet rooms, the required lavatory shall be located in the same room as the required water closet.~~

Reason: This section is misplaced as a subsection of “Setting.” The location of plumbing fixtures is regulated in Section 403, not 405. Furthermore, this is a meaningless section. There is no definition of “room” in the Plumbing Code, nor is there a definition of “room” in the Building Code. Interesting, the Building Code has a definition of Guest Room. Yet within that definition, there is a separate bathroom that is a part of the guest room. Hence, does a lavatory on the open side of a door enclosing a water closet constitute the same room.

This is a code requirement seeking to solve a problem that does not exist. The section should have never been added to the code. With the increased use of all gender toilet rooms, the water closet may be located in a room with a lockable door located within an overall toilet room. If the lavatory is on the other side of the door, is it still within the same room as the water closet?

In checking with Merriam- Webster dictionary, the first definition of room is, “an extent of space occupied by or sufficient or available for something.” Another definition is, “a partitioned part of the inside of a building.” That would seem to imply that a water closet compartment with partitions may be a room.

Section 405.3 adequately addresses the location of plumbing fixture and the proximity of a lavatory to a water closet. There is a definition of toilet facilities. This identifies that the water closet and lavatory are together. Any additional requirements, such as Section 405.3.2, does not belong in the code.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$1,920 to $6,960 for one lavatory.

Estimated Immediate Cost Impact Justification (methodology and variables):

This change has no impact on the cost of construction if lavatories are not relocated. However, if this section is misinterpreted, the deletion may lower the cost of construction. If a floor area is reduced by the relocation of a public lavatory to a non-increase area of the building, there would be a savings in floor area of 8 square feet. This would result in a savings in the cost of construction of between $1,920 and $6,960 depending on where the building is constructed in the United States. It should be noted that these values are based on the United States, not the rest of the international world. The justification for these savings is based on a cost of commercial construction ranging from $240 to $870 per square foot. These values were published in an article written by Jennifer Carlson and edited by Kristen Cramer on January 4, 2024. Realize that this savings is per lavatory relocation. If 10 lavatories are required, the cost savings would increase to $19,200 to $69,600. Public lavatories will still be required.

P30-24

IPC: 405.3.4 (New), 405.3.4, 405.3.5, CHAPTER 15, IAPMO Chapter 15 (New)

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Bradley Corp. (jbengineer@aol.com)

2024 International Plumbing Code

Add new text as follows:

405.3.4 Premanufactured water closet and urinal partitions.. Premanufactured partitions for water closets or urinals shall comply with IAPMO Z124.10.

Revise as follows:

~~405.3.4~~405.3.5 Water closet privacy ~~compartment~~.
Each water closet utilized by the public or employees shall occupy a separate compartment with walls or partitions and a door enclosing the fixtures to ensure privacy. Premanufactured partitions for water closets located in separate gender toilet or bathing rooms shall comply with the Type B privacy requirements of IAPMO Z124.10. Water closets located in all gender toilet rooms shall be enclosed by premanufactured partitions complying with the Type A privacy requirements of IAPMO Z124.10 or the water closet shall be located in separate room with a lockable door.

Exceptions:

1. Water closet compartments shall not be required in a single-occupant toilet room with a lockable door.
2. Toilet facilities located in child day care facilities and containing two or more water closets shall be permitted to have one water closet without an enclosing compartment.
3. This provision is not applicable to toilet areas located within Group I-3 housing areas.

~~405.3.5~~405.3.6 Urinal ~~partitions~~ privacy.
Each urinal utilized by the public or employees shall occupy a separate area with walls or partitions to provide privacy. Premanufactured partitions for urinals located in separate gender toilet or bathing rooms shall comply with the Type C privacy requirements of IAPMO Z124.10. The horizontal dimension between walls ~~or partitions~~ at each urinal shall be not less than 30 inches (762 mm). The walls ~~or partitions~~ shall ~~begin at a height not greater than 12 inches (305 mm) from and~~ extend not less than 60 inches (1524 mm) above the finished floor surface. The walls ~~or partitions~~ shall extend from the wall surface at each side of the urinal not less than 18 inches (457 mm) or to a point not less than 6 inches (152 mm) beyond the outermost front lip of the urinal measured from the finished backwall surface, whichever is greater. Urinals located in all gender toilet rooms shall be enclosed by premanufactured partitions complying with the Type A privacy requirements of IAPMO Z124.10 or the urinals shall be located in a separate room.

Exceptions:

1. Urinal partitions shall not be required in a single occupant or family/assisted-use toilet room with a lockable door.
2. Toilet facilities located in child day care facilities and containing two or more urinals shall be permitted to have one urinal without partitions.

CHAPTER 15 REFERENCED STANDARDS

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

Z124.10-22 Standard for Water Closets and Urinal Partitions

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO Z124.10-22 *Standard for Water Closets and Urinal Partitions*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: IAPMO Z124.10 is a new standard that regulates water closet and urinal partitions. The standard was published in 2022. The standard specified three different privacy ratings. In addition, there are tests for the quality of the partition. The tests include load, coating, surface examination, subsurface, colorfastness, stain resistance, wear and cleanability, chemical resistance, and stress test to name a few.

Type A privacy partitions are intended for all gender toilet rooms and provide the highest level of privacy. The standard states the following privacy requirements, “The bottom edge of the partition including the door shall be located less than or equal to 100 mm (4 in) off the finished floor. The top edge of the partition including the door shall be located greater than or equal to 2.13 m (84 in) above the finished floor. The full height of the door to the partitions on both sides shall prevent any visual observation from the outside of the partition enclosure. Doors shall be lockable from the inside of the partition enclosure. The door locking device shall be readily distinguishable as locked from the outside of the partition enclosure.” Furthermore, the standard requires a visual indication that the compartment is occupied when the partition door lock is activated.

Type B privacy partitions are standard water closet partitions found in separate gender toilet rooms. The standard states the following for privacy, “The bottom edge of the partition including the door shall be located within 406 mm (16 in) of the finished floor. The top edge of the partition including the door shall be located greater than or equal to 1.75 m (69 in) above the finished floor. The door to the partitions shall have a maximum of 13 mm (½ in) gap between the edge of the door and the wall of the partition. Doors shall be lockable from the inside of the partition enclosure.”

Type C privacy partitions are urinal partitions. The standard specifies the following requirements, “The bottom of the urinal partition shall be located a maximum of 406 mm (16 in) above the finished floor. The top of the urinal partition shall be a minimum of 1.5 m (60 in) above the finished floor. The urinal partition shall extend a minimum of 457 mm (18 in) from the wall.”

With the increase in the number of all gender toilet rooms, it is important to have proper privacy requirements to assure both privacy and security. This proposed change will require water closets and urinals in all gender toilet rooms to be enclosed in Type A privacy partitions or be located in a separate room. This will provide the highest level of privacy and security.

Type B privacy partitions are standard water closet partitions found in men’s and ladies’ rooms today. However, the gap between partition sections or between the door and frame have been reduced to ½ inch. Currently, there is no regulation on the gap in partitions nor are there any regulations for the quality of the partitions.

Type C privacy partitions are urinal partitions currently found in men’s rooms. Type C partitions are only intended for separate gender toilet rooms. In all gender toilet rooms, urinals are located similar to water closets to ensure privacy.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.12 to $6.04 per partition, dependent on partition production volume.

Estimated Immediate Cost Impact Justification (methodology and variables):

This change could increase the cost of construction. It should be noted that manufacturers are prohibited by Federal Law to discuss prices. That being stated, one can review the cost of listing a product on-line. Compliance with the standard will add a cost to manufacturers for the testing and listing of partitions. In an attempt to find out the listing costs, one can check the ICC-ES website. The questions of what a cost of a listing is results in the following answer: Fees may vary. Contact us for a Statement of Work and/or an initial estimate. Similarly, IAPMO R&T does not publish fees. One can only request a quote for a listing. A Google search for the cost of a UL listing identified the cost as ranging between $5,000 and $50,000. Intertek advertises an annual listing fee of $6,040 for a single sanitary product, which is what a partition would likely be classified as. Hence, the exact dollar amount for a listing is unknown. That listing cost may or may not be added to the cost of the product. If it is added to the cost of the product, that additional cost will add to the cost of construction. However, manufacturers do not indicate if listing costs increase the cost of the product (construction). Hence, the impact is unknown. If one assumes the Intertek price for a listing and further assumes that the manufacturer sells 50,000 partitions a year, the increase cost of construction per partition could be assumed to be $0.12. If they only sell 1,000 partitions, the increased cost per partition would be $6.04.

P31-24

IPC: 405.4.3

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Plumbing Code

Revise as follows:

405.4.3 Securing wall-hung water closet bowls <u>and urinals</u>.
Wall-hung water closet bowls <u>and urinals</u> shall be supported by a concealed metal carrier that is attached to the building structural members so that strain is not transmitted to the fixture connector or any other part of the plumbing system. The carrier shall conform to ASME A112.6.1M or ASME A112.6.2.

Reason: The ASME A112.6.1 and ASME A112.6.2 standards includes requirements for floor-affixed supports that can be used to secure off the floor water closets and as well as urinals.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarification of which fixtures the standards includes, supports already used for urinals and water closets.

P31-24

P32-24

IPC: 407.1, 419.1, 421.1, 422.1, CSA Chapter 15 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

Revise as follows:

407.1 Approval.
Bathtubs shall conform to ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4, ~~or~~ CSA B45.5/IAPMO Z124,CSA B45.8/IAPMO Z403 or CSA B45.12/IAPMO Z402.

419.1 Approval.
Lavatories shall conform to ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4, ~~or~~ CSA B45.5/IAPMO Z124,CSA B45.8/IAPMO Z403, CSA B45.11/IAPMO Z401 or CSA B45.12/IAPMO Z402. Group wash fixtures shall conform to the requirements of Section 402. For determining the number of lavatories required by Table 403.1, every 20 inches (508 mm) of rim space of a group wash fixture shall be considered as one lavatory.

421.1 Approval.
Prefabricated showers and shower compartments shall conform to ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4, CSA B45.5/IAPMO Z124, CSA B45.8/IAPMO Z403 or CSA B45.12/IAPMO Z402. Shower valves for individual showers shall conform to the requirements of Section 412.3.

422.1 Approval.
Sinks shall conform to ASME A112.19.1/CSA B45.2, ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4, ~~or~~ CSA B45.5/IAPMO Z124 , CSA B45.8/IAPMO Z403, CSA B45.11/IAPMO Z401 or CSA B45.12/IAPMO Z402 .

Add new standard(s) as follows:

CSA

CSA Group
8501 East Pleasant Valley Road
Cleveland, OH 44131-5516

CSA B45.8-18/IAPMO Z403-2018 Terrazzo, concrete, composite stone, and natural stone plumbing fixtures

CSA B45.11:17/IAPMO Z401-2017	Glass plumbing fixtures
CSA B45.12-13/IAPMO Z402-2013 (R2018)	Aluminum and copper plumbing fixtures

Staff Analysis: A review of the standard proposed for inclusion in the code, CSA/IAPMO CSA B45.8-18/IAPMO Z403-2018 *Terrazzo, concrete, composite stone, and natural stone plumbing*, CSA/IAPMO CSA B45.12-13/IAPMO Z402-2013 (R2018) *Aluminum and copper plumbing fixtures* and CSA/IAPMO CSA B45.11:17/IAPMO Z401-2017 *Glass plumbing fixtures* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The code needs to include fixtures that are covered by product standards in order to allow for easy approvals. These types of fixtures are becoming more prevalent in building designs.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The choice of the material type of fixtures is a designer decision.

P32-24

P33-24

IPC: SECTION 202 (New), SECTION 202, 410.4

Proponents: Eirene Knott, BRR Architecture, Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com)

2024 International Plumbing Code

Add new definition as follows:

BOTTLE FILLING STATION. A plumbing fixture that is manually controlled by the user for the purpose of dispensing potable drinking water into water bottles or containers not less than 10 inches (254 mm) in height. Such fixture is connected to both the potable water distribution system and sanitary drainage system of the premises. See also *water dispenser.*

Revise as follows:

WATER DISPENSER. A plumbing fixture that is manually controlled by the user for the purpose of dispensing potable drinking water into a receptacle such as a cup, glass or bottle. Such fixture is connected to the potable water distribution system of the premises. Such fixtures include bottle filling stations.

410.4 Substitution.
Where restaurants provide drinking water in a container free of charge, drinking fountains shall not be required in those restaurants. In other *occupancies* ~~where three or more drinking fountains are required, *water dispensers*~~ bottle filling stations not combined with a drinking fountain shall be permitted to be substituted for not more than 50 percent of the required number of drinking fountains. Bottle filling stations combined with a drinking fountain shall be permitted to be substituted for all drinking fountains.

Reason: When Covid hit the country in 2020, every single drinking fountain in the country was no longer available. Since the IPC has been designed to make sure that the general public has access to free drinking water at all times, this created a problem. What I'm trying to do with this code change is allow the use of a bottle filling station to be used in lieu of a drinking fountain in all occupancy groups. If a bottle filling station is associated with a drinking fountain, then those can be substituted directly for a drinking fountain. If the bottle filling station does not also contain a drinking fountain, then the substitution ratio is fifty percent.

Just during the 2023 year, Michigan, Illinois, Vermont, Maine and Delaware passed legislation to require for bottle filling stations in educational occupancies. Both Maine and Vermont have language that specifically states "sanitary reasons" for the use of the bottle filler. Many states allow for the use of a combination drinking fountain/bottle filling station as an option for the required drinking fountain. In addition, the State of Washington allows for the bottle filling station and/or combination of a drinking fountain/bottle filling station for each drinking fountain required. Their point is to eliminate public waste with all the plastic bottles. Pennsylvania also has legislation encouraging the reduction in the use of plastics by allowing substitution of the bottle filling station for the required drinking fountains.

The State of Massachusetts recently enacted a ban on the purchase of single use plastic bottles for state agencies. The National Park Service began phasing out the sale of single use plastic bottles in 2022.

In September 2023, the United Nations published the "Zero Draft of the Plastics Treaty", which a portion addresses the plastics pollution concern.

Do we want plumbing fixtures to be dictated by state or even national requirements or by the building and/or plumbing code? The IPC needs to be the leader here and allow for the substitution of bottle filling stations for drinking fountains.

I have modified the definition of water dispenser to include a bottle filling station, as a bottle filling station meets these requirements. In addition, I have provided a definition of a bottle filling station to account for the minimum requirements needed to provide for a bottle or similar container. A bottle filling station would comply with the requirements of UL 399 as noted in IPC 410.1.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0 to $1100

Estimated Immediate Cost Impact Justification (methodology and variables):

I opted to reflect the increase as the cost of a bottle filling station may be more than that of a drinking fountain. However, a decrease may actually occur.
There may be minimal cost impact due to the legislative requirements in many states.

Based upon pricing available online, a typical hi-lo drinking fountain runs between $1000 and $2200 depending on the aesthetics of the fountain.

A single bottle filling stating ranges from $590 to $1100 depending on aesthetics and whether or not the filling station also includes a drinking fountain.

A dual hi-lo drinking fountain combined with a bottle filling station can range from $1400 to $1900.

Based on these numbers, no increase may occur. If a dual hi-lo drinking fountain is installed and a bottle filling station is installed in addition to the drinking fountain, then an increase of up to $1100 could occur.

However, if a combination hi-lo drinking fountain combined with a bottle filling station is installed, a decrease may occur depending on the aesthetics of the units provided.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

P33-24

P34-24

IPC: CHAPTER 4, SECTION 410, 410.4

Proponents: Jonathan Flannery, Pandemic Task Force Code Development Working Group, PTF CDWG (jflannery@aha.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

CHAPTER 4 FIXTURES, FAUCETS AND FIXTURE FITTINGS

SECTION 410
DRINKING FOUNTAINS

Revise as follows:

410.4 Substitution.
Where restaurants provide drinking water in a container free of charge, drinking fountains shall not be required in those restaurants. In other *occupancies* where three or more drinking fountains are required, *water dispensers* shall be permitted to be substituted for ~~not more than 50 percent of~~ the required number of drinking fountains provided that at least two drinking fountains are installed in accordance with Section 410.3.

Reason: Ensuring safe access to drinking water is critical for the public health and well-being of building occupants. Traditional drinking fountains have served this purpose; however, limitations on these traditional fixtures were uncovered when many drinking fountains were roped off and abandoned due to fears of disease transmission during the COVID-19 pandemic. The use of water bottles and bottle filling stations largely took the place of traditional drinking fountains during this time and persisted, as a portion of the population no longer trusts drinking fountains as a “safe” water source. Recognizing this shift in water consumption habits, the proposed cost neutral change aims to expand the existing allowance in the IPC Section 410.4 for the substitution of drinking fountains with water dispensers. This proposed change will allow additional flexibility in the interior design while maintaining water access points and a minimum of two drinking fountains for persons without receptacles or who require fountains due to accessibility reasons.

The ICC/NEHA Pandemic Task Force (PTF) was organized and tasked with researching the effects of the COVID-19 pandemic on the built environment and developing a roadmap and proposing needed resources – including guidelines, recommended practices, publications and updates to the International Codes® (I-Codes®) – that are necessary to overcome the numerous challenges that may be faced during future pandemics and to construct and manage safe, sustainable and affordable occupancy of the built environment. The ICC Pandemic Task Force Code Development Work Group (PTF CDWG) has conducted a comprehensive review of current code requirements as they relate to the prevention of the transmission of diseases and other serious health concerns and suggested revisions to current code requirements based on this assessment.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal does not mandate any change from current practices, it only increases the allowance for installing water dispensers in place of drinking fountains.

P34-24

P35-24

IPC: 410.4

Proponents: Joe Wolff, Zurn Elkay Water Solutions, Zurn Elkay Water Solutions (joe.wolff@elkay.com)

2024 International Plumbing Code

Revise as follows:

410.4 Substitution.
Where restaurants provide drinking water in a container free of charge, drinking fountains shall not be required in those restaurants. In other *occupancies* where three or more drinking fountains are required, *water dispensers* shall be permitted to be substituted for ~~not more than 50~~up to 100 percent of the required number of drinking fountains, provided that at least two drinking fountains are installed in accordance with Section 410.3.

Reason: Ensuring safe access to drinking water is crucial for the public health and well-being of building occupants. Traditional drinking fountains have served this purpose; however, limitations of these traditional fixtures were uncovered when many drinking fountains were roped off and abandoned due to fears of disease transmission during the COVID pandemic. The use of water bottles and bottle filling stations largely took the place of traditional drinking fountains during this time and has persisted, as a portion of the population no longer trusts drinking fountains as a “safe” water source. Recognizing this shift in water consumption habits, the proposed cost neutral change aims to expand the existing allowance in IPC Section 410.4 for the substitution of drinking fountains with water dispensers. This proposed change will allow additional flexibility in interior design while maintaining water access points and a minimum of two drinking fountains for persons without receptacles or who require fountains due to accessibility reasons.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal does not mandate any change from current practices, it only increases the allowance for installing water dispensers in place of drinking fountains.

P35-24

P36-24

IPC: 411.2

Proponents: Greg McDaniel, Self (gmcdaniel@townofmorrisville.org)

2024 International Plumbing Code

Revise as follows:

411.2 Waste connection. Chemical waste connections shall ~~not~~ be required for emergency showers and eyewash stations where located inside laboratories or chemical handling areas.

Reason: The purpose of this Code Change to manage how the Chemical Waste is collected when having to utilize an Emergency Shower or Eyewash station in the case of a spill in a Laboratory or a Chemical Handling area.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Acid resistant piping $80.00

Flood Drain $100.00

Install Labor $100.00

Total $280.00 each

Estimated Immediate Cost Impact Justification (methodology and variables):

I used common websites for parts and matrial. The estimates are using the higher end pricepoints. Labor for install will vary with each install.

Estimated Life Cycle Cost Impact:

Once installed there is no additional cost.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Once installed there is no additional cost.

P36-24

P37-24

IPC: 412.3, 412.4, 412.5, 412.10

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Revise as follows:

412.3 Individual shower valves.
Individual shower and tub-shower combination valves shall be balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valves that conform to the requirements of ASSE 1016/ASME A112.1016/CSA B125.16 or ASME A112.18.1/CSA B125.1. Such valves shall be installed at the point of use. Shower control valves shall be rated for the flow rate of the installed shower head. Shower and tub-shower combination valves required by this section shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer's instructions to provide water at a temperature not to exceed 120°F (49°C). In-line thermostatic valves shall not be utilized for compliance with this section. <u>The thermostat on a water heater shall not be used for final temperature control. at fixtures.</u>

412.4 Multiple (gang) showers.
Multiple (gang) showers supplied with a single, *tempered water* supply pipe shall have the water supply for such showers controlled by an *approved* automatic temperature control mixing valve that conforms to ASSE 1069 or CSA B125.3, or each shower head shall be individually controlled by a balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valve that conforms to ASSE 1016/ASME A112.1016/CSA B125.16 or ASME A112.18.1/CSA B125.1 and that is installed at the point of use. Where a shower head is individually controlled, shower control valves shall be rated for the flow rate of the installed shower head. Such valves shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer's instructions to provide water at a temperature not to exceed 120°F (49°C). *Access* shall be provided to an ASSE 1069 or CSA B125.3 valve. <u>The thermostat on the water heater shall not be used for final temperature control at fixtures.</u>

412.5 Bathtub and whirlpool bathtub valves.
Bathtubs and whirlpool bathtub valves shall have or be supplied by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or by a water heater complying with ASSE 1082 or ASSE 1084, except where such valves are combination tub/shower valves in accordance with Section 412.3. The water-temperature-limiting device required by this section shall be equipped with a means to limit the maximum setting of the device to 120°F (49°C), and, where adjustable, shall be field adjusted in accordance with the manufacturer's instructions to provide *hot water* at a temperature not to exceed 120°F (49°C). *Access* shall be provided to water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70. <u>The water heater thermostat shall not be used for final temperature control at fixtures.</u>

~~Exception~~ <u>Exceptions</u>:

<u>1.</u> *Access* shall not be required for nonadjustable water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70 and are integral with a fixture fitting, provided that the fixture fitting itself can be accessed for replacement.

<u>2. The thermostat on an ASSE 1084 water heater can serve as the temperature limiting device in lieu of an ASSE 1070 valve.</u>

412.10 Head shampoo sink faucets.
Head shampoo sink faucets shall be supplied with *hot water* that is limited to not more than 120°F (49°C). Each faucet shall have integral check valves to prevent crossover flow between the hot and cold water supply connections. <u>The water heater thermostat shall not be used for final temperature control at fixtures, except for item # 2 below.</u> The means for regulating the maximum temperature shall be one of the following:

1. A limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70.
2. A water heater conforming to ~~ASSE 1082 or~~ ASSE 1084.
3. A temperature-actuated, flow-reduction device conforming to ASSE 1062.

Reason: The code language prohibiting use of the water heater thermostat for final temperature control at fixtures is code language that has a long history and purpose in the plumbing codes, and it was mistakenly removed in previous code cycles.

The current language in these sections does not expressly prohibit the use of the water heater thermostat for final temperature at fixtures, and this is necessary to emphasize in order to protect against scalding at fixtures.

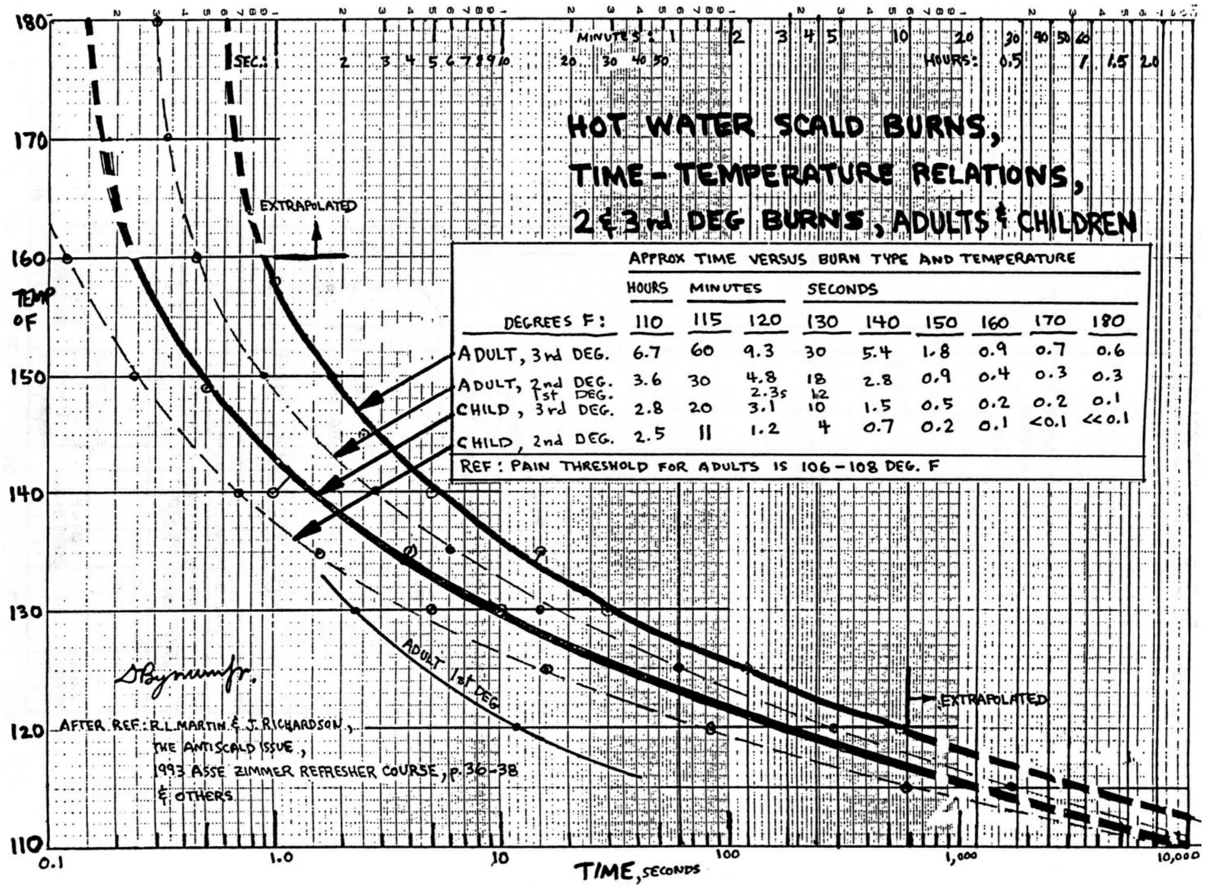
The standard for combination gas controls (thermostats) and the standard for uncirculated, tank-type water heaters (both above 75,000 btu/hr and 75,000 btu/hr or less) do not have tests to address temperature control accuracy for scald protection. It is widely known in the plumbing industry that the combination gas control (thermostat) standard allows a 10-degree variation at the thermostat level, and the water heater standards allow a 20-degree temperature differential from the thermostat level, inserted near the bottom of the tank, to the top of the water heater tank.

It is widely known in the plumbing industry that short, intermittent draws of hot water can cause thermal stacking in an uncirculated tank-type water heater, and that short, intermittent draws of hot water are a normal occurrence when cooking or cleaning. Together, these standards (standard for combination gas controls (thermostats) and the standard for uncirculated, tank-type water heaters) allow for 150F hot water to come out of a water heater when the thermostat is set to 120F. 150F hot water will cause irreversible scald burn injuries in an adult male in a less than one second, and burns can occur much quicker in women and children due to their thinner skin, compared to an adult male.

Simply relying on the thermostat on a water heater to supply hot water to a distribution system allows a variation in hot water temperature of up to 30 degrees F. If a pressure balancing type shower valve is installed, it cannot compensate for significant changes in incoming hot water temperature making it possible to significantly exceed the maximum allowable temperature after shower valve limit stops are adjusted at start-up (before stacking occurs).

A properly installed and adjusted shower or tub-shower valve, as required by these code sections, can also prevent thermal shock, as well as scalding. In addition, no water heater meeting the ASSE water heater temperature limiting control standard can address or control pressure imbalances at the fixture that lead to thermal shock. Therefore, the thermostat on any water heater used for shower and tub-shower applications should never be used for final temperature control at fixtures, as doing so will expose bathers to thermal shock, even when an ASSE water heater is installed.

This language prohibiting water heater thermostats from being the final temperature control for scald protection needs to be reinstated.



APPROX TIME VERSUS BURN TYPE AND TEMPERATURE

	HOURS	MINUTES		SECONDS					
DEGREES F:	110	115	120	130	140	150	160	170	180
ADULT, 3rd DEG.	6.7	60	9.3	30	5.4	1.8	0.9	0.7	0.6
ADULT, 2nd DEG.	3.6	30	4.8	18	2.8	0.9	0.4	0.3	0.3
1st DEG.			2.3s	12					
CHILD, 3rd DEG.	2.8	20	3.1	10	1.5	0.5	0.2	0.2	0.1
CHILD, 2nd DEG.	2.5	11	1.2	4	0.7	0.2	0.1	<0.1	<<0.1

REF: PAIN THRESHOLD FOR ADULTS IS 106 – 108 DEG. F

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is clarifying language making it clear that the thermostat on the water heater cannot be relied on for final temperature control to prevent scalding. This is not adding new installation requirements to the code. This change does not add construction costs. This change will help prevent medical injury costs and reduce liability costs to owners.

P37-24

P38-24

IPC: 412.3, 412.4, 412.5, 412.10

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Revise as follows:

412.3 Individual shower valves.
Individual shower and tub-shower combination valves shall be balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valves that conform to the requirements of ASSE 1016/ASME A112.1016/CSA B125.16 or ASME A112.18.1/CSA B125.1. Such valves shall be installed at the point of use. Shower control valves shall be rated for the flow rate of the installed shower head. ~~Shower and tub-shower combination valves required by this section shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer's instructions to provide water at a temperature not to exceed 120°F (49°C).~~ The integral maximum temperature limit-stop adjustment on these valves shall be field adjusted in accordance with the manufacturer's instructions upon installation, and seasonally adjusted as in-coming cold water temperatures change, and adjusted every time there is a change to the domestic hot water distribution system temperature to limit the maximum temperature flowing from the fixture outlet to no greater than 115F (46.1C). In-line thermostatic valves shall not be utilized for compliance with this section.

412.4 Multiple (gang) showers.
Multiple (gang) showers supplied with a single, *tempered water* supply pipe shall have the water supply for such showers controlled by an *approved* automatic temperature control mixing valve that conforms to ASSE 1069 or CSA B125.3, or each shower head shall be individually controlled by a balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valve that conforms to ASSE 1016/ASME A112.1016/CSA B125.16 or ASME A112.18.1/CSA B125.1 and that is installed at the point of use. Where a shower head is individually controlled, shower control valves shall be rated for the flow rate of the installed shower head. The integral maximum temperature limit-stop adjustment on these valves shall be field adjusted in accordance with the manufacturer's instructions upon installation, and seasonally adjusted as in-coming cold water temperatures change, and adjusted every time there is a change to the domestic hot water distribution system temperature to limit the maximum temperature flowing from the fixture outlet to no greater than 115F (46.1C).~~Such valves shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer's instructions to provide water at a temperature not to exceed 120°F (49°C).~~ *Access* shall be provided to an ASSE 1069 or CSA B125.3 valve.

412.5 Bathtub and whirlpool bathtub valves.
Bathtubs and whirlpool bathtub valves shall have or be supplied by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or by a water heater complying with ASSE 1082 or ASSE 1084, except where such valves are combination tub/shower valves in accordance with Section 412.3. The water-temperature-limiting device required by this section shall be equipped with a means to limit the maximum setting of the device to 115 ~~120~~°F (49°C), and, where adjustable, shall be field adjusted in accordance with the manufacturer's instructions to provide *hot water* at a temperature not to exceed 115 ~~120~~°F (49°C). *Access* shall be provided to water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70.

Exception: *Access* shall not be required for nonadjustable water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70 and are integral with a fixture fitting, provided that the fixture fitting itself can be accessed for replacement.

412.10 Head shampoo sink faucets.
Head shampoo sink faucets shall be supplied with *hot water* that is limited to not more than 115 ~~120~~°F (49°C). Each faucet shall have integral check valves to prevent crossover flow between the hot and cold water supply connections. The means for regulating the maximum temperature shall be one of the following:

1. A limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70.
2. A water heater conforming to ASSE 1082 or ASSE 1084.
3. A temperature-actuated, flow-reduction device conforming to ASSE 1062.

Reason: This code change lowers the maximum allowable shower and bathing temperature from 120 F to 115 F to improve safety.

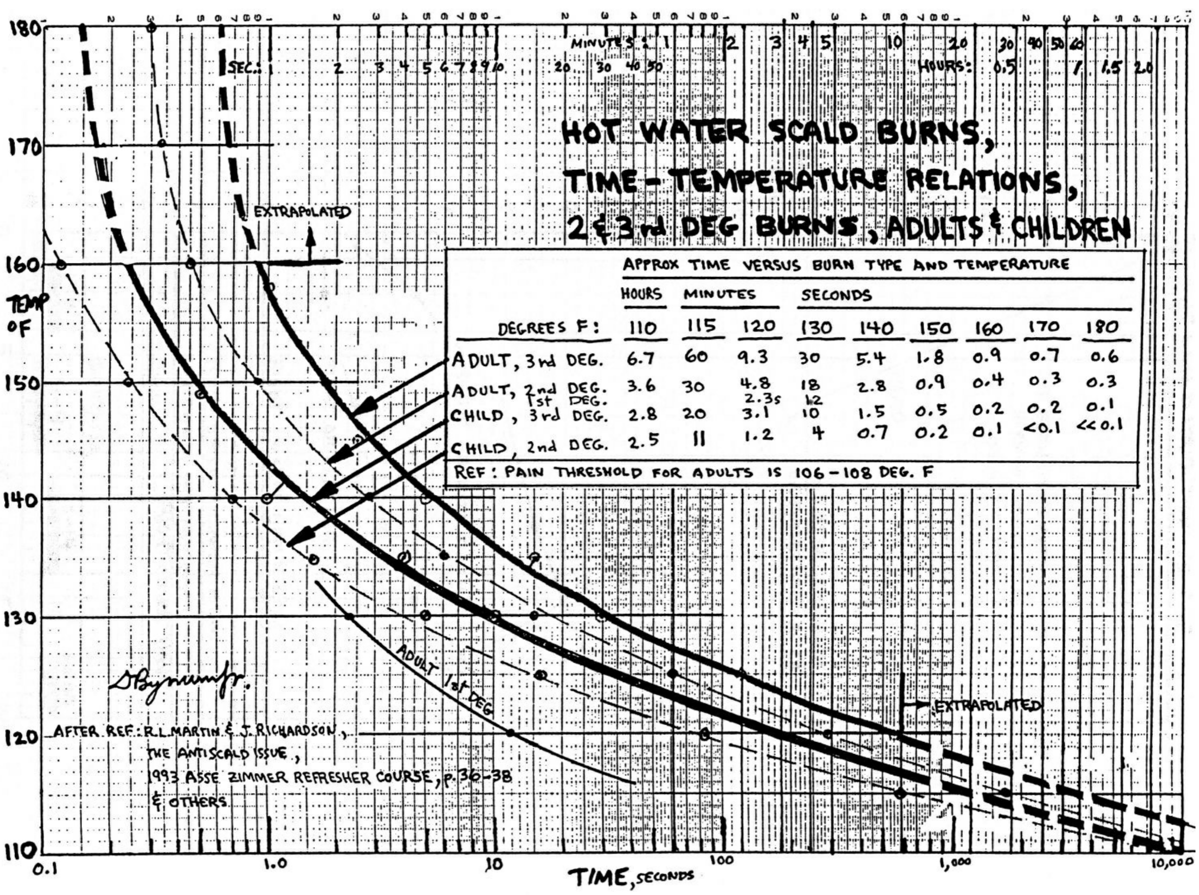
The table below extracted from the Moritz & Henriques Burn Studies shows that at 115 F it significantly increases the amount of time for a bather to get out of harm's way before a serious, irreversible, blistering 2nd degree burn injury occurs.

As you can see, 120 F only gives an adult male 4.8 minutes to get out of harm's way and before a serious burn injury occurs. Women, children & infants have thinner skin and can be burned in a much shorter time (1.2 minutes) when exposed to 120 F. Also a bathtub can be filled with 115 F water with heat loss during filling for a comfortable bath at around 102 - 105 F. Therefore, lowering the maximum allowable shower temperature to 115 will provide an increased level of safety for bathing and showering fixtures. The hot water delivery temperature to the shower valve or tub-shower valve can still be higher to control bacteria in the hot water distribution temperature and the maximum temperature limit stop is adjusted to a lower delivery temperature from the shower head or tub filler faucet.

The Moritz & Henriques burn Studies at Harvard Medical College burn study information is shown below:,

The time temperature exposure to hot water at 120 F vs 115 F water.

Temperature:	Time:	Adult/Child	Degree of Burn:
120 F	4.8 mins	Adult Male	2nd
115 F	30 mins	Adult Male	2nd
120 F	1.2 mins	Child	2nd
115 F	11 mins	Child	2nd



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is simply changing the maximum allowable temperature adjustment, It will not increase the cost of construction, however it will significantly increase health and safety in the showering and bathing settings.

P38-24

P39-24

IPC: 412.4

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Revise as follows:

412.4 Multiple (gang) showers.
Multiple (gang) showers supplied with a single, *tempered water* supply pipe shall have the water supply for such showers controlled by an *approved* automatic temperature control mixing valve that conforms to ASSE 1069 or CSA B125.3, and set to deliver tempered water within 5°F (2.7 C) plus or minus of 105°F (40.5 C), or each shower head shall be individually controlled by a balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valve that conforms to ASSE 1016/ASME A112.1016/CSA B125.16 or ASME A112.18.1/CSA B125.1 and that is installed at the point of use. The integral maximum temperature limit-stop adjustment on these valves shall be field adjusted in accordance with the manufacturer's instructions upon installation, and adjusted seasonally as in-coming cold water temperatures change, and adjusted every time there is a change to the domestic hot water distribution system temperature to limit the maximum temperature flowing from the fixture outlet to no greater than 115F (46.1C). ~~Where a shower head is individually controlled, shower control valves shall be rated for the flow rate of the installed shower head. Such Individually valves shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer's instructions to provide water at a temperature not to exceed 120°F (49°C).~~ *Access* shall be provided to an ASSE 1069 or CSA B125.3 valve.

Reason: Having a maximum temperature limit of 120 F on a gang shower with a single delivery temperature is unsafe.

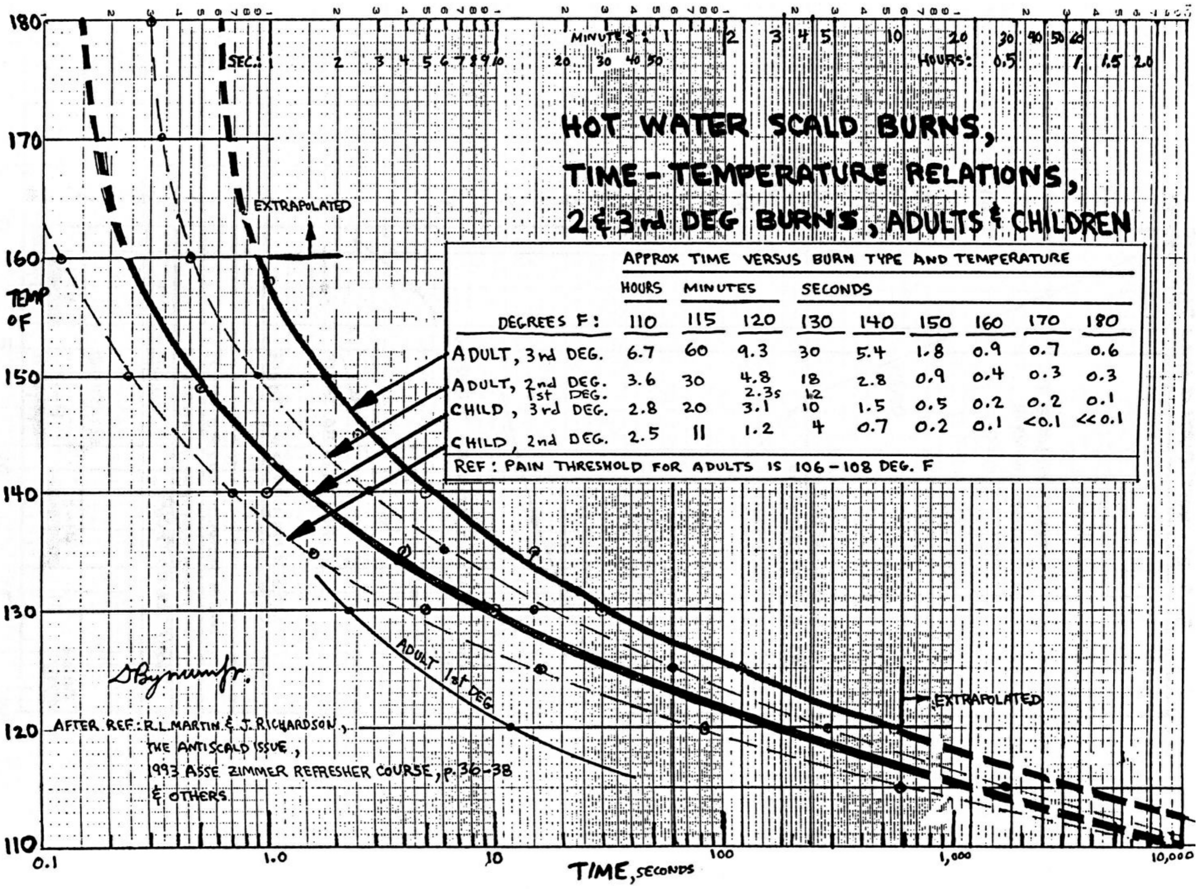
This code change simply gives a temperature setting range within a comfortable bathing temperature. Studies of bathing temperatures have shown showering temperatures generally range between 102 to 109 F. Setting the gang shower mixing valve to 105 F with a tolerance of 5 degrees above or below seems like a good and safe temperature requirement. Temperatures above 115 were painful in the Moritz & Henriques Burn Studies. This code change proposes 105 F plus or minus 5 degrees F. The second part of the code change lowers the maximum allowable shower temperature from 120 F to 115 F. The table below extracted from the Moritz & Henriques Burn Studies shows that at 115 F it significantly increases the amount of time for a bather to get out of harm's way before a serious, irreversible, blistering 2nd degree burn injury occurs.

As you can see, 120 F only gives an adult male 4.8 minutes to get out of harm's way and before a serious burn injury occurs. Women, children & infants have thinner skin and can be burned in a much shorter time (1.2 minutes) when exposed to 120 F. Also a bathtub can be filled with 115 F water with heat loss during filling for a comfortable bath at around 102 - 105 F. Therefore, lowering the maximum allowable shower temperature to 115 will provide an increased level of safety for bathing and showering fixtures.

The Moritz & Henriques burn Studies at Harvard Medical College burn study information is shown below:,

The time temperature exposure to hot water at 120 F vs 115 F water.

Temperature:	Time:	Adult/Child	Degree of Burn:
120 F	4.8 mins	Adult Male	2nd
115 F	30 mins	Adult Male	2nd
120 F	1.2 mins	Child	2nd
115 F	11 mins	Child	2nd



Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change simply edits the maximum temperature set point for shower valves. This code change will save lives and reduce scald injuries. There will be an increase in plumbing system safety and a reduction in medical costs associated with treating scald injuries.

P39-24

P40-24

IPC: 412.5

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com); William Grayzar, DiClemente Siegel Design, Inc., Self (bill@dsdonline.com)

2024 International Plumbing Code

Revise as follows:

412.5 Bathtub and whirlpool bathtub valves.
Bathtubs and whirlpool bathtub valves shall have or be supplied by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or by a water heater complying with ~~ASSE 1082 or~~ ASSE 1084, except where such valves are combination tub/shower valves in accordance with Section 412.3. The water-temperature-limiting device required by this section shall be equipped with a means to limit the maximum setting of the device to 120°F (49°C), and, where adjustable, shall be field adjusted in accordance with the manufacturer's instructions to provide *hot water* at a temperature not to exceed 120°F (49°C). *Access* shall be provided to water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70.

Exception: *Access* shall not be required for nonadjustable water-temperature-limiting devices that conform to ASSE 1070/ASME A112.1070/CSA B125.70 and are integral with a fixture fitting, provided that the fixture fitting itself can be accessed for replacement.

Reason: [SHANKS]:

ASSE 1082 is designed for the following - This standard is for water heaters that control the outlet temperature to specific limits and are installed within a hot water distribution system but not at point-of-use. Being this code section is in regards to point of use the ASSE 1082 is the wrong application.

The correct application is the ASSE 1084 which is designed for the following - Water heaters covered by this standard have a cold-water inlet connection, a means of heating the water, a means of controlling the water temperature, a means of limiting the temperature to a maximum of 120 °F (48.9 °C), and have an outlet connection to connect to downstream fixture fittings. This water heater in regards to a ASSE 1082 is intended to supply tempered water at point of use in order to reduce and control the risks of scalding. This water heater as an ASSE 1082 is not intended to limit thermal shock. This water heater is not a substitute for an automatic compensative valve complying with ASSE 1016 / ASME A112.1016 / CSA B125.16.

Leaving the ASSE 1082 in this section of the code for this useage will go against other current code sections within the IPC such as 408.3 (Bidets) and 419.5 (Public Hand Washing Lavatories). Which causes not only a health and safety concern to the end user but confusion in the Plumbing Industry.

[GRAYZAR]:

ASSE Standard 1082 added in the 2021 code cycle is not suitable for a point-of-use applications. ASSE 1082 Standard does not include scald protection and is intended for steady state flow conditions.

The proposed revision is intended to remove ASSE Standard 1082 only from point-of use applications, while allowing it to remain in Chapter 6 of the code for distribution systems.

The ASSE Standard 1082 is similar to the ASSE Standard 1017 and is intended for controlling the water outlet temperature in a water distribution system and not intended for end use applications without the use of a point-of-use control valve as specified by ASSE 1016/ASME A112.1016/CSA B125.16, ASSE 1069, ASSE 1070/ ASME A112.1070/CSA B125.70, or other appropriate standard.

ASSE Standard 1082 does not include scald protection and is intended for various steady state flow conditions and has an outlet temperature range between 105ºF and 125ºF. The outlet temperature can vary as much as +/- 3ºF for flows less than 5 GPM, +/- 5ºF for flows between 5 GPM and 50 GPM, and as much a +/- 7ºF for flows above 50 GPM.

ASSE Standard 1084 added in the 2024 code cycle is the correct standard in addition to ASSE 1070/ASME A112.1070/BSA B125.70 for this application. An ASSE 1084 compliant device is intended to perform like a water heater with a ASSE 1070/ASME A112.1070/CSA B125.70 compliant water- temperature-limiting device.

ASSE Standard 1084 is intended for varying flow conditions, it is intended to include a level of scald protection consistent with ASSE 1070/ASME A112.1070/CSA B125.70, and it has an outlet temperature range between 100ºF and 110ºF with a maximum temperature of 110ºF for non-adjustable application and 120ºF for an adjustable application.

ASSE Standards 1082 and 1084 do not limit thermal shock and are not substitutes for automatic compensative valves complying with ASSE 1016/ASME A112.1016/CSA B125.16 Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations.

Bibliography: [GRAYZAR]: ASSE Standard 1082-2018 - Performance Requirements for Water Heaters with Integral Temperature Control Devices For Hot Water Distribution Systems

ASSE Standard 1084-2018 - Performance Requirements for Water Heaters with Temperature Limiting Capacity

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

[SHANKS]: This proposed change will bring the current requirements for protection against hot water temperatures in the IPC 2024 Code in line with already existing Code Sections for the protection of health and safety of the public. The costs are already included in the construction of a Hot Water System currently in the Code.

[GRAYZAR] : The proposal has no cost impact it is editorial and removes the misapplied ASSE 1082 Standard, which applies hot water distribution systems, from being allowed in a point of use application.

P40-24

P41-24

IPC: 412.10

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com); William Grayzar, DiClemente Siegel Design, Inc., Self (bill@dsdonline.com)

2024 International Plumbing Code

Revise as follows:

412.10 Head shampoo sink faucets.
Head shampoo sink faucets shall be supplied with *hot water* that is limited to not more than 120°F (49°C). Each faucet shall have integral check valves to prevent crossover flow between the hot and cold water supply connections. The means for regulating the maximum temperature shall be one of the following:

1. A limiting device conforming to ASSE 1070/ASME A112.1070/CSA B125.70.
2. A water heater conforming to ~~ASSE 1082 or~~ ASSE 1084.
3. A temperature-actuated, flow-reduction device conforming to ASSE 1062.

Reason: [SHANKS]:

ASSE 1082 is designed for the following - This standard is for water heaters that control the outlet temperature to specific limits and are installed within a hot water distribution system but not at point-of-use. Being this code section is in regards to point of use the ASSE 1082 is the wrong application.

The correct application is the ASSE 1084 which is designed for the following - Water heaters covered by this standard have a cold-water inlet connection, a means of heating the water, a means of controlling the water temperature, a means of limiting the temperature to a maximum of 120 °F (48.9 °C), and have an outlet connection to connect to downstream fixture fittings. This water heater in regards to a ASSE 1082 is intended to supply tempered water at point of use in order to reduce and control the risks of scalding. This water heater as an ASSE 1082 is not intended to limit thermal shock. This water heater is not a substitute for an automatic compensative valve complying with ASSE 1016 / ASME A112.1016 / CSA B125.16.

Leaving the ASSE 1082 in this section of the code for this useage will go against other current code sections within the IPC such as 408.3 (Bidets) and 419.5 (Public Hand Washing Lavatories). Which causes not only a health and safety concern to the end user but confusion in the Plumbing Industry.

[GRAYZAR]:

ASSE Standard 1082 added in the 2021 code cycle is not suitable for a point-of-use application. ASSE 1082 Standard does not include scald protection and is intended for steady state flow conditions.

The proposed revision is intended to remove ASSE Standard 1082 only from point-of use applications, while allowing it to remain in Chapter 6 of the code for distribution systems.

The ASSE Standard 1082 is similar to the ASSE Standard 1017 and is intended for controlling the water outlet temperature in a water distribution system and not intended for end use applications without the use of a point-of-use control valve as specified by ASSE 1016/ASME A112.1016/CSA B125.16, ASSE 1069, ASSE 1070/ ASME A112.1070/CSA B125.70, or other appropriate standard.

ASSE Standard 1082 does not include scald protection and is intended for various steady state flow conditions and has an outlet temperature range between 105°F and 125°F. The outlet temperature can vary as much as +/- 3°F for flows less than 5 GPM, +/- 5°F for flows between 5 GPM and 50 GPM, and as much a +/- 7°F for flows above 50 GPM.

ASSE Standard 1084 added in the 2024 code cycle is the correct standard in addition to ASSE 1070/ASME A112.1070/BSA B125.70 for this application. An ASSE 1084 compliant device is intended to perform like a water heater with a ASSE 1070/ASME A112.1070/CSA B125.70 compliant water- temperature-limiting device.

ASSE Standard 1084 is intended for varying flow conditions, it is intended to include a level of scald protection consistent with ASSE 1070/ASME A112.1070/CSA B125.70, and it has an outlet temperature range between 100ºF and 110ºF with a maximum temperature of 110ºF for non-adjustable application and 120ºF for an adjustable application.

ASSE Standards 1082 and 1084 do not limit thermal shock and are not substitutes for automatic compensative valves complying with ASSE 1016/ASME A112.1016/CSA B125.16 Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations.

Bibliography: [GRAYZAR]: ASSE Standard 1082-2018 - Performance Requirements For Water Heaters With Integral Temperature Control Devices For Hot Water Distribution Systems.

ASSE Standard 1084-2018 - Performance Requirements For Water Heaters With Temperature Limiting Capacity

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

[SHANKS]: This proposed change will bring the current requirements for protection against hot water temperatures in the IPC 2024 Code in line with already existing Code Sections for the protection of health and safety of the public. The costs are already included in the construction of a Hot Water System currently in the Code.

[GRAYZAR]:

The proposal has no cost impact it is editorial and removes the misapplied ASSE 1082 Standard, which applies hot water distribution systems, from being allowed in a point of use application.

P41-24

P42-24 Part I

IPC: 413.1, ASME Chapter 15 (New)

Proponents: THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

413.1 Approval.
Floor drains shall conform to ASME A112.3.1~~,~~ or ASME A112.6.3 ~~or CSA B79~~. Trench drains shall comply with ASME ~~A112.6.3~~ A112.6.8/CSA B79.8.

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

A112.6.8/CSA B79.8–2022	Trench Drains

Staff Analysis: A review of the standard proposed for inclusion in the code, SME A112.6.8/CSA B79.8-2022 T*rench Drains*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P42-24 Part I

P42-24 Part II

IRC: TABLE P2701.1, P2719.1, ASME Chapter 44 (New)

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Residential Code

Revise as follows:

TABLE P2701.1 PLUMBING FIXTURES, FAUCETS AND FIXTURE FITTINGS

Portions of table not shown remain unchanged.

MATERIAL	STANDARD
Air gap fittings for use with plumbing fixtures, appliances and appurtenances	ASME A112.1.3
Bathtub/whirlpool pressure-sealed doors	ASME A112.19.15
Diverters for faucets with hose spray, anti-syphon type, residential application	ASME A112.18.1/CSA B125.1
Enameled cast-iron plumbing fixtures	ASME A112.19.1/CSA B45.2
Floor drains	ASME A112.6.3
Framing-affixed supports for off-the-floor water closets with concealed tanks	ASME A112.6.2
Hose connection vacuum breaker	ASSE 1052
Hot water dispensers, household storage type, electrical	ASSE 1023
Household disposers	ASSE 1008
Hydraulic performance for water closets and urinals	ASME A112.19.2/CSA B45.1
Individual automatic compensating valves for individual fixture fittings	ASME A112.18.1/CSA B125.1
Individual shower control valves anti-scald	ASSE 1016/ASME A112.1016/CSA B125.16
Macerating toilet systems and related components	ASME A112.3.4/CSA B45.9
Nonvitreous ceramic plumbing fixtures	ASME A112.19.2/CSA B45.1
Plastic bathtub units	CSA B45.5/IAPMO Z124; ASME A112.19.2/CSA B45.1
Plastic lavatories	CSA B45.5/IAPMO Z124
Plastic shower receptors and shower stalls	CSA B45.5/IAPMO Z124
Plastic sinks	CSA B45.5/IAPMO Z124
Plastic water closet bowls and tanks	CSA B45.5/IAPMO Z124
Plumbing fixture fittings	ASME A112.18.1/CSA B125.1
Plumbing fixture waste fittings	ASME A112.18.2/CSA B125.2; ASTM F409
Porcelain-enameled formed steel plumbing fixtures	ASME A112.19.1/CSA B45.2
Pressurized flushing devices for plumbing fixtures	ASSE 1016/ASME 112.1016/CSA B125.16; CSA B125.3
Specification for copper sheet and strip for building construction	ASTM B370
Stainless steel plumbing fixtures	ASME A112.19.3/CSA B45.4
Suction fittings for use in whirlpool bathtub appliances	ASME A112.19.7/CSA B45.10
Temperature-actuated, flow reduction valves to individual fixture fittings	ASSE 1062
Thermoplastic accessible and replaceable plastic tube and tubular fittings	ASTM F409
Trench drains	~~ASME A112.6.3~~ <u>ASME A112.6.8/CSA B79.8</u>
Trim for water closet bowls, tanks and urinals	ASME A112.19.5/CSA B45.15
Vacuum breaker wall hydrant-frost-resistant, automatic-draining type	ASSE 1019
Vitreous china plumbing fixtures	ASME A112.19.2/CSA B45.1
Wall-mounted and pedestal-mounted, adjustable and pivoting lavatory and sink carrier systems	ASME A112.19.12
Water closet flush tank fill valves	ASSE 1002/ASME A112.1002/CSA B125.12; CSA B125.3
Whirlpool bathtub appliances	ASME A112.19.7/CSA B45.10

P2719.1 Floor <u>and trench</u> drains.

<u>*Floor drains* shall comply to ASME A112.6.3. Trench drains shall comply to ASME A112.6.8/CSA B79.8</u>. *Floor drains* shall have waste outlets not less than 2 inches (51 mm) in diameter and a removable strainer. *Floor drains* shall be constructed so that the drain can be cleaned. Access shall be provided to the drain inlet. *Floor drains* shall not be located under or have their access restricted by permanently installed appliances.

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

<u>A112.6.8/CSA B79.8–2022</u> <u>Trench Drains</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, SME A112.6.8/CSA B79.8-2022 T*rench Drains*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The ASME A112.6.3 was harmonized with CSA B79 such that the CSA B79 designation is not used. The updated standard designation will be proposed in Group B Administrative standard updates. Trench drains are now covered under ASME A112.6.8/CSA B79.3.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarification as to which standard is applicable to which product. Drains were already using the ASME standards for certification.

P42-24 Part II

P43-24

IPC: 414.1, ASME Chapter 15, ASME Chapter 15 (New)

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Plumbing Code

Revise as follows:

414.1 Approval.
Sanitary floor sinks shall conform to the requirements of ASME A112.6.7/CSA B79.7.

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

~~A112.6.7—2010 (R2024)~~ ~~Sanitary Floor Sinks~~

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

A112.6.7/CSA B79.7-2022 Sanitary Floor Sinks

Staff Analysis: A review of the standard proposed for inclusion in the code, ASME A112.6.7/CSA B79.7-2022 *Sanitary Floor Sinks*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The ASME A112.6.7 was harmonized with CSA B79. The intent of this proposal is to replace the current standard with the new standard.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Products were already required to comply with ASME standard, this to clarify the ASME was harmonized with the CSA B79 standard.

P43-24

P44-24

IPC: 419.5

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

419.5 Tempered water for public hand-washing facilities.
~~*Tempered water* shall be delivered from lavatories and group wash fixtures located in *public* toilet facilities provided for customers, patrons and visitors.~~ Tempered water shall be delivered from lavatories and group wash fixtures located in public toilet facilities provided for any occupancy with primary users being children, such as elementary schools, Sunday bible schools, and child daycare facilities or for any occupancy serving primarily elderly or other vulnerable occupants, and for any lavatories and group wash fixtures located in public use toilet facilities that are provided with a single delivered temperature faucet. *Tempered water* shall be delivered through an *approved* water-temperature limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70.

Reason: Tempered water for public handwashing fixtures was the result of an overreach associated to trying to protect the users of bathtubs and showers from sudden changes in temperature. The protection for users of bathtubs and showers makes sense because the user is "captive" to the fixture when they use it. The same cannot be said for handwashing fixtures. This requirement was a massive overreach because the same risk level just isn't there. If a user of a handwashing fixture senses water is too hot or too cold, they can simply remove their hands from the stream of water. This proposal will still require protection for public facility users that would be most at risk, such as children and senior citizens in assisted care facilities.

Bibliography: See reason statement.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Between $200-$500 for each unit that would no longer be required to be installed.

Estimated Immediate Cost Impact Justification (methodology and variables):

$100-$200 per unit and between $100-$300 for labor depending on the local labor costs.

P44-24

P45-24

IPC: 421.4

Proponents: Guy McMann, Jefferson County Colorado, CAPMO (gmcmann@jeffco.us)

2024 International Plumbing Code

Revise as follows:

421.4 Shower compartments. Shower compartments shall be not less than 900 square inches (0.58 m^2) in interior cross-sectional area. Shower compartments shall be not less than 30 inches (762 mm) in least dimension as measured from the finished interior dimension of the compartment, exclusive of fixture valves, showerheads, soap dishes and safety grab bars or rails. Except as required in Section 404, the minimum required area and dimension shall be measured from the finished interior dimension at a height equal to the top of the threshold and at a point tangent to its centerline and shall be continued to a height not less than 70 inches (1778 mm) above the shower drain outlet. <u>Where curbs are installed, the curb shall be not less than 2 inches (51 mm) and not more than 9 inches (229 mm) deep when measured from the top of the curb to the top of the drain.</u>

> **Exception:** Shower compartments having not less than 25 inches (635 mm) in minimum dimension measured from the finished interior dimension of the compartment, provided that the shower compartment has not less than 1,300 square inches (0.838 m^2) of cross-sectional area.

Reason: This added text will align with what's in the IRC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This a clarification because most showers have curbs yet there isn't anything in the code about the height of the curb. Establishing a minimum height of a curb doesn't change the cost of a curb installation because the cost of choosing to install the curb is already considered.

P45-24

P46-24

IPC: 423.3

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com); William Grayzar, DiClemente Siegel Design, Inc., Self (bill@dsdonline.com)

2024 International Plumbing Code

Revise as follows:

423.3 Footbaths and pedicure baths.
The water supplied to specialty plumbing fixtures, such as pedicure chairs having an integral foot bathtub and footbaths, shall be limited to not greater than 120ºF (49ºC) by a water-temperature-limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70 or by a water heater complying with ~~ASSE 1082 or~~ 1084.

Reason: [SHANKS]: ASSE 1082 is designed for the following - This standard is for water heaters that control the outlet temperature to specific limits and are installed within a hot water distribution system but not at point-of-use. Being this code section is in regards to point of use the ASSE 1082 is the wrong application.

The correct application is the ASSE 1084 which is designed for the following - Water heaters covered by this standard have a cold-water inlet connection, a means of heating the water, a means of controlling the water temperature, a means of limiting the temperature to a maximum of 120 °F (48.9 °C), and have an outlet connection to connect to downstream fixture fittings. This water heater in regards to a ASSE 1082 is intended to supply tempered water at point of use in order to reduce and control the risks of scalding. This water heater as an ASSE 1082 is not intended to limit thermal shock. This water heater is not a substitute for an automatic compensative valve complying with ASSE 1016 / ASME A112.1016 / CSA B125.16.

Leaving the ASSE 1082 in this section of the code for this useage will go against other current code sections within the IPC such as 408.3 (Bidets) and 419.5 (Public Hand Washing Lavatories). Which causes not only a health and safety concern to the end user but confusion in the Plumbing Industry.

[GRAYZAR]:

ASSE Standard 1082 added in the 2021 code cycle is not suitable for a point-of-use application. ASSE 1082 Standard does not include scald protection and is intended for steady state flow conditions.

The proposed revision is intended to remove ASSE Standard 1082 only from point-of use applications, while allowing it to remain in Chapter 6 of the code for distribution systems.

The ASSE Standard 1082 is similar to the ASSE Standard 1017 and is intended for controlling the water outlet temperature in a water distribution system and not intended for end use applications without the use of a point-of-use control valve as specified by ASSE 1016/ASME A112.1016/CSA B125.16, ASSE 1069, ASSE 1070/ ASME A112.1070/CSA B125.70, or other appropriate standard.

ASSE Standard 1082 does not include scald protection and is intended for various steady state flow conditions and has an outlet temperature range between 105ºF and 125ºF. The outlet temperature can vary as much as +/- 3ºF for flows less than 5 GPM, +/- 5ºF for flows between 5 GPM and 50 GPM, and as much a +/- 7ºF for flows above 50 GPM.

ASSE Standard 1084 added in the 2024 code cycle is the correct standard in addition to ASSE 1070/ASME A112.1070/BSA B125.70 for this application. An ASSE 1084 compliant device is intended to perform like a water heater with a ASSE 1070/ASME A112.1070/CSA B125.70 compliant water- temperature-limiting device.

ASSE Standard 1084 is intended for varying flow conditions, it is intended to include a level of scald protection consistent with ASSE 1070/ASME A112.1070/CSA B125.70, and it has an outlet temperature range between 100ºF and 110ºF with a maximum temperature of 110ºF for non-adjustable application and 120ºF for an adjustable application.

ASSE Standards 1082 and 1084 do not limit thermal shock and are not substitutes for automatic compensative valves complying with ASSE 1016/ASME A112.1016/CSA B125.16 Performance Requirements for Automatic Compensating Valves for Individual Showers and Tub/Shower Combinations.

Bibliography: [GRAYZAR]: ASSE Standard 1082-2018 - Performance Requirements for Water Heaters with Integral Temperature Control Devices For Hot Water Distribution Systems.

ASSE Standard 1084-2018 - Performance Requirements for Water Heaters with Temperature Limiting Capacity

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

[SHANKS]: This proposed change will bring the current requirements for protection against hot water temperatures in the IPC 2024 Code in line with already existing Code Sections for the protection of health and safety of the public. The costs are already included in the construction of a Hot Water System currently in the Code.

[GRAYZAR]: The proposal has no cost impact it is editorial and removes the misapplied ASSE 1082 Standard, which applies hot water distribution systems, from being allowed in a point of use application.

P46-24

P47-24 Part I

IPC: 425.1.3

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

425.1.3 Dual flush water closets.
Water closets equipped with a dual flushing device shall comply with ~~ASME A112.19.14~~ ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4 or CSA B45.5/IAPMO Z124.

Staff Analysis: The proposed standards are currently referenced in the Code.

P47-24 Part I

P47-24 Part II

IRC: P2712.1

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Residential Code

Revise as follows:

P2712.1 Approval.
Water closets shall conform to the water consumption requirements of Section P2903.2 and shall conform to ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4 or CSA B45.5/IAPMO Z124. Water closets shall conform to the hydraulic performance requirements of ASME A112.19.2/CSA B45.1. Water closet tanks shall conform to ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4 or CSA B45.5/IAPMO Z124. Water closets that have an invisible seal and unventilated space or walls that are not thoroughly washed at each discharge shall be prohibited. Water closets that allow backflow of the contents of the bowl into the flush tank shall be prohibited. Water closets equipped with a dual flushing device shall comply with ~~ASME A112.19.14~~ ASME A112.19.2/CSA B45.1, ASME A112.19.3/CSA B45.4 or CSA B45.5/IAPMO Z124.

Staff Note: The proposed standards are currently referenced in the Code.

Reason: ASME A112.19.14 has been discontinued. The requirements from ASME A112.19.14 for dual flush are now covered under ASME A112.19.2/CSA B45.1 for ceramic fixtures, ASME A112.19.3/CSA B45.4 for stainless steel fixtures or CSA B45.5/IAPMO Z124 for plastic fixtures.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The requirements remained the same so no new testing is needed for toilets to be certified, this change just clarification as to what standard is applicable.

P47-24 Part II

P48-24

IPC: 425.3 (New), IAPMO Chapter 15 (New)

Proponents: Terry Burger, IAPMO Group, IAPMO Group (terry.burger@asse-plumbing.org)

2024 International Plumbing Code

Add new text as follows:

425.3 Water closet seats. Water closets shall be equipped with seats of smooth, nonabsorbent material. Seats of water closets provided for *public* or employee toilet facilities shall be of the hinged open-front type. Integral water closet seats shall be of the same material as the fixture. Water closet seats shall be sized for the water closet bowl type. Plastic water closet seats shall conform to IAPMO Z124.5

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

Z124.5 - 2013E1(R2018)	Plastic toilet seats

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO Z124.5-2023e1(R2018) *Plastic Toilet Seats* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The water closet seat standard provides the performance and material requirements which provides a means to demonstrate performance and material requirements in addition to compliance to this section of the codes

Bibliography: IAPMO Z124.5 - 2013E1(R2018) Plastic toilet seats

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Product exist in the market place already compliant to the reference standard. This change has no cost impact.

P48-24

P49-24

IPC: SECTION 202 (New), SECTION 427 (New), 427.1 (New), 427.2 (New), 427.3 (New), IAPMO Chapter 15 (New)

Proponents: Misty Guard, Regulosity LLC, MAG Industries LLC (misty.guard@regulosity.com)

2024 International Plumbing Code

Add new definition as follows:

ASSISTIVE TABLE.
A product produced, generally available, or used by or for persons with a physical, or cognitive disability intended to facilitate and support personal care or hygiene with a changing surface to support a user in a reclined or lying position. Assistive Tables can be fixed or adjustable height and have integrated plumbing fittings and fixtures.

Add new text as follows:

SECTION 427
ASSISTIVE TABLES

427.1 Approval. Assistive tables shall conform to IAPMO Z1390. Assistive tables with an integrated water closet shall conform with Section 425. Assistive tables with an integrated bidet shall conform to Section 408. Assistive tables with an integrated faucet or fixture fitting shall conform to Section 412. Assistive tables with an integrated flushing device for a water closet shall conform to Section 415. Assistive tables with an integrated lavatory shall conform to Section 419. Assistive tables with an integrated sink shall conform to Section 422.

427.2 Waste outlet connection. Assistive tables with an integrated water closet shall have a waste outlet that connects to a 4 x 4 or 4 x 3 water closet flange. A 4-inch by 3-inch (102 mm by 76 mm) closet bend shall be acceptable.

427.3 Installation. Assistive tables shall be installed in accordance with Section 405.

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

Z1390-xx Assistive Tables

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO Z1390-xx *Assistive Tables*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Assistive tables are plumbing products that facilitate and support the personal hygiene of individuals who are physically challenged, disabled, or elderly. While the assistive table is not a new product, the products are required in new commercial buildings and substantial renovations of existing bathrooms in Arkansas, Arizona, California, New Hampshire, and Pennsylvania. Massachusetts, Michigan, Minnesota, and Wisconsin have pending legislation for these products. A technical subcommittee of manufacturers, consultants, installers, and disability experts wrote the product performance and safety standard, IAPMO Z1390 Assistive Tables. IAPMO Z1390 covers 1) product design requirements for user weight, maximum loads, heights, operation, locking safety mechanisms, mechanical wear, cleaning and disinfection, changing surface, grab rails, safety restraint systems, electrical, support structure, integrated plumbing fittings, integrated plumbing fixtures, 2) performance requirements for height, vertical movement, locking mechanisms, changing surface tests, grab bars, support structures, waste fitting connections, and body part entrapment, 3) marking and signage requirements, and 4) installation documentation.

Bibliography: IAPMO Z1390: Assistive Table

Cost Impact: Increase

Estimated Immediate Cost Impact:

This requirement will increase the cost of these products by requiring the product manufacturer to obtain testing through a testing laboratory and third-party certification. Laboratory testing and third-party certification fees for products typically range between $3,000 to $20,000. The increase in cost is offset by the benefits to public health and safety of products that conform to product safety and performance standards resulting in a reduction of harm to users.

Estimated Immediate Cost Impact Justification (methodology and variables):

This requirement will increase the cost of these products by requiring the product manufacturer to obtain testing through a testing laboratory and third-party certification. The increase in cost is offset by the benefits to public health and safety of products that conform to product safety and performance standards resulting in a reduction of harm to users.

P49-24

P50-24

IPC: CHAPTER 5, SECTION 501, 501.10 (New)

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

CHAPTER 5 WATER HEATERS

SECTION 501
GENERAL

Add new text as follows:

501.10 Minimum Storage Temperature in Storage Type Water Heaters. Storage type water heaters shall have a minimum water temperature of 140 F to control the growth of Legionella bacteria and other pathogens in the storage tank.

Reason: ASHRAE 188 and ASHRAE Guideline 12 dealing with control of Legionella in Building water systems recommends a minimum hot water storage temperature to kill bacteria. This code change is intended to bring the code in line with industry standards on Legionella. **Effects of Temperature on Legionella Bacteria**

Temperature[1]	Result
Below 68F (20C)	Legionella survives, but will not grow/multiply
68 F (20C)	Legionella will double its population in 8 days
77 F (25C)	Legionella will double its population in 3 days
68 to 122 F (20-50C)	Legionella bacteria growth temperature range[3]
95 to 115 F (35-46C)	Ideal Legionella bacteria growth temperature range
Abv 122F & Bel. 131 F	Legionella bacteria survives, will not grow/multiply[2,3]
131 F (55C)	Legionella bacteria dies in 5 to 6 hours[2]
140 F (60C)	Legionella bacteria dies in 32 minutes[2]
151 F (66C)	Legionella bacteria dies in 2 minutes[2]
158 F + (70C+)	Legionella bacteria dies instantly (Disinfection temp.)[2]

Notes:

1. These temperatures are based on laboratory tests. Field conditions may vary due to differences in water quality, insulating properties of host amoeba, biofilm,

   scale and sediment.

2. Verify that the water heater is capable of heating to non-growth or disinfection temperatures.

3. The coolest point in the hot water system (Hot water return pipe) should be a couple of degrees above the highest growth temperature as a safety factor.

   (122F + 2F = 124F, many temperature gauges have a + or – 2F accuracy Locate a temperature gauge just before HW Return connects to Water Heater/Mixing

   Valve return tee.)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Raising the hot water storage temperature does not affect costs of construction as this is something that is done after construction. This proposal improves health & Safety.

P50-24

P51-24

IPC: 501.8, 501.8.1 (New), 501.8.2 (New)

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

501.8 Temperature controls.
Hot water supply systems shall be equipped with automatic temperature controls capable of adjustments from the lowest to the highest acceptable temperature settings for the intended temperature operating range.

Add new text as follows:

501.8.1 Water Heater Outlet Temperature Controls. All water heaters in hospitals, medical facilities, nursing homes, senior housing facilities, hotels and motels shall have a temperature actuated mixing valve conforming to ASSE 1017, set to maintain the hot water temperature 2 degrees above the Legionella bacteria growth temperature of 122 F at all points in the storage and distribution system.

501.8.2 Water Heater Minimum Storage Temperature.
Storage type water heaters in hospitals, medical facilities, nursing homes, senior housing facilities, hotels and motels shall have a minimum water storage temperature of 140 F to control the growth of Legionella bacteria and other pathogens in the storage tank.

Staff Analysis: The proposed standard is in the current edition of the code.

Reason: This code change is intended to add a minimum storage temperature and temperature controls for for buildings with susceptible populations for Legionnaires disease. This code change will increase the cost of construction, but it will significantly increase the safety of building occupants in these facilities.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$100 to $4,950

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of mixing valves depends on the size of the valve Mixing valves can cost anywhere between $100 to $4,950.0

The cost of a Legionella outbreak can be millions of dollars.

Estimated Life Cycle Cost Impact:

Not installing a mixing valve can leave a system susceptible to Legionella bacteria growth and one outbreak can bankrupt a company.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

To purchase a 1-1/2 inch Temperature actuated mixing valve ranges from $1,080 to $1,500

A Legionella Outbreak has cost some companies tens of millions of dollar

The idea of an outbreak of Legionnaires' Disease sends property managers and owners everywhere scurrying for cover. and News reporters and camera operators knocking on your door for a statement for the evening news.

Legionnaires disease spread through contaminated aerosolized water droplets, that when inhaled into the lungs, the bacteria flourishes in the warm, moist lining of he lungs where it multiplyas and eventually can cause pneumonia and many other complications.

According to The **Center for Disease Control and Prevention (CDC)**, between 8,000 and 18,000 people are hospitalized with Legionnaires' disease each year, and only about 20 percent of Legionnaires disease cases are reported. With the number of cases rapidly rising in the last ten years, and medical costs exceeding $360 million annually. Owners and managers of properties where outbreaks occur frequently find themselves the target of legal action by those who have contracted the disease, and the cost of an outbreak can quickly tally up to eight figures and beyond. Legionnaires disease is 100% preventable with a good system design, a water management plan to monitor and control the system to prevent conditions conducive to growth and with education.

What is the Price of Liability?

In the event of a Legionnaires' outbreak on your property, there are three main consequences that can cost you:

Expensive settlements and personal injury awards A Legionnaires' outbreak is serious business. An outbreak can affect dozens, and even hundreds, of people, with death rates between 20 and 40 percent, and many survivors facing weeks to months of hospitalization, six-figure medical bills, and permanent damage. Because of this, settlements and jury awards range from the hundreds of thousands to several million dollars.

Building closure and business interruption

On top of legal action, investigation and remediation of an outbreak usually results in a building closure, causing substantial business interruption. A 2009 outbreak at Miami's EPIC Hotel, for instance, reportedly caused daily income losses of about $200,000.

Irreparable negative publicity The damage to a companie's reputation, brand, and other intangibles may be harder to put a number on, but this damage is also often longer-lasting and less easily repaired.

P51-24

P52-24 Part I

IPC: SECTION 202 (New), 501.10 (New), ASSE Chapter 15 (New)

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Add new definition as follows:

<u>**HEAT INTERFACE UNIT.** A unit including one or more double wall heat exchangers and control devices for transferring heat from a primary to a secondary system. The primary system may be a hot water heating system. The secondary system is the domestic hot water system within the dwelling or other space.</u>

Add new text as follows:

<u>**501.10 Heat Interface Unit.** Installed heat interface units shall contain a proportional control valve that is third-party certified to ASSE 1379.</u>

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

<u>1379-20xx</u>	<u>Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installation</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1379-20xx *Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installation*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The Heat Interface Unit helps improve water quality, water and energy efficiency, water and energy conservation, and system performance.

A Heat Interface Unit system eliminates more than 50% of the Domestic Hot Water (DHW) volume. This is accomplished by eliminating much of the hot water piping and all the recirculation line piping. Since much of the hot water piping has been eliminated with a Heat Interface Unit system there is a much higher turnover of fresh water in the domestic system. The domestic hot-water piping that remains in the building is only the in-suite piping on the other side of the Heat Interface Unit. These are short runs of smaller-diameter piping that have little volume of water and cool quickly after use to help minimize the time in the optimal-bacterial-growth temperature range.

When designed properly, a Heat Interface Unit system can realize up to 35% reduction of energy used in the building by eliminating a central DHW system with its recirculation piping and pumps, and just using the 4-pipe HVAC system to distribute hot water to the Heat Interface Units.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

P52-24 Part II

IRC: SECTION 202 (New), P2805 (New), P2805.1 (New), ASSE Chapter 44 (New)

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com)

2024 International Residential Code

Add new definition as follows:

HEAT INTERFACE UNIT. A unit including one or more double wall heat exchangers and control elements for transferring heat from a primary to a secondary system. The primary system may be a hot water heating system. The secondary system is the domestic hot water system within the dwelling or other space.

Add new text as follows:

P2805
HEAT INTERFACE UNIT

P2805.1 Heat interface unit. Installed heat interface units shall contain proportional control valves that are third-party certified to ASSE 1379.

-

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1379-20xx	Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installations

Reason: The Heat Interface Unit helps improve water quality, water and energy efficiency, water and energy conservation, and system performance.

A Heat Interface Unit system eliminates more than 50% of the Domestic Hot Water (DHW) volume. This is accomplished by eliminating much of the hot water piping and all the recirculation line piping. Since much of the hot water piping has been eliminated with a Heat Interface Unit system there is a much higher turnover of fresh water in the domestic system. The domestic hot-water piping that remains in the building is only the in-suite piping on the other side of the Heat Interface Unit. These are short runs of smaller-diameter piping that have little volume of water and cool quickly after use to help minimize the time in the optimal-bacterial-growth temperature range.

When designed properly, a Heat Interface Unit system can realize up to 35% reduction of energy used in the building by eliminating a central DHW system with its recirculation piping and pumps, and just using the 4-pipe HVAC system to distribute hot water to the Heat Interface Units.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

P52-24 Part II

P53-24 Part I

IPC: SECTION 202 (New), 501.10 (New), ASSE Chapter 15 (New)

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Add new definition as follows:

INDIRECT-FIRED WATER HEATER. A water heater equipped with an internal or external heat exchanger used to transfer heat from an external source to heat potable water. The equipment either contains heated potable water or water supplied from an external source.

Add new text as follows:

501.10 Indirect-fired water heaters. Where indirect-fired water heaters contain proportional control valves, such valves shall be third-party certified to ASSE 1379.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1379-20xx	Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installations

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1379-20xx *Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installation*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: An indirect-fired water heater helps improve water quality, water and energy efficiency, water and energy conservation, and system performance.

An indirect-fired water heater system eliminates more than 50% of the Domestic Hot Water (DHW) volume. This is accomplished by eliminating much of the hot water piping and all the recirculation line piping. Since much of the hot water piping has been eliminated with an indirect-fired water heater system there is a much higher turnover of fresh water in the domestic system. The domestic hot-water piping that remains in the building is only the in-suite piping on the other side of the indirect-fired water heater. These are short runs of smaller-diameter piping that have little volume of water and cool quickly after use to help minimize the time in the optimal-bacterial-growth temperature range. When designed properly, an indirect-fired water heater system can realize up to 35% reduction of energy used in the building by eliminating a central DHW system with its recirculation piping and pumps, and just using the 4-pipe HVAC system to distribute hot water to the indirect-fired water heater.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

Estimated Life Cycle Cost Impact:

Estimated Life Cycle Cost Impact Justification (methodology and variables):

P53-24 Part II

IRC: SECTION 202 (New), SECTION P2805 (New), P2805.1 (New), ASSE Chapter 44 (New)

Proponents: David Nickelson, Uponor, Uponor (david.nickelson@uponor.com)

2024 International Residential Code

Add new definition as follows:

[MP] INDIRECT-FIRED WATER HEATER. A water heater equipped with an internal or external heat exchanger used to transfer heat from an external source to heat potable water. The equipment either contains heated potable water or water supplied from an external source.

Add new text as follows:

SECTION P2805
INDIRECT-FIRED WATER HEATERS

P2805.1 Indirect-fired water heaters. Where indirect-fired water heaters contain a proportional control valve, such valves shall be third-party certified to ASSE 1379.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1379-20xx	Proportional Flow Control Devices, with Protection from Cross Connection via Hydronic Water, for use in Potable Water Installation

Reason: An indirect-fired water heater helps improve water quality, water and energy efficiency, water and energy conservation, and system performance.

An indirect-fired water heater system eliminates more than 50% of the Domestic Hot Water (DHW) volume. This is accomplished by eliminating much of the hot water piping and all the recirculation line piping. Since much of the hot water piping has been eliminated with an indirect-fired water heater system there is a much higher turnover of fresh water in the domestic system. The domestic hot-water piping that remains in the building is only the in-suite piping on the other side of the indirect-fired water heater. These are short runs of smaller-diameter piping that have little volume of water and cool quickly after use to help minimize the time in the optimal-bacterial-growth temperature range. When designed properly, an indirect-fired water heater system can realize up to 35% reduction of energy used in the building by eliminating a central DHW system with its recirculation piping and pumps, and just using the 4-pipe HVAC system to distribute hot water to the indirect-fired water heater.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

The inclusion of an additional option does not in and of itself increase or decrease the overall cost impact of the code, because an option may or may not be chosen. The existing options are still relevant, and if chosen, have no cost impact on the actual code requirements.

P53-24 Part II

P54-24 Part I

IPC: SECTION 202 (New), SECTION 502, 502.1, SECTION 506 (New), 506.1 (New), 506.2 (New), 506.3 (New), 506.3.1 (New), 506.3.2 (New), 506.4 (New), 506.5 (New), 506.5.1 (New), TABLE 506.5.1 (New), 506.5.2 (New), TABLE 506.5.2 (New), 506.5.3 (New), 506.5.4 (New)

Proponents: Jim Lutz, self (jdlutz@hotwaterresearch.net), Gary Klein (gary@garykleinassociates.com)

2024 International Plumbing Code

Add new definition as follows:

WATER HEATER, HEAT PUMP, AIR SOURCE. A water heating system, containing a heat pump and storage tank, where the heat pump uses ambient air as a heat source to heat water. There are two types:

1. Unitary systems where the heat pump and storage tank are a single assembly. The heat pump is generally mounted on top of the storage tank.
2. Split systems where the heat pump and storage tank are separate assemblies.

SECTION 502 INSTALLATION

Revise as follows:

502.1 General. Water heaters shall be installed in accordance with the manufacturer's instructions. Oil-fired water heaters shall conform to the requirements of this code and the *International Mechanical Code*. Electric water heaters shall conform to the requirements of this code and provisions of NFPA 70. Gas-fired water heaters shall conform to the requirements of the *International Fuel Gas Code.* Solar thermal water heating systems shall conform to the requirements of the *International Mechanical Code* and ICC 900/SRCC 300. Air source heat pump water heaters shall be installed in accordance with Section 506.

Add new text as follows:

SECTION 506 Heat Pump Water Heaters

506.1 Air-source heat pump water heaters (HPWH). Air-source heat pump water heaters (HPWH) shall comply with Sections 506.2. through 506.5.

506.2 Obstructions and clearances. Air intakes, exhaust outlets, filters, heating elements, wiring connections, condensate drains, temperature and pressure relief valves shall not be obstructed. Clearances shall be provided for maintenance and replacement in accordance with Section 502.5.

506.3 Seismic Supports. Seismic supports shall comply with Section 502.4. Restraints shall not obstruct components specified in Section 506.2.

506.3.1 Unitary HPWH. Seismic restraints for unitary HPWHs shall be located at points within the upper one-third and lower one-third of the vertical dimensions of the storage tank, and not on the heat pump portion.

506.3.2 Split System HPWH. For split systems, the seismic restraints for the storage tank shall be in accordance with Section 506.3.1. The heat pump portion of the split system shall be installed in accordance with the manufacturer's instructions.

506.4 Condensate Drains. Condensate drain lines from air source HPWHs shall be in accordance with Section 314.2.

506.5 Ventilation. The ventilation requirements for air-source HPWH shall be in accordance with Sections 506.5.1 through 506.5.4. The minimum dimensions for the space volume where the HPWH is installed shall be 3.5 x 3.5 x 8 = 98 cubic feet.

506.5.1 Space volume method. Ventilation shall comply with the provisions Table 506.5.1.

TABLE 506.5.1 MINIMUM SPACE VOLUME FOR INSTALLING AIR-SOURCE HPW

Heat Pump Capacity (BTU/Hour)	<1,000	≥1,000 and <2,000	≥2,000 and <3,000	≥3,000 and <4,000	≥4,000 and <5,000	≥5,000 and <6,000	≥6,000 and <7,000	≥7,000 and <8,000	≥8,000 and <9,000	≥9,000 and <10,000	≥10,000 and <11,000	≥11,000 and <12,000	≥12,000 and <13,000	≥13,000 and <14,000	≥14,000 and <15,000	≥15,000 and <16,000	≥16,000 and <17,000	≥17,000 and <18,000
Space Volume (cubic feet)	175	350	525	700	875	1,050	1,225	1,400	1,575	1,750	1,925	2,100	2,275	2,450	2,625	2,800	2,975	3,150

For SI units: 1 cubic foot = 0.0283 m^3, 1000 British thermal units per hour = 0.293 kW

506.5.2 Passive ventilation method. Where the location of the HPWH is in a space smaller than required in Table 506.5.1, additional ventilation shall be provided in accordance with Table 506.5.2. Passive ventilation shall be into an adjacent space that shares the same pressure zone with the HPWH. The sum of the volume of the space where the HPWH is located and the volume in the adjacent space shall be not less than the space volume required for the capacity shown in Table 506.5.2. The net free area of the passive ventilation shall be equally distributed between high and low openings. These openings shall be in the top quarter and bottom quarter of the space where the HPWH is located.

TABLE 506.5.2 MINIMUM NET FREE AREA FOR INSTALLING AIR-SOURCE HPWH

Space Volume (cubic feet)	Heat Pump Capacity (BTU/Hour)																	
	<1,000	≥1,000 and <2,000	≥2,000 and <3,000	≥3,000 and <4,000	≥4,000 and <5,000	≥5,000 and <6,000	≥6,000 and <7,000	≥7,000 and <8,000	≥8,000 and <9,000	≥9,000 and <10,000	≥10,000 and <11,000	≥11,000 and <12,000	≥12,000 and <13,000	≥13,000 and <14,000	≥14,000 and <15,000	≥15,000 and <16,000	≥16,000 and <17,000	≥17,000 and <18,000
≥3,150																		0
≥2,975 and <3,150																	0	80
≥2,800 and <2,975																0	80	100
≥2,625 and <2,800															0	80	100	120
≥2,450 and <2,625														0	80	100	120	140
≥2,275 and <2,450													0	80	100	120	140	160
≥2,100 and <2,275												0	80	100	120	140	160	180
≥1,925 and <2,100											0	80	100	120	140	160	180	200
≥1,750 and <1,925										0	80	100	120	140	160	180	200	220
≥1,575 and <1,750									0	80	100	120	140	160	180	200	220	240
≥1,400 and <1,575								0	80	100	120	140	160	180	200	220	240	260

≥1,225 and <1,400							0	80	100	120	140	160	180	200	220	240	260	280
≥1,050 and <1,225						0	80	100	120	140	160	180	200	220	240	260	280	300
≥875 and <1,050					0	80	80	120	140	160	180	200	220	240	260	280	300	320
≥700 and <875				0	80	80	100	140	160	180	200	220	240	260	280	300	320	340
≥525 and <700			0	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360
≥350 and <525		0	120	160	200	240	280	320	360	400	440	480	520	560	600	640	680	720
≥175 and <350	0	120	180	240	300	360	420	480	540	600	660	720	780	840	900	960	1020	1080
≥100 and <175	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260
<100	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260

For SI units: 1 cubic foot = 0.0283 m3, 1000 British thermal units per hour = 0.293 kW

506.5.3 **Ducted ventilation method.** Where the location of the HPWH is in a space smaller than required in Table 506.5.1, and it is not possible to comply with the provisions for passive ventilation in accordance with Table 506.5.2, the HPWH shall be ducted in accordance with the manufacturer's instructions. Air intake and exhaust ducts shall come from and go to the same pressure zone. The termination of the ducts in the remote space shall be directed so that they draw from and exhaust to different parts of the pressure zone. It is permissible to install a combination of passive and ducted ventilation to meet the air flow requirements of the HPWH.

506.5.4 **New construction.** Ventilation shall comply with the provisions in Sections 506.5.1, 506.5.2 and 506.5.3 for the 18,000 BTU per Hour capacity column in Tables 506.5.1 and 506.5.2.

Exception: For HPWHs larger than 18,000 BTU per hour, the minimum space volume shall be not less than 0.175 cubic feet per BTU per hour as rated by the manufacturer. Net free area and ducting shall be in accordance with the manufacturer's instructions.

P54-24 Part I

P54-24 Part II

IRC: SECTION 202 (New), CHAPTER 20, SECTION M2005, M2005.1, P2805 (New), P2805.1 (New), P2805.2 (New), P2805.3 (New), P2805.3.1 (New), P2805.3.2 (New), P2805.4 (New), P2805.5 (New), P2805.5.1 (New), TABLE 2805.5.1 (New), P2805.5.2 (New), TABLE 2805.5.2 (New), P2805.5.3 (New), P2805.5.4 (New)

Proponents: Jim Lutz, self (jdlutz@hotwaterresearch.net), Gary Klein (gary@garykleinassociates.com)

2024 International Residential Code

Add new definition as follows:

Water Heater, Heat Pump, Air Source.
A water heating system, containing a heat pump and storage tank, where the heat pump uses ambient air as a heat source to heat water. There are two types:

(1) Unitary systems where the heat pump and storage tank are a single assembly. The heat pump is generally mounted on top of the storage tank.

(2) Split systems where the heat pump and storage tank are separate assemblies.

CHAPTER 20 BOILERS AND WATER HEATERS

SECTION M2005
WATER HEATERS

Revise as follows:

M2005.1 General. Water heaters shall be installed in accordance with Chapter 28, the manufacturer's instructions and the requirements of this code. Water heaters installed in an *attic* shall comply with the requirements of Section M1305.1.2. Gas-fired water heaters shall comply with the requirements in Chapter 24. Domestic electric water heaters shall comply with UL 174. Oiled-fired water heaters shall comply with UL 732. Solar thermal water heating systems shall comply with Chapter 23 and ICC 900/SRCC 300. Solid fuel-fired water heaters shall comply with UL 2523. Air source heat pump water heaters shall comply with the requirements in Section P2805.

Add new text as follows:

P2805
Heat Pump Water Heaters

P2805.1 Air-source HPWHs. Air-source heat pump water heaters (HPWH) shall comply with Section P2805.2. through Section P2805.5.

P2805.2 Obstructions and clearances. Air intakes, exhaust outlets, filters, heating elements, wiring connections, condensate drains, temperature and pressure relief valves shall not be obstructed. Clearances shall be provided for maintenance and replacement in accordance with Section M1305.

P2805.3 Seismic bracing. Seismic bracing shall comply with Section P2801.8. Restraints shall not obstruct components specified in Section P2805.2.

P2805.3.1 Unitary HPWH. For unitary HPWHs seismic restraints shall be located at points within the upper one-third and lower one-third of the vertical dimensions of the storage tank, and not on the heat pump portion.

P2805.3.2 Split System HPWH. For split systems the seismic restraints for the storage tank shall be in accordance with Section

P2805.3.1. The heat pump portion of the split system shall be installed in accordance with the manufacturer's instructions.

P2805.4 Condensate drains. Condensate drain lines from air source HPWHs shall be in accordance with Section M1411.3.

P2805.5 Ventilation. The ventilation requirements for air-source HPWH shall be in accordance with Sections P2805.5.1 through P2805.5.4. The minimum dimensions for the space volume where the HPWH is installed shall be 3.5 x 3.5 x 8 = 98 cubic feet.

P2805.5.1 Space volume method. Ventilation shall comply with the provisions Table P2805.5.1.

TABLE 2805.5.1 MINIMUM SPACE VOLUME FOR INSTALLING AIR-SOURCE HPW

Heat Pump Capacity (BTU/Hour)	<1,000	≥1,000 and <2,000	≥2,000 and <3,000	≥3,000 and <4,000	≥4,000 and <5,000	≥5,000 and <6,000	≥6,000 and <7,000	≥7,000 and <8,000	≥8,000 and <9,000	≥9,000 and <10,000	≥10,000 and <11,000	≥11,000 and <12,000	≥12,000 and <13,000	≥13,000 and <14,000	≥14,000 and <15,000	≥15,000 and <16,000	≥16,000 and <17,000	≥17,000 and <18,000
Space Volume (cubic feet)	175	350	525	700	875	1,050	1,225	1,400	1,575	1,750	1,925	2,100	2,275	2,450	2,625	2,800	2,975	3,150

For SI units: 1 cubic foot = 0.0283 m^3, 1000 British thermal units per hour = 0.293 kW

P2805.5.2 Passive ventilation method. Where the location of the HPWH is in a space smaller than required in Table P2805.5.1, additional ventilation shall be provided in accordance with Table P2805.5.2. Passive ventilation shall be into an adjacent space that shares the same pressure zone with the HPWH. The sum of the volume of the space where the HPWH is located and the volume in the adjacent space shall be not less than the space volume required for the capacity shown in Table P2805.5.2. The net free area of the passive ventilation shall be equally distributed between high and low openings. These openings shall be in the top quarter and bottom quarter of the space where the HPWH is located.

TABLE 2805.5.2 MINIMUM NET FREE AREA FOR INSTALLING AIR-SOURCE HPWH

Space Volume (cubic feet)	Heat Pump Capacity (BTU/Hour)																	
	<1,000	≥1,000 and <2,000	≥2,000 and <3,000	≥3,000 and <4,000	≥4,000 and <5,000	≥5,000 and <6,000	≥6,000 and <7,000	≥7,000 and <8,000	≥8,000 and <9,000	≥9,000 and <10,000	≥10,000 and <11,000	≥11,000 and <12,000	≥12,000 and <13,000	≥13,000 and <14,000	≥14,000 and <15,000	≥15,000 and <16,000	≥16,000 and <17,000	≥17,000 and <18,000
≥3,150																		0
≥2,975 and <3,150																	0	80
≥2,800 and <2,975																0	80	100
≥2,625 and <2,800															0	80	100	120
≥2,450 and <2,625														0	80	100	120	140
≥2,275 and <2,450													0	80	100	120	140	160
≥2,100 and <2,275												0	80	100	120	140	160	180
≥1,925 and <2,100											0	80	100	120	140	160	180	200
≥1,750 and <1,925										0	80	100	120	140	160	180	200	220
≥1,575 and <1,750									0	80	100	120	140	160	180	200	220	240

≥1,400 and <1,575								0	80	100	120	140	160	180	200	220	240	260
≥1,225 and <1,400							0	80	100	120	140	160	180	200	220	240	260	280
≥1,050 and <1,225						0	80	100	120	140	160	180	200	220	240	260	280	300
≥875 and <1,050					0	80	80	120	140	160	180	200	220	240	260	280	300	320
≥700 and <875				0	80	80	100	140	160	180	200	220	240	260	280	300	320	340
≥525 and <700			0	80	100	120	140	160	180	200	220	240	260	280	300	320	340	360
≥350 and <525		0	120	160	200	240	280	320	360	400	440	480	520	560	600	640	680	720
≥175 and <350	0	120	180	240	300	360	420	480	540	600	660	720	780	840	900	960	1020	1080
≥100 and <175	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260
<100	70	140	210	280	350	420	490	560	630	700	770	840	910	980	1050	1120	1190	1260

For SI units: 1 cubic foot = 0.0283 m3, 1000 British thermal units per hour = 0.293 kW

P2805.5.3 Ducted ventilation method. Where the location of the HPWH is in a space smaller than required in Table P2805.5.1, and it is not possible to comply with the provisions for passive ventilation in accordance with Table P2805.5.2, the HPWH shall be ducted in accordance with the manufacturer's instructions. Air intake and exhaust ducts shall come from and go to the same pressure zone. The termination of the ducts in the remote space shall be directed so that they draw from and exhaust to different parts of the pressure zone. It is permissible to install a combination of passive and ducted ventilation to meet the air flow requirements of the HPWH.

P2805.5.4 New construction. Ventilation shall comply with the provisions in Sections P2805.5.1, P2805.5.2 and P2805.5.3 for the 18,000 BTU per Hour capacity column in Tables P2805.5.1 and P2805.5.2.

> **Exception:** For HPWHs larger than 18,000 BTU per hour, the minimum space volume shall be not less than 0.175 cubic feet per BTU per hour as rated by the manufacturer. Net free area and ducting shall be in accordance with the manufacturer's instructions.

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Reason: The purpose of this proposal is to add an option to the plumbing code so that installers of heat pump water heaters (HPWH) have clear provisions in the chapterson Water Heaters regarding their proper installation. HPWH are water heaters, and most of the provisions regarding the installation of all water heaters apply. A key requirement that does not exist is that they need to be installed so that they operate in heat pump mode for the majority of their duty cycle.

For air source HPWH, the type of water heater discussed in this proposal, this means special attention must be paid to the air flow requirements. They need a source of "warm" air to extract energy and they need a sink for the cold air they discharge to be absorbed. The source and the sink need be matched. This can be challenging in cold climates.

To accommodate the energy exchange required by the source and the sink, the sizes of which depend on the capacity of the heat pump, there needs to be

1. A minimum volume of the space where the HPWH is installed. Energy exchange happens within that space.

2. Passive ventilation into an adjacent space if the space where the HPWH is located is not large enough. The volume of the two spaces must meet the minimum volume requirements for the HPWH's capacity. The two spaces must share a common pressure zone.

3. Ducted ventilation into an adjacent or remote space if the minimum volume or passive ventilation requirements cannot be me. The HPWH needs to be ducted to and from a location with the ability to support required energy exchange. When ducted, the remote terminals for the intake need to come from, and exhaust ducts to, the same pressure zone so that they do not adversely affect the performance of other mechanical systems.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds an option to the existing code. It does not add or remove existing options or solutions to the existing code. If this option is not chosen, the existing solutions/options are the existing costs of the previous code language.

P54-24 Part II

P55-24

IPC: 502.11 (New)

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Add new text as follows:

502.11 Hot water Generators, Heat Exchangers, Pre-heaters, Solar water heaters. Hot water generators, heat exchangers, pre-heaters, and solar water heaters that utilize heat exchangers to heat or pre-heat domestic hot water shall have a temperature-actuated mixing valve complying with ASSE 1017 located downstream of any hot water generators, heat exchangers, pre-heaters, or solar water heaters to limit and control the water temperature supplied to the potable hot water distribution system to a stable, temperature. The potability of the water shall be maintained throughout the domestic hot water distribution system. Requirements for the heat source piping systems shall be in accordance with the International Mechanical Code.

Staff Analysis: The proposed standard is in the current edition of the code.

Reason: Heat exchangers used as pre-heaters or hot water generators have the ability to overheat the domestic hot water when steam or heating hot water valves stick open or when flue gasses are extremely hot. This code change assures that a temperature actuated mixing valve will mix the hot water downstream of the device to a stable and desired temperature. A specific temperature is not given, because in some applications the distribution temperature may need to be slightly above 140 F in order to keep the circulated return above a Legionella bacteria growth temperature in larger buildings with significant heat loss in the system. Having the mixing valve downstream of these heat exchangers and HW generators can control the temperature when the heat recovery or pre-heater system heats the water well beyond the desired hot water system temperature.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This will slightly increase the cost of construction, but adds a significant level of safety.

The retail cost of a 3/4-inch valves starts at $88.89 and the wholesale price is typically 40% less than retail price. The installed cost with a labor rate of $95/hr can start at $183.

Estimated Immediate Cost Impact Justification (methodology and variables):

This will save lives for as little as $183.00 on smaller systems and up to a few thousand dollars on larger systems. The value of this safety device is cheap compared to the increase in safety. This code change is needed to provide a safe hot water distribution system. The retail cost of a 3/4-inch valves starts at $88.89 and the wholesale price is typically 40% less than retail price. The installed cost starts at about $183 for Water heaters up to 80 gallons or a maximum of gpm.

For larger systems, Bronze Thermostatic Mixing Valves 1" in size cost is about $100.00 to $300.00; Bronze Tempering Valves 3" in size cost about $2,400.00 to $3,925.00.

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Estimated Life Cycle Cost Impact:

This cost is much less than the cost of a burn injury which can reach millions of dollars in medical costs, and affect entire families who have to help care for burn victims. The physical, emotional, phycological and ongoing medical costs can be immense. Then add any litigation costs associated with litigation. Insurance companies should support this as a safer installation and a total reduction in overall medical and liability costs.

When a facility has an unsafe hot water system (Without temperature controls to prevent overheating conditions) injuries and deaths can occur. injuries include costs for medical treatment which includes burn care, debridement to scrape off dead tissue still attached to the body, skin grafting to cover burned areas with skin from the burn victim to prevent rejection issues, Ongoing surgeries to splice in skin as the body grows, because the scar tissue does not grow or have elasticity. Additional medical costs associated with related medical conditions, psychological counseling, etc. Another cost not accounted for is the Litigation cost associated with a burn injury.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

The average size of a cold water make-up valve in an institutional building is about 3 inches in size.

In my experience dealing with scald litigation, the judge and jury awards for scald cases have included costs to cover medical expenses, and ongoing medical equipment, assistance and treatments including punitive damages totaling in excess of 16 million dollars for one incident at a facility that had hot water systems that were not safely designed, controlled and maintained and caused burn injuries.
According to Internet research, In Western countries and other democracies, estimates for the value of a statistical life typically range from $1 million US dollars to $10 million US Dollars; for example, the United States Federal Emergency Management Agency (FEMA) estimated the value of a statistical life at $7.5 million US Dollars in 2020.
The cost of a valve is far less expensive than the injury, pain, suffering, Medical and physical therapy expenses, and litigation expenses. Or the emotional issues from a serious burns or loss of life from a scald injury.

P55-24

P56-24

IPC: 503.3 (New)

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Add new text as follows:

503.3 Water Heaters, Heat Exchangers and Heat Recovery Device Appurtenances. Each water heater, heat exchanger, or heat recovery device serving the domestic hot water system shall have isolation valves located on the inlet and on the outlet pipe connections. The isolation valves shall be located outside of de-liming tees with 3/4-inch hose valve connections, and outside of a temperature and pressure gauge on each connection.

Reason: Water heaters, heat exchangers, and heat recovery devices need temperature and pressure gauges in order to see how the equipment is performing. For example, when heat exchangers or heat recovery devices are used to pre-heat domestic cold water that is supplied to the water heater, it is important to understand what the temperature is coming into the water heater in order to avoid sending water into the distribution system that is a higher temperature than the water heater thermostat setting.

Water heaters, heat exchangers, and heat recovery devices are susceptible to temperature and pressure changes due to the heating fluid temperature and pressure changes associated with scale and water quality.

Valved de-liming connections allow for descaling operations to take place when service is scheduled or required.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This will increase of the cost of construction initially but will save thousands of dollars in fuel costs by keeping the system running efficiently. This will reduce the emission of greenhouse gasses.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of the small valves and pressure gauges here are minimal.

Estimated Life Cycle Cost Impact:

By allowing the operators to see the pressure drop and temperature changes, they will know when the heat exchanger is fouled. De-liming the heat exchanger will allow the equipment to go back to full efficiency. If a heat exchanger fouls 10% per year because of hard water, then each additional year, the fuel required to heat the water or application will increase by 10 %. Theoretically, after 5 years the additional fuel required would be 50% more fuel required to perform the same amount of work. The compounded additional expenses on fuel bills justifies having these devices to allow the operator to see what the system is doing. If the equipment requires $1,000 in fuel per month to operate, at the end of the first year each month it will waste an extra $200 or an average of $100 per month over the first year. ($1,200 for the first year wasted energy, by the 5th year the wasted energy could be in excess of $6,000) The cost of these devices in minimal compared to the potential energy wasted and additional greenhouse gasses created.

P56-24

P57-24

IPC: 504.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

504.2 Vacuum relief valve.
Bottom fed storage water heaters and bottom fed tanks connected to water heaters shall have a vacuum relief valve installed. The vacuum relief valve shall comply with ANSI Z21.22.

Reason: This section was originally intended to protect storage tanks and storage tank type water heaters from being siphoned which could result in the tanks being dry when energized causing the elements to burn out or in the case of a gas fired water heater, it could result in the tank liner fracturing prematurely. Due to the current language in the code, this is also being applied to tankless water heaters. Tankless water heaters typically have flow switches which prove there is ample water inside the unit before they can energize, thus they are already protected from accidental damage.

Bibliography: See reason statement.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Between $160 - $480 per unit.

Estimated Immediate Cost Impact Justification (methodology and variables):

Between $60 - $180 per unit depending on markup by the contractor and $100-$300 for labor depending on the local labor rates.

P57-24

P58-24 Part I

IPC: 504.4, 504.4.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

504.4 Relief valve. Storage water heaters operating above atmospheric pressure shall be provided with an *approved*, self-closing (levered) pressure relief valve and temperature relief valve or combination thereof. The relief valve shall conform to ANSI Z21.22. The relief valve shall not be used as a means of controlling thermal expansion. Tankless instantaneous water heaters shall not be required to be provided with pressure or temperature relief valves unless required by the manufacturer's installation instructions.

504.4.1 Installation.
Storage water heaters shall have ~~S~~such valves ~~shall be~~ installed in the shell of the water heater tank. Temperature relief valves shall be located in the tank so as to be actuated by the water in the top 6 inches (152 mm) of the tank served. For installations with separate storage tanks, the *approved*, self-closing (levered) pressure relief valve and temperature relief valve or combination thereof conforming to ANSI Z21.22 valves shall be installed on both the storage water heater and storage tank. There shall not be a check valve or shutoff valve between a relief valve and the heater or tank served.

P58-24 Part I

P58-24 Part II

IRC: P2804.4

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

P2804.4 Temperature relief valves. Temperature relief valves shall have a relief rating compatible with the temperature conditions of the *appliances* or equipment protected. The valves shall be installed such that the temperature-sensing element monitors the water within the top 6 inches (152 mm) of the tank. The valve shall be set to open at a temperature of not greater than 210°F (99°C).

> **Exception:** Tankless instantaneous water heaters shall not be required to be provided with pressure or temperature relief valves unless required by the manufacturer’s installation instructions.

Reason: This proposal clarifies requirements for relief valves for tankless instantaneous water heaters. Typically, these are specified for the manufacturer only in specific installations, such as providing hot water for space heating applications.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Approximately $100 per tankless water heater installation.

Estimated Immediate Cost Impact Justification (methodology and variables):

The existing code language was not clear to all users such that temperature valves may have been required by some code officials in tankless installations, which was not the intent of the existing code. The proposal reduces costs by the elimination of the temperature relief valve ($20), the associated plumbing ($30), and the labor ($50) to install those components.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

P58-24 Part II

P59-24

IPC: 504.6

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

504.6 Requirements for discharge piping.
The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

1. Not be directly connected to the drainage system.
2. Discharge through an *air gap* located in the same room as the water heater.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the *air gap*.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the water heater or storage tank where the water heater or storage tank is not elevated off of the floor, to a waste receptor, or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Terminate not more than 6 inches (152 mm) above and not less than two times the discharge pipe diameter above the floor or *flood level rim* of the waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 or materials tested, rated and *approved* for such use in accordance with ASME A112.4.1.
14. Be one nominal size larger than the size of the relief valve outlet, where the relief valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.

Reason: When water heaters are elevated off the floor, discharging to the pan can create splashing that will result in scalding if persons are standing near the water heater or below the water heater. This potential would violate item #6 of this section.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is for clarification only to ensure that people are not put at risk by ensuring users of the code understand the section and how it should be applied.

P59-24

P60-24

IPC: 504.6

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com)

2024 International Plumbing Code

Revise as follows:

504.6 Requirements for discharge piping.
The discharge piping serving a pressure relief valve, temperature relief valve or combination thereof shall:

1. Not be directly connected to the drainage system.
2. Discharge through an *air gap* located in the same room as the water heater.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the *air gap*.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, to the pan serving the water heater or storage tank, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants. <u>Where the discharge termination point is not readily visible and observable, a leak detection monitoring device with alarm notification (and not automatic shut-off), or a building management system shall be required.</u>
8. Not be trapped.
9. Be installed so as to flow by gravity.
10. Terminate not more than 6 inches (152 mm) above and not less than two times the discharge pipe diameter above the floor or *flood level rim* of the waste receptor.
11. Not have a threaded connection at the end of such piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section 605.4 or materials tested, rated and *approved* for such use in accordance with ASME A112.4.1.
14. Be one nominal size larger than the size of the relief valve outlet, where the relief valve discharge piping is installed with insert fittings. The outlet end of such tubing shall be fastened in place.

Reason: Approval of this code change will allow design flexibility, and more importantly, provide for the allowance of leak detection technology to warn building occupants and managers of a problem with a safety device.

Current code language just requires visibility of the termination point, but if there is a significant discharge of the valve there may not be any awareness of the problem for an extended period. This can especially be a problem when a building is unoccupied and then significant flood damage can result.

This proposal does not intend to require the devices, just allow their use if the termination point is not visible. The allowance of leak detection technology makes for safer, smarter buildings.

Bibliography: Links date: 11-29-2023

https://www.homedepot.com/p/MOEN-Smart-Leak-Detectors-1-Pack-920-004/312855333

https://www.prowaterheatersupply.com/sentinel-hydrosolutions-leak-defense-system-lds-3-200.html

Cost Impact: Increase

Estimated Immediate Cost Impact:

Residential: Moen retail $50

Commercial: Sentinel Systems $2,500 - $3,500 retail depending on size

Residential Installation Cost: $0

Commercial Installation Cost: Labor 2 hours at $100/hr.

Estimated Immediate Cost Impact Justification (methodology and variables):

Residential: Moen retail $50

Commercial: Sentinel Systems $2,500 - $3,500 retail depending on size

Residential Installation Cost: $0

Commercial Installation Cost: Labor 2 hours at $100/hr.

Estimated Life Cycle Cost Impact:

Life Cycle Cost: $0

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Life Cycle Cost: $0

P60-24

P61-24 Part I

IPC: 504.7, 504.7.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

504.7 Required pan.
Where a storage tank-type water heater or a hot water storage tank is installed in ~~a~~ an elevated location where water leakage from the tank will cause damage or personal injury, the tank shall be installed in a pan constructed of one of the following:

1. Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness.
2. Plastic not less than 0.036 inch (0.9 mm) in thickness.
3. Other *approved* materials.

A plastic pan installed beneath a gas-fired water heater shall be constructed of material having a flame spread index of 25 or less and a smoked-developed index of 450 or less when tested in accordance with ASTM E84 or UL723. Water heaters installed in pans shall comply with Section 314.2.3.2.

Exception: In existing buildings, a pan shall not be required where one was not previously installed unless the room or space can accommodate a pan and the drain can be run to an approved place of disposal.

504.7.2 Pan drain termination.
The pan drain shall extend full size and terminate over a suitably located indirect waste receptor or floor drain or extend to the exterior of the building and terminate not less than 6 inches (152 mm) and not more than 24 inches (610 mm) above the adjacent ground surface. ~~Where a pan drain was not previously installed, a pan drain shall not be required for a replacement water heater installation.~~

P61-24 Part I

P61-24 Part II

IRC: P2801.5, P2801.5.1

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Residential Code

Revise as follows:

P2801.5 Required pan.
Where a storage tank-type water heater or a *hot water* storage tank is installed in ~~a~~ an elevated location where water leakage from the tank will cause damage or personal injury, the tank shall be installed in a pan constructed of one of the following:

1. Galvanized steel or aluminum of not less than 0.0236 inch (0.6010 mm) in thickness.
2. Plastic not less than 0.036 inch (0.9 mm) in thickness.
3. Other *approved* materials.

A plastic pan beneath a gas-fired water heater shall be constructed of material having a *flame spread index* of 25 or less and a *smoke-developed index* of 450 or less when tested in accordance with ASTM E84 or UL 723.
EXCEPTION: In existing buildings, a pan shall not be required where one was not previously installed unless the room or space can accommodate a pan and the drain can be run to an approved place of disposal.

P2801.5.1 Pan size and drain.
The pan shall be not less than 1 $^1/_2$ inches (38 mm) deep and shall be of sufficient size and shape to receive dripping or condensate from the tank or water heater. The pan shall be drained by an *indirect waste pipe* of not less than $^3/_4$ inch (19 mm) diameter. Piping for safety pan drains shall be of those materials indicated in Table P2906.5.
~~Where a pan drain was not previously installed, a pan drain shall not be required for a replacement water heater installation.~~

Reason: The idea that a water heater pan will prevent damage from leaks, dripping, or condensate is nothing more than a sales pitch. Especially if you consider the pan drain is not required to be terminated to a waste receptor if there wasn't one previously installed (ref. P2801.6.1). A pan drain cannot handle a full open discharge of a 3/4-inch T&P discharge pipe. The bottom line is if we are actually trying to protect people, protect them from an actual danger, such as when the water heaters are elevated then that is what we should focus on in the code. Elevated water heaters have a significantly higher possibility of resulting in an injury when the T&P valve discharges. Regardless of how high they are elevated; the discharge can now splash up high on a person's leg is they are nearby when it happens. The risk to injury is even higher when associated to leaks or drips when the water heater is located above a ceiling.

Bibliography: In over 30 + years working in the plumbing industry, with over 14 years as a plumbing inspector, I have yet to see a situation where a leaking water heater caused a building to fail. The bigger danger exists only when the water heaters are elevated and pose a greater risk of personal injury.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Water heater pan costs range anywhere between approximately $20 to over $200 each.

Estimated Immediate Cost Impact Justification (methodology and variables):

Actual cost impact is dependent on numerous factors, such as the type of construction (new, remodel/repair), the building use group, the method chosen for installation, the type of pan, the local labor rates, and the mark-up factor the contractor uses.

P61-24 Part II

P62-24 Part I

IPC: 504.7.1, 504.7.2, IAPMO Chapter 15 (New)

Proponents: Jay Peters, Codes and Standards International LLC, IPS Corporation (peters.jay@me.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

504.7.1 Pan size and drain.
The pan shall be not less than $1^1/_2$ inches (38 mm) in depth and shall be of sufficient size and shape to receive all dripping or condensate from the tank or water heater. The pan shall be drained by an indirect waste pipe having a diameter of not less than $^3/_4$ inch (19 mm) or shall be equipped with a device complying with CAN/IAPMO Z1349 to automatically shut off the water supply to the water heater upon detection of a leak.. Piping for safety pan drains shall be of those materials listed in Table 605.4.

504.7.2 Pan drain termination.
The pan drain shall extend full size and terminate over a suitably located indirect waste receptor or floor drain or extend to the exterior of the building and terminate not less than 6 inches (152 mm) and not more than 24 inches (610 mm) above the adjacent ground surface. Where a pan drain was not previously installed, a pan drain shall not be required for a replacement water heater installation where equipped with a device complying with CAN/IAPMO Z1349 to detect and automatically shut off the water supply to the water heater in the event of a leak..

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

ANSI/CAN/IAPMO Z1349-2021 Standard for Detection, Monitoring or Control of Plumbing Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/CAN.IAPMO Z1349 -2021 *Standard for Detection, Monitoring or Control of Plumbing Systems*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The pan and drainage piping are intended to relieve small leaks. Although it might be small, a leak should not occur and is the first sign of a possible pending catastrophic event with no indication to the owner of any possible problem, as it is typically out of sight. In other instances, it can be extremely onerous to provide piping to an approved location in existing construction.

These listed devices are approved as options in many jurisdictions across Texas, California and more. In come cases, they are required in lieu of a pan and/or drain. They are reliable and sense a minuscule bit of moisture (one drop) and immediately shut off the water supply to the specific appliance. There are multiple manufacturers and well over a million units have been installed. Leading water heater manufacturers, such as Rheem and AO Smith, have already incorporated this leak sensing technology into their equipment. This provision will raise the level of safety and protection for installations without integral devices.

T**he first change above** provides an option, could be a less expensive installation in some cases, raises the level of safety, has the potential to reduce injuries and save millions of dollars in water damages to structures.

T**he second change above** provides a much higher level of safety and corrects a potential safety hazard. The original provision allows for a noncompliant (unsafe) installation to be replaced and remain noncompliant in perpetuity regardless of whether it is above an occupied space or any other potential unsafe location. If a leak occurs above an occupied space, the pan may collect and have no place to drain. This new addition would now require a replacement water heater to have a pan drain or have an integral device or an approved external device to shut off the water to the heater in the event of a leak.

The code should not incentivize substandard installations and provide exceptions for noncompliant unsafe conditions that could cause damage and bodily harm just because it was already done previously.

Sample Local Jurisdiction Code Language:

Fort Worth, Texas

Exception: When a water heater retrofit or replacement occurs on a slab foundation and the line cannot be discharged to an approved location the T& P discharge line can be piped to the water heater pan provided with all of the following:

1. the water heater when water is detected inside the pan;

2. A device is installed that will sound an audible alarm when water is detected inside the pan to alert the occupants that a leak has occurred.

Frisco Texas

P2801.9 Water heaters installed in attics or with living space below: Water heaters, other than tankless, when located in an attic space or a space located above living space, shall be equipped with a WAGS, Floodstop or other approved device to automatically shut off the water supply if a water leak is detected.**Exception:** Replacement water heaters that were permitted on or before December 31, 2013, shall not be required to be equipped with an automatic Shut off device.

The following standard for the testing and certification of these devices has also beed proposed to the list of approved standards in the IRC and the IPC: **ANSI/CAN/IAPMO Z1349 Standard for Devices for Detection, Monitoring or Control of Plumbing Systems.**

This standard supports the proposals in the IRC and IPC to allow these devices as an additional option. It is an ANSI Standard

Cost Impact: Decrease

Estimated Immediate Cost Impact:

No Cost Impact. ($0)

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal only provides an additional option that could potentially reduce construction and installation costs and does not have a cost impact since it is merely an option. The provision could save construction and installation costs, not to mention prevent leaks from becoming damaging over time or even catastrophic. Since **it is only another option, and not a required provision, it should never increase the cost of construction** if the decision is made on cost alone. This provision could save construction and installation costs, not to mention prevent leaks from becoming damaging over time or even catastrophic. The proposal corrects an unsafe provision and could also potentially save tens thousands of dollars per leak incident.

P62-24 Part I

P62-24 Part II

IRC: P2801.5.1, IAPMO Chapter 44 (New)

Proponents: Jay Peters, Codes and Standards International LLC, IPS Corporation (peters.jay@me.com)

2024 International Residential Code

Revise as follows:

P2801.5.1 Pan size and drain. The pan shall be not less than $1^1/_2$ inches (38 mm) deep and shall be of sufficient size and shape to receive dripping or condensate from the tank or water heater. The pan shall be drained by an *indirect waste pipe* of not less than $^3/_4$ inch (19 mm) diameter or be equipped with a device complying with CAN/IAPMO Z1349 to automatically shut off the water supply to the water heater upon detection of a leak. Piping for safety pan drains shall be of those materials indicated in Table P2906.5. Where a pan drain was not previously installed, a pan drain shall not be required for a replacement water heater installation when equipped with a device complying with CAN/IAPMO Z1349 to automatically shut off the water supply to the water heater upon detection of a leak.

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761-USA

ANSI/CAN/IAPMO Z1349-2021 Devices for Detection, Monitoring or Control of Plumbing Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ANSI/CAN/IAPMO Z1349-21 *Standard for Devices for Detection, Monitoring or Control of Plumbing Systems*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The pan and drainage piping are intended to relieve small leaks. Although it might be small, a leak should not occur and is the first sign of a possible pending catastrophic event with no indication to the owner of any possible problem, as it is typically out of sight. In other instances, it can be extremely onerous to provide piping to an approved location in existing construction.

These listed devices are approved as options in many jurisdictions across Texas, California and more. In come cases, they are required in lieu of a pan and/or drain. They are reliable and sense a minuscule bit of moisture (one drop) and immediately shut off the water supply to the specific appliance. There are multiple manufacturers and well over a million units have been installed. Many water heater manufacturers, such as Rheem and AO Smith, have already incorporated this leak sensing technology into the equipment. This provision will raise the level of safety and protection for installations without integral devices.

T**he first change above** provides an option, could be a less expensive installation in some cases, raises the level of safety, has the potential to reduce injuries and save millions of dollars in water damages to structures.

T**he second change above** provides a much higher level of safety and corrects a potential safety hazard. The original provision allows for a noncompliant (unsafe) installation to be replaced and remain noncompliant in perpetuity regardless of whether it is above an occupied space or any other potential unsafe location. If a leak occurs above an occupied space, the pan may collect and have no place to drain. This new addition would now require a replacement water heater to have a pan drain or have an integral device or an approved external device to shut off the water to the heater in the event of a leak.

The code should not incentivize substandard installations and provide exceptions for noncompliant unsafe conditions that could cause damage and bodily harm just because it was already done previously.

Sample Local Jurisdiction Code Language:

Fort Worth, Texas

Exception: When a water heater retrofit or replacement occurs on a slab foundation and the line cannot be discharged to an approved location the T& P discharge line can be piped to the water heater pan provided with all of the following:

1. the water heater when water is detected inside the pan;

2. A device is installed that will sound an audible alarm when water is detected inside the pan to alert the occupants that a leak has

occurred.

<u>Frisco Texas</u>

P2801.9 Water heaters installed in attics or with living space below: Water heaters, other than tankless, when located in an attic space or a space located above living space, shall be equipped with a WAGS, Floodstop or other approved device to automatically shut off the water supply if a water leak is detected.**Exception:** Replacement water heaters that were permitted on or before December 31, 2013, shall not be required to be equipped with an automatic Shut off device.

The following standard for the testing and certification of these devices has also beed proposed to the list of approved standards in the IRC and the IPC. **ANSI/CAN/IAPMO Z1349 Standard for Devices for Detection, Monitoring or Control of Plumbing Systems.**

This standard supports the proposals in the IRC and IPC to allow these devices as an additional option. It is an ANSI Standard

Cost Impact: Decrease

Estimated Immediate Cost Impact:

No Cost Impact. ($0)

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposal only provides an additional option that could potentially reduce construction and installation costs and does not have a cost impact since it is merely an option.
This provision could save construction and installation costs, not to mention prevent leaks from becoming damaging over time or even catastrophic. Since it is **<u>only another option, and not a required provision, it should never increase the cost of construction</u>** if the decision is made on cost alone.The proposal corrects an unsafe provision and could also potentially save tens thousands of dollars per leak incident.

Estimated Life Cycle Cost Impact:

None

Estimated Life Cycle Cost Impact Justification (methodology and variables):

None

P62-24 Part II

P63-24

IPC: 504.7.3 (New)

Proponents: Brian Kelleher, Kelleher Home Solutions, LLC, Self (bkelleher@kelleherhvac.com)

2024 International Plumbing Code

Add new text as follows:

504.7.3 Pan drain termination cap. A protection device shall be installed on the drain pan adaptor to deter pest and air exchange from passing through but still allowing water to discharge when necessary.

Attached Files

- **dyno-cap.jpg**
  https://www.cdpaccess.com/proposal/9327/28398/files/download/3923/

Reason: To deter unwanted pest and outside air from entering the home through this required 1" PVC open pipe but without compromising water to discharge when necessary. Safety and efficiency! Deter mice, snakes, scorpions, insects from entering. Prevents unconditioned outside air from entering the home environment.

Bibliography: Please see supporting documentation, including videos, and analysis at the following link:

https://www.dropbox.com/scl/fo/7admcn4t757e5xcd4ko3n/h?rlkey=o8ndpvv7k5ukrxa684n3hmpi3&dl=0 This site was created and updated on 8 January 2024.

“Performance Video 1” shows the product in place on a drain line. When the water in the pan contacts the diaphragm, it dissolves in under 5 seconds (actually about 1-3 seconds). This video uses a push on version of the device with a thin metal retaining nut previously installed on the drain line.

Performance Video 2 shows the product in place on a drain line. This video uses a push on version of the device with a larger CPVC retaining nut previously installed on the drain line. When the water in the pan contacts the diaphragm, it dissolves in under 5 seconds (actually about 1-3 seconds).

Performance Video 3 shows the product in place on a drain line. This video uses a screw on version of the device with a thin metal retaining nut previously installed on the drain line. When the water in the pan contacts the diaphragm, it dissolves in under 5 seconds (actually about 1-3 seconds).

The video “Mouse vs Dyno-Cap” video shows the ease with which a mouse can access the inside of a home via an open 1” drain line. It further shows that with the proposed product in place, the mouse is deterred from entering the house. Similar effect is expected with insects, small snakes, etc…

The video “Temperature vs Dyno Cap” shows the resistance that the proposed product has to ingress of outside air into the home. It shows temperature at the cap to be 69-F when in place, and then rapidly decreasing to below freezing in under 2 minutes when the cap is removed.

The File “Results of Temperature” is a PDF document reviewing the equipment set up and and results as seen on the “Temperature vs Dyno cap” video.

The file “Statement of pros and cons” shows supporting discussion for the cost effectiveness of the proposed product.

The File "Proposed product" contains photo of the product in 3 different potential versions.

Cost Impact: Increase

Estimated Immediate Cost Impact:

A very small cost impact of $19/water heater is expected as a one time cost for the protection product which takes less than 10 seconds to install.

Estimated Immediate Cost Impact Justification (methodology and variables):

As the inventor of the product, manufacturing cost estimates support the cost at or below $19. The product design will be available for licensing and additional manufactures may market the product for less.

P63-24

P64-24

IPC: 504.8 (New)

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Add new text as follows:

504.8 Temperature Actuated Mixing Valves. All water heaters serving facilities with domestic hot water for bathing, washing, or showering shall have a temperature actuated mixing a valve conforming to ASSE 1017.

Staff Analysis: The proposed standard are is in the current edition of the code.

Reason: It's time to require temperature controls on water heaters! Currently, there are no temperature controls on water heaters. The combination gas controls (thermostats) serving gas-fired, storage type water heaters are burner controls, and these are located near the bottom of the water heater to sense cold water coming in and to turn "on" the burner. The heating element on electric water heaters are energy controls, and they are not intended to accurately control outlet temperature in the tight temperature ranges to prevent scalding.

The water heater thermostats do not sense or control the water temperature leaving the top of a tank type water heater. Tank type heaters allow hot water temperatures leaving the top of the water heater to vary up to 30 degrees Fahrenheit (30F) from the thermostat set point temperature.

Stacking occurs when there are short, intermittent draws of hot water that draw in a little cold water to the bottom of the water heater, and this causes the burner or heating element to cycle "ON." The standards for a water heater and combination gas control valve, combined, allow a 30F rise in temperature from the level of the thermostat to the top of the water heater. A 30F rise is not safe. At 120F, it takes about 4.8 minutes to cause serious blistering burn injuries in an adult male. At 150F, an adult male can receive serious blistering burn injuries in less than one second. This is so fast, that the bather would not have time to react and get out of harm's way. Women & children have thinner skin and can be burned in less time than an adult male.

This code change to require thermostatic or temperature actuated temperature controls on water heaters is intended to protect bathers, especially children, the elderly, and handicapped persons. The inability of storage type water heaters to accurately control the outlet temperature presents a scald danger.

Because storage type water heaters do not have the ability to control the outlet temperature in ranges to avoid scalding dangers, engineers, contractors, medical personnel, and researchers have been calling for thermostatic or temperature actuated mixing valves to be installed on water heaters serving the hot water distribution system. According to researchers at Johns Hopkins University and injury lawyers that specialize in scald burns, who have researched the costs associated with burn injuries, burn injuries are very expensive to treat. Serious burn injuries have many complications—some physical, some medical, some psychological, some financial. A severely burned injury victim can end up permanently disabled and suffering from post-traumatic stress disorder (PTSD).

Burn injuries are often expensive to treat because a serious injury can cause multiple medical problems. Some of the physical injuries and medical costs that can result from burn injuries include skin damage, skin loss, and scarring and disfigurement:* Follow-up surgeries to scrape off or cut off and remove dead tissue (Debridement)

* Sepsis infection from dead tissue that rots on or in the body (Sepsis Shock)
* Contracture (Skin Tightening that limits future mobility)
* Damage to or loss of soft tissues, such as ligaments, tendons, and muscles
* Damage to bones (with severe burn injuries)
* Nerve damage
* Loss of vision

* Lung damage

* Other internal organ damage, often from medical complications.

Burn injuries often require hospital stays that are much longer than stays for non-burn injuries; the average is 8.1 days for burn victims and 4.5 days for those with non-burn injuries. Costs run much higher as well, often more than twice as high for burn-injury sufferers. The American Burn Association has stated that a burn accident survivor with 40 to 60 percent of their body burned will be in the hospital an average of 54 days, at an average cost of $780,000. If burns are more serious, costs can skyrocket. Severe burns without complications cost $1.6 million on average.

Medical Complications Increase Medical Costs of Burn Injury Victims Quickly:

* Burn injuries cause loss of skin leaving burn victims vulnerable to infections, which can add up to $120,000 in costs (occurs, on average, in 35 percent of cases).

* Skin grafts and slow healing can increase costs to $110,000 (occurs, on average, in 32 percent of cases).

* Fragile skin and skin breakdown can increase costs to $107,000 (occurs, on average, in 55 percent of cases).

* PSTD and other psychological issues can add $75,000 to hospital costs (occurs, on average, in 57 percent of cases).

* Disfigurement, scarring, and contracture can increase costs to $35,000 (occurs, on average, in 66 percent of cases).

* Serious burn injuries can require a multitude of specialists:

* Surgeons, including plastic and reconstructive surgeons

* Anesthesiologists

* Pain management specialists

* Wound-care professionals

* Various types of therapists, including physical, occupational, speech, and psychological, depending on the injuries

* Mental health professionals and social workers.

Such specialized care is not inexpensive. On top of that, the many medications—at the minimum, pain relief and antibiotics—are costly, along with specialized wound dressings, pressure bandages to help limit scarring, and blood transfusions.

Post-hospital, costs can mount if it is necessary to modify the home or the family vehicle to accommodate the new disability. Other items that can add to costs are wheelchairs or walkers, prosthetics, and orthotics. Often, specialized home health care is required.

The family of the burn victim can also suffer from financial loss after the injury, if the scald victim was the breadwinner. However, if the injury was caused by another party's negligence or recklessness, a number of economic and non-economic damages are recoverable. "Economic damages" are things such as past and future medical bills; the cost of rehabilitation, assistive devices and prostheses; and lost wages. Typical "non-economic" damages are compensation for pain and suffering, and for mental anguish resulting from the injury. No amount of compensation will undo a serious scald burn injury.This code change should eliminate most of the scald injuries and reduce litigation and liability costs, which should also help reduce the retail cost of water heaters.

Bibliography: Related research:

"Burn injuries in the older population and understanding the common causes to influence accident prevention," published in the journal Burns in June 2023, finds: "The main cause of burn injuries in the elderly of Yorkshire and Humber [England] was food preparation. The majority of the food preparation burn injuries were a scald burn due to the handling of hot fluids, either from a saucepan or a kettle. A prevention strategy aiming to make people aware of this finding can help reduce burn injuries in the over 65 years old age group."

"Pediatric major burns: a monocentric retrospective review of etiology and outcomes (2008–2020),"

published in the European Journal of Plastic Surgery in April 2022, finds: "Scalds were the main mechanism of injury (70.1%) and upper extremity was the most frequent location affected (68%). The 28.6% of patients suffered some complication, but the mortality rate was low (0.7%)."

"A state-wide analysis of pediatric scald burns by tap water, 2016–2018,"

published in Burns in December 2020, finds “a significant number of scald burn injuries by tap water in children, particularly under 5 years.”

“Burn Injury,”

published in Nature Reviews, Disease Primers, in February 2020, finds, “Development of international burn registries should facilitate better understanding of burn injury aetiologies in many vulnerable populations.”

“Pediatric Burns:

A Single Institution Retrospective Review of Incidence, Etiology, and Outcomes in 2273 Burn Patients (1995–2013)” published in the Journal of Burn Care & Research in November 2016, finds “children 6 years or younger accounted for more than half of the burn-associated hospitalizations, and were more likely to be male children suffering scald burns.” Also, “Geographical analysis revealed significantly higher incidence of burns in areas with lower incomes.”

“Preventing childhood scalds within the home: Overview of systematic reviews and a systematic review of primary studies,” published in Burns in August 2015, finds, “The paucity of evidence we found highlights the need for research to investigate the effect of interventions on reducing the incidence of childhood scalds in the home, the safe handling of food and drinks, and safe kitchen and cooking practices.”

Cost Impact: Increase

- **Berkley Nat Lab WH Retail Price Database for DOE1997-1999.pdf**
  https://www.cdpaccess.com/proposal/10283/30697/documentation/147338/attachments/download/4326/

Estimated Immediate Cost Impact:

$70 - $250 Materials Plumber's cost to consumer for a thermostatic mixing valve

$120 - $240 for a plumber to install a thermostatic mixing valve on site.

Total price range to install a thermostatic nixing valve on a water heater discharge piping at a jobsite = $190 - $490

$35-$55 Materials wholesale price for manufacturer to purchase Thermostatic Mixing Valves in bulk
$7-$15 to install a thermostatic mixing valve on a factory assembly line

Total price range to install a thermostatic mixing valve on a Water heater in a factory assembly line = $42 - $70

Estimated Immediate Cost Impact Justification (methodology and variables):

Reducing burn injuries is a health & safety issue that will save hundreds of thousands of dollars in medical costs and long term care for over 17,000 tap water scald burn victims each year.
According to Researchers at John’s Hopkins University and prominent burn injury lawyers, that have researched burn injuries, and determined that costs associated with burn injuries are very expensive.

Burn Injury Treatment And Expenses: January 23, 2018 / Catastrophic Injuries.

Serious burn injuries have many complications—some physical, some medical, some psychological, some financial. A severely burned injury victim can end up permanently disabled and suffering from post-traumatic stress disorder (PTSD). If the burn injury occurred because of someone else’s negligence or recklessness, you may have an actionable lawsuit for lost income and other damages.

Between 2016 and 2018, 52,088 people in the U.S. visited emergency departments for tap water scald burns (Over 17,000 per year).

An additional 7,270 were hospitalized and 110 died at the hospital.

In total, the cost of visits added up to $29.79 million for emergency department visits and $206.69 million for hospital stays.

Among those who were hospitalized, 41% were white, 28% were Black and 17% were Hispanic. About 9% were listed as “others” and data was missing for 5%. Race data were not available for emergency department visits.

Also, Medicaid and Medicare paid for 67% of inpatient stays and 47% of emergency department visits, reflecting that scald burns disproportionally affect older adults and lower-income populations. Medicaid covers people whose income is below a certain government threshold, while Medicare covers people who are 65 and older, regardless of income. Both programs cover people who have disabilities.

"We're all paying these costs with federal dollars, and it has a simple engineering solution," says a researcher at John's Hopkins University.

Burn Injuries Are Extremely Costly To Treat Burn injuries are often expensive to treat because a serious injury can cause multiple medical problems. Some of the physical injuries that can result from burn injuries include:

kin damage, skin loss, and scarring and disfigurement. (Elephant Man Syndrome)

ollow-up surgeries to scrape off or cut off and remove dead tissue (Debridement)

epsis infection from dead tissue that rots on or in the body

ontracture (skin tightening that limits future mobility)

amage to or loss of soft tissues such as ligaments, tendons, and muscles

amage to bones (with severe burn injuries)

erve damage

oss of vision

ung damage

ther internal organ damage, often from medical complications.

Burn injuries often require hospital stays that are much longer than stays for non-burn injuries; the average is 8.1 days for burn victims and 4.5 days for those with non-burn injuries. Costs run much higher as well, often more than twice as high for burn-injury sufferers. The American Burn Association has stated that a burn accident survivor with 40 to 60 percent of their body burned will be in the hospital an average of 54 days, at an average cost of $780,000. If burns are more serious, costs can skyrocket. Severe burns without complications cost $1.6 million on average.

Medical Complications Increase medical costs of burn Injury Victims Quickly:

urn injuries cause loss of skin leaving burn victims vulnerable to infections, which can add up to $120,000 in costs (occurs, on average, in 35 percent of cases).

kin grafts and slow healing can increase costs to $110,000 (occurs, on average, in 32 percent of cases).

ragile skin and skin breakdown can increase costs to $107,000 (occurs, on average, in 55 percent of cases).

STD and other psychological issues can add $75,000 to hospital costs (occurs, on average, in 57 percent of cases).

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Such specialized care is not inexpensive. On top of that, the many medications—at the minimum, pain relief and antibiotics—are costly, along with specialized wound dressings, pressure bandages to help limit scarring, and blood transfusions.

Post-hospital, costs can mount if it is necessary to modify the home or the family vehicle to accommodate the new disability. Other items that can add to costs are wheelchairs or walkers, prosthetics, and orthotics. Often, specialized home health care is required as well.

The family of the burn victim can also suffer from financial loss after the injury, if the scald victim was the breadwinner. However, if the injury was caused by another party's negligence or recklessness, a number of economic and non-economic damages are recoverable. "economic damages" are things such as past and future medical bills; the cost of rehabilitation, assistive devices and prostheses; and lost wages. typical "non-economic" damages are compensation for pain and suffering, and for mental anguish resulting from the injury. No amount of compensation will undo a serious scald burn injury.

But facts and figures do not come close to touching the heart of the matter. The human costs—the burn victim's physical and emotional suffering, as well as the emotional pain of family members—mean that everyone suffers when a serious burn injury occurs.

Estimated Life Cycle Cost Impact:

Between 2016 and 2018, 52,088 people in the U.S. visited emergency departments for tap water scald burns (Over 17,000 per year).

An additional 7,270 were hospitalized and 110 died at the hospital.

In total, the cost of visits added up to $29.79 million for emergency department visits and $206.69 million for hospital stays.

Among those who were hospitalized, 41% were white, 28% were Black and 17% were Hispanic. About 9% were listed as "others" and data was missing for 5%. Race data were not available for emergency department visits.

Also, Medicaid and Medicare paid for 67% of inpatient stays and 47% of emergency department visits, reflecting that scald burns disproportionally affect older adults and lower-income populations. Medicaid covers people whose income is below a certain government threshold, while Medicare covers people who are 65 and older, regardless of income. Both programs cover people who have disabilities.

"We're all paying these costs with federal dollars, and it has a simple engineering solution," says a researcher at John's Hopkins University.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

See Berkley LAbs report on WH Retail Pricing.

P64-24

P65-24

IPC: 602.2

Proponents: Kyle Thompson, Technical Director, Plumbing Manufacturers International, Plumbing Manufacturers International (kthompson@safeplumbing.org)

2024 International Plumbing Code

Revise as follows:

602.2 Potable water required.
Only potable water shall be supplied to plumbing fixtures that provide water for drinking, bathing or culinary purposes, or for the processing of food, medical or pharmaceutical products. Unless otherwise provided in this code, potable water shall be supplied to all plumbing fixtures. <u>Water closets supplied by an alternate non-potable water source for use in flushing shall also be supplied with an equal-sized potable water line that is dry until in use.</u>

Reason: The objective of this proposal is to safeguard an individual's freedom to choose between a conventional flush toilet and a smart toilet or personal hygiene device (bidet seat) for their home, ensuring that the code upholds this right.

The current code incorporates provisions for providing non-potable water indoors specifically for toilet flushing and other applications. In instances where a building is plumbed with a non-potable water supply line to the toilet, residents opting for a smart toilet or personal hygiene device, whether out of necessity or choice, must connect to the available non-potable water supply or re-pipe with a potable water supply line for proper installation of the smart toilet – often incurring prohibitive expenses. The code restricts the use of non-potable water for activities like bathing, washing with faucets, showerheads, tub spouts, etc. This same consideration should be extended to personal hygiene devices and smart toilets, crucial for many Americans due to medical conditions, or preferred for reasons of cleanliness, health, and environmental awareness.

Making an allowance in the existing code for the inclusion of these products, which adhere to all major plumbing codes and boast a longstanding presence in the market, is important for ensuring public health and safety. The U.S. smart toilet market, valued at $1.8 billion, is anticipated to surpass $3 billion within the next five years. Individuals across the United States incorporate these products into their bathrooms, with some relying on them for maintaining dignity, privacy, and self-reliance, especially those with special needs or limited mobility.

Ensuring ease of cleaning is immediately beneficial and crucial for seniors, significantly impacting their hygiene. Moreover, individuals facing colorectal issues like hemorrhoids, irritable bowel syndrome (IBS), and inflammatory bowel disease (IBD),[1.] along with pregnant women experiencing severe constipation or postpartum recovery,[2.] derive additional hygiene-related advantages from these products. They also contribute to maintaining hand hygiene, a critical factor in preventing the spread of diseases.[3.]

Beyond hygiene, many smart toilets feature health monitoring capabilities that analyze stool or urine to detect health issues such as sugar levels in diabetics. These innovations have proven especially beneficial for stroke rehabilitation[4.]. For certain individuals who cannot use toilet paper due to medical reasons, personal hygiene devices are indispensable. Additionally, these devices have demonstrated a reduction in instances of rashes, hemorrhoids, and urinary tract infections.

In essence, these products are vital for numerous individuals across the United States in preserving their health. However, the existing code could impede the installation of such products in residential bathrooms where the building is plumbed with a non-potable water supply line to the toilet.

This proposal aims to guarantee residents the freedom to choose personal hygiene devices or smart toilets for their homes. It specifies the availability of a potable water supply if builders opt to install non-potable water lines for toilet flushing. To prevent stagnant water conditions, the proposal necessitates keeping the potable water line dry until it is in use. Achieving this could involve installing a water line from the lavatory and incorporating a labeled shutoff valve at the lavatory.

Furthermore, the code already approves using personal hygiene devices that conform to ASME A112.4.2/CSA B45.16. This industry standard requires that a personal hygiene device includes backflow protection through an atmospheric vacuum breaker, air space type vacuum breaker, or air gap fitting.

Non-potable water treated to the level for use in toilet flushing that is compliant with the code, applicable laws, rules, ordinances, and NSF/ANSI 350 or IGC 324 is not equivalent to the level of safety that is dictated by federal law for potable water. Many individuals that use smart toilets and personal hygiene devices do so out of necessity due to disabilities and/or underlying health issues (e.g., arthritis, urinary tract infections, hemorrhoids, anal fissures). The quality level of water that is used with smart toilets and personal hygiene devices must be free of any pathogens, etc., that could cause infection or disease, and therefore, must be treated at a minimum in accordance with regulations for potable water.

Though it is always wise to consult a building official before tackling a new project, the codes do not require a permit to be pulled for every installation in a residential occupancy. For example, the IRC allows for the removal and reinstallation of a toilet without a permit if the installation does not involve or require the replacement or rearrangement of valves, pipes, or fixtures (Section R105.2). A personal hygiene device or smart toilet would meet this exemption as they are installed using the existing plumbing components and piping configuration.

Bibliography: 1.
"How to Decide If You Need a Bidet," by Amber J. Tresca, 2019, Verywell Health, https://www.verywellhealth.com/do-i-need-a-bidet-1942839

2. "The Effect of Bidet Use on Severity of Constipation and Quality of Life Among Pregnant Women," by Sultan Alan, Ebru Gozuyesil and Sule Gokyildiz Surucu, August 2020, Yonago Acta Medica (YAM), Journal of Medical Sciences, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7435113/

3. "The Use of Electric Toilet Seats with Water Supply Is Efficacious in Maintaining Hand Hygiene in Experimental Model," by Shigeharu Oie, Hiromi Aoshika, Emiko Arita and Akira Kamiya, 2018, Japanese Journal of Infectious Diseases, https://www.jstage.jst.go.jp/article/yoken/71/4/71_JJID.2017.515/_article/-char/en

4. "Technology-assisted toilets: Improving independence and hygiene in stroke rehabilitation," by David Yachnin, Georges Gharib, Jeffrey Jutai and Hillel Finestone, August 2017, Journal of Rehabilitation and Assistive Technologies Engineering, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6453101/

Cost Impact: Increase

Estimated Immediate Cost Impact:

Increase cost of $175 for rough in of potable water supply line that is dry until in use.

Estimated Immediate Cost Impact Justification (methodology and variables):

a. Rough-in of potable water line that is dry until in use:
i. Parts: shutoff valve ($40), 20 ft copper pipe ($60).
ii. Plumbing Labor: 0.5-hour labor @$150/hr ($75).
iii. Total $175

Estimated Life Cycle Cost Impact:

Savings of $775 for re piping when compared with the cost of rough in of potable supply pipe.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

a. Re-pipe for potable water supply line after construction:
i. Construction
1. Parts: Estimate Drywall $2.50/sq ft., Tile $10/sq ft.
2. Construction Labor: $100/hr.
3. Construction Subtotal: Remove and restore 20sq ft of drywall and tile. 2 hr labor plus parts (Sub Total $450).
ii. Plumbing
1. Parts: Shutoff valve ($40), 20 ft copper pipe ($60).

2. Plumbing Labor: $150/hr.

3. Plumbing Subtotal: Reframe for new plumbing, pipe and fitting installation. 2 hr labor plus parts (Sub Total: $400).

iii. Permit: $100.

iv. Total $950 for re-pipe after construction.

P65-24

P66-24

IPC: 602.2.1 (New), ASHRAE Chapter 15 (New)

Proponents: Emily Toto, ASHRAE, ASHRAE (etoto@ashrae.org)

2024 International Plumbing Code

Add new text as follows:

602.2.1 Pathogen Control. Where required, water supply and distribution systems shall be designed and maintained to control Legionella and other pathogens in accordance with ASHRAE 188 and ASHRAE 514.

Add new standard(s) as follows:

ASHRAE

ASHRAE
180 Technology Parkway
Peachtree Corners, GA 30092

ASHRAE 188-2021	Legionellosis: Risk Management for Building Water Systems
ASHRAE 514-2023	Risk Management for Building Water Systems: Physical, Chemical, and Microbial Hazards

Staff Analysis: A review of the standard proposed for inclusion in the code, ASHRAE 188-2021 *Legionellosis: Risk Management for Building Water Systems* and ASHRAE 514-2023 *Risk Management for Building Water Systems: Physical, Chemical, and Microbial Hazards,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: ASHRAE Standard 188 provides minimum legionellosis risk management requirements for the design, construction, commissioning, operation, maintenance, repair, replacement, and expansion of new and existing buildings and their associated (potable and non-potable) water systems and components.

Standard 188 has been in development for over 12 years by a cross-section of expert stakeholders. It has been supported by the CDC and was adopted as the basis for their Legionella Toolkit. It is increasingly being adopted by state and local jurisdictions, for example New York and Michigan. Additionally, the Alliance to Prevent Legionnaires' Disease endorses the use of ASHRAE Standard 188 by building owners and operators holistically to support risk management against legionella for the entire building.

ASHRAE Standard 188 gives building owners a structured approach to develop water management plans designed for their specific facility to assist with legionella prevention. Further, it takes into consideration the risks of incoming water quality that can result in building and residential water quality and bacterial issues, which is sometimes overlooked.

In contrast, ASHRAE Standard 514 is broader in scope to include chemical, physical, and microbial hazards. Thus, having both references will ensure the necessary steps are taken to maintain optimal water quality.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The cost will vary based on the specifics of the water management plan. However, the cost is associated with developing and carrying out a water management plan will be orders of magnitude less than the cost of remediation and possible litigation should there be an outbreak.

An estimated cost based on a previous project is $4,000 in upfront cost (for a consultant) and $1600 - $2600 annual cost for training and testing.

Estimated Immediate Cost Impact Justification (methodology and variables):

Consultant cost for generating water plan: $4,000 assuming 40 hours of work.

Staff training: $600 per year assuming 2 hour training session at a rate of $20/hr per person and 15 people being trained.

Testing: $1,000 - $2,000 per year assuming 20 tests/year.

P66-24

P67-24

IPC: 604.4, 604.4.1 (New), 604.4.2 (New), TABLE 604.4

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Bradley Corp. (jbengineer@aol.com)

2024 International Plumbing Code

Revise as follows:

604.4 Maximum flow and water consumption.
The maximum water consumption flow rates and quantities for all plumbing fixtures and fixture fittings shall be in accordance with Table 604.4.

~~**Exceptions:**~~

1. ~~Blowout design water closets having a water consumption not greater than 3$^1/_2$ gallons (13 L) per flushing cycle.~~
2. ~~Vegetable sprays.~~
3. ~~Clinical sinks having a water consumption not greater than 4$^1/_2$ gallons (17 L) per flushing cycle.~~
4. ~~Service sinks.~~
5. ~~Emergency showers.~~

Add new text as follows:

604.4.1 Group wash fixtures. Group wash fixtures used as public lavatories shall have a maximum water consumption flow rate in accordance with Table 604.4 based on each 16 inches of rim space.

604.4.2 Emergency fixtures. The maximum flow rates in Table 604.4 shall not apply to emergency fixtures.

Revise as follows:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Clinical sink	4.5 gallons per flushing cycle
Lavatory, private	2.2 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a, c]	2.0 gpm at 80 psi
~~Sink~~ Kitchen sink faucet	2.2 gpm at 60 psi
Urinal	1.0 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle
Water closet, blowout	3.5 gallons per flushing cycle

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1-2020/CSA B125.1.

Reason: This proposal is an alternative approach for addressing the exceptions currently listed in Section 604.4. Clinical sink and blowout water closets have been added to the table since there are water consumption requirements. These are not exceptions.

The other change to the table is the addition of the word “kitchen” in front of sink faucet in Table 604.4. The Federal water conservation requirements are very clear in listing kitchen faucets. The use of the term “sink faucets” has led to some of the confusion regarding what sinks are regulated for water conservation.

A new subsection is proposed for determining the water consumption use for group wash fixtures used as public lavatories. Section 419.1 lists a rim space to be classified as a lavatory. However, for water consumption applications, the spacing listed is not consistent with the use of the fixture. The manufacturers have allocated the water use for each 16 inches of rim space.

The other new subsection states that emergency fixtures, showers, eyewash, or facewash, are not regulated by Table 604.4. This is consistent with the Federal requirements.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is editorial. If one reviews the change, they will notice that there is no additional requirements for plumbing fixtures. The text is simplified into a table format for better understanding. Hence, this has no impact on the cost of construction.

P67-24

P68-24

IPC: 604.4, 604.4.1 (New), 604.4.2 (New), 604.4.3 (New), 604.4.4 (New), TABLE 604.4

Proponents: Julius Ballanco, P.E., JB Engineering and Code Consulting, P.C., Bradley Corp. (jbengineer@aol.com)

2024 International Plumbing Code

Revise as follows:

604.4 Maximum flow and water consumption.
The maximum water consumption flow rates and quantities for all plumbing fixtures and fixture fittings shall be in accordance with Table 604.4 and Section 604.4.1 through 604.4.4.

~~**Exceptions:**~~

1. ~~Blowout design water closets having a water consumption not greater than 3 1/2 gallons (13 L) per flushing cycle.~~
2. ~~Vegetable sprays.~~
3. ~~Clinical sinks having a water consumption not greater than 4 1/2 gallons (17 L) per flushing cycle.~~
4. ~~Service sinks.~~
5. ~~Emergency showers.~~

Add new text as follows:

604.4.1 Blowout water closets. Blowout design water closets shall have a maximum water consumption of 3-1/2 gallons (13 L) per flushing cycle.

604.4.2 Clinical Sinks. Clinical sinks shall have a maximum water consumption of 4-1/2 gallons (17 L) per flushing cycle.

604.4.3 Group wash fixtures. Group wash fixtures used as public lavatories shall have a maximum water consumption flow rate in accordance with Table 604.4 based on each 16 inches of rim space.

604.4.4 Vegetable sprays, service sinks, and emergency fixtures. The maximum flow rates in Table 604.4 shall not apply to vegetable sprays, service sinks, and emergency fixtures.

Revise as follows:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Lavatory, private	2.2 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a, c]	2.0 gpm at 80 psi
Kitchen ~~Sink~~ sink faucet	2.2 gpm at 60 psi
Urinal	1.0 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1-2020/CSA B125.1.

Reason: The primary purpose of this proposal is to remove the exceptions from Section 604.4. Many of the exceptions are not exceptions, they are additional requirements. As such, the requirements belong as subsections of the main section. The fixtures that are not listed as not having applicable requirements are technically not even listed in Table 604.4. However, these fixtures were added as exceptions to clarify that the table requirements do not apply. Rather than removing these fixtures from the additional requirements, they have been combined and added as the last subsection indicating that the water consumption requirements do not apply.

For the other items, blowout water closets and clinical sinks, the water consumption requirements are included in the first two subsections. However, it should be noted that both of these fixtures could be added to Table 604.4 since there are maximum water consumption requirements for the fixtures.

The final additional subsection is for determining the water consumption use for group wash fixtures used as public lavatories. Section 419.1 lists a rim space to be classified as a lavatory. However, for water consumption applications, the spacing listed is not consistent with the use of the fixture. The manufacturers have allocated the water use for each 16 inches of rim space.

The final modification is the addition of the word “kitchen” in front of sink faucet in Table 604.4. The Federal water conservation requirements are very clear in listing kitchen faucets. The use of the term “sink faucets” has led to some confusion regarding what sinks are regulated for water conservation.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This change is editorial as current code requirements are being reformatted for clarity.

P68-24

P69-24

IPC: TABLE 604.4

Proponents: Anthony Floyd, City of Scottsdale, City of Scottsdale (afloyd@scottsdaleaz.gov); Edward R. Osann, Natural Resources Defense Council, Natural Resources Defense Council (eosann@nrdc.org)

2024 International Plumbing Code

Revise as follows:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Lavatory, private	2.2 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a, c]	2.0 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Urinal	~~1.0~~0.5 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1-2020/CSA B125.1.

Reason: Urinals can account for a significant amount of indoor water usage in commercial and institutional buildings. A typical urinal getting 18 flushes a day over 260 weekdays will draw and discharge nearly 5,000 gallons of water per year if operating at the IPC's maximum flush volume of 1 gallon per flush. In light if this, in 2009 the US EPA WaterSense Program published a voluntary specification for flushing urinals, with a maximum flush volume of 0.5 gallons per flush while conforming with all other applicable industry standards. Manufacturers responded with scores of urinal models having a maximum flush rate of 0.5 gallons or less without sacrificing product performance.

All flushing urinals produce calcite build-up in the urinal trapway and drain pipes caused by the bonding of the mineral ions in the flush water with the sediment in urine. As such, build-up occurs in all flushing urinals from 1.0 gpf down to 0.1 gpf and is not any greater for 0.5 gpf urinals.

Based on WaterSense product listings from January 2024, there are 19 brands and 399 models of flushing urinals and 17 brands and 407 models of urinal flush valves sold separately that meet the 0.5 gpf criterion, demonstrating the commercial viability and availability of water-efficient urinals. To date, 12 states (including New York and California) and the District of Columbia have adopted requirements limiting new urinals to a maximum flush volume of 0.5 gallons or less.

The installation of urinals that conform to this proposal will save building owners on water and wastewater charges (see cost impact statement below) and help protect public water supplies by reducing unnecessary water use over the life of the building.

Bibliography: EPA WaterSense
- https://www.epa.gov/watersense/urinals

Considerations for Reduced Water Consumption Rates of Urinal Fixtures (Sloan Valve) - https://www.sloan.com/sites/default/files/2016-01/hybrid-urinal-whitepaper.pdf

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The code change proposal will decrease the cost of construction, with a likely range of cost reduction of $30 to $0 per urinal. In most cases, there is little cost difference between urinals that flush at 0.5 gpf, as proposed here, and those that flush at 1.0 gpf, the volume allowed in the IPC. Numerous examples are found where the price of 0.5 gpf units are the same or less.

Our review (below) of current pricing information reaffirms what the US EPA WaterSense program found comparing 1.0 gpf units with 0.5 gpf units in 2017, when it stated:

"Our product research has found that high-efficiency urinal fixtures and flushing devices are no more expensive than their standard (1.0 gpf) counterparts. The average price of a new high-efficiency or standard urinal fixture is about $350 and the average cost for a high-efficiency or standard pressurized flushing device (flushometer valve) is approximately $200. Because there is very little to no cost difference between high-efficiency flushing urinals and standard flushing urinals, installing high-efficiency models in new construction or as part of the natural replacement process is cost-effective with immediate payback in water cost savings."

See https://19january2017snapshot.epa.gov/www3/watersense/pubs/faq_lfu.html#two.

Estimated Immediate Cost Impact Justification (methodology and variables):

Pricing information is from the W. W. Grainger web site,

<https://www.grainger.com/category/plumbing?analytics=nav> accessed January 8, 2024, and illustrates this point.

Urinal flush valves and urinal fixtures are frequently sold separately, as well as in combination. Urinal fixture models can be found that are rated to operate at *both* 1.0 gpf and 0.5 gpf, allowing for a flush valve of either 0.5 gpf or 1.0 gpf to be affixed to the fixture. Thus, for a significant group of urinal fixtures, there is *no difference* in cost because the same fixture can perform at either flush volume, as controlled by the specific flush valve selected. Among wall-mounted washout urinals with a top spud, the least expensive fixture model carried by Grainger is the Gerber Lafayette, rated at both 1.0 gpf and 0.5 gpf, offered at $137. Other examples include American Standard Maybrook, rated at 0.1, 0.25, and 0.5 gpf, priced at $197; Sloan, rated at 0.1, 0.25, and 0.5 gpf, priced at $195.50; and Kohler Darfield, rated at both 1.0 gpf and 0.5 gpf, priced at $412. For wall-mounted urinals with back spuds, all seven of the models offered by Grainger were rated at 0.5 gpf or less.

Urinal flush valves can vary in cost based on spud and inlet dimensions and internal mechanism. But where manufactures are offering comparable products that differ only in flush volume, there is little difference in price. For American Standard piston-type manual valves with 3/4 in spud coupling and 3/4 in inlet, the 1.0 gpf model is priced at $143.21 and the 0.5 gpf model is priced at $143.83. Similarly, Toto offers a comparable piston-type valve priced at $276.42 for the 1.0 gpf model and $280.40 for the 0.5 gpf model, a difference of less than 2%. In manual diaphragm-type valves, the Zurn Aquaflush Z6003 rated at 1.0 gpf is priced at $176.21, while the same model rated at 0.5 gpf is priced at $134.12, significantly less. The Sloan Royal diaphragm-type valve with the same dimensions flushing at 1.0 gpf is priced at $253.63, while the comparable model flushing at 0.5 gpf is priced at $223.15, also significantly less. Automatic flush valves are significantly more expensive than manual valves, but again, several examples can be found of manufacturers offering valves that are similar in all dimensions and differ only in flush volume, with models rated at 1.0 gpf and 0.5 gpf being priced at nearly the same levels. For example, Zurn's Metroflush ZEM6203 electric valves are priced identically in both 1.0 gpf and 0.5 gpf models.

Estimated Life Cycle Cost Impact:

Cost savings attributable to reduced water and sewer charges to the building owner ($22 per year) over a 30-year period have a present value of approximately $430 in current dollars.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Water savings to the building owner or tenant will vary by usage, of course. But for a urinal receiving typical usage of 18 flushes per day over 260 weekdays per year (assumptions used by WaterSense in their own analysis), the savings in water and wastewater charges from flushing at 0.5 gpf rather than 1.0 gpf amount to about $22 per year per urinal, based on a national average $9.09/kgal for the quantity charge for water and wastewater service to commercial customers as of July 2022, as reported by the Water and Wastewater Rate Survey produced by the American Water Works Association, Raftelis Financial Consultants, Inc, and posted here: https://ellio.raftelis.com/Account/AWWA. Applying a 3% discount rate over 30 years, these savings have a present value of $431 per urinal, based on standard discounted cash flow analysis.

See: https://www.gigacalculator.com/calculators/dcf-calculator.php

P69-24

P70-24 Part I

IPC: TABLE 604.4

Proponents: Diana Burk, Energy Solutions, Energy Solutions (dburk@energy-solution.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Lavatory, private	~~2.2~~ 1.2 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a, c]	2.0 gpm at 80 psi
Sink faucet	~~2.2~~ 1.8 gpm at 60 psi[d]
Urinal	1.0 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1-2020/CSA B125.1.

d. Kitchen faucets shall be permitted to temporarily increase the flow above the maximum rate, but not to exceed 2.2 gpm at 60 psi provided that the faucet reverts to a maximum flow rate of 1.8 gpm at 60 psi upon valve closure.

Reason: Residential Lavatory Faucets: This proposal requires a maximum flow rate of 1.2 gallon per minute (gpm) at 60 psi standard for residential lavatory faucets. These standards have been adopted in multiple states, including California, Hawaii, Oregon, Washington, Maine, and New York. There is wide technological availability—of the 12,602 lavatory faucets and aerators listed in DOE's Compliance Certification Database, 10,607 or 85% meet the 1.2 gpm standard. In their analysis to establish this standard in 2013, the California Energy Commission found no or very low incremental costs for compliant products.[1] Plumbing and sewer systems in older buildings are not expected to be negatively impacted as the standards allow for only 20% less water to flow.

Res Kitchen Faucets: This proposal requires a maximum flow rate of 1.8 gpm (with a 2.2 gpm override) at 60 psi for kitchen faucets. These standards have been adopted in multiple states including Maine, Massachusetts, New Jersey, New York and Vermont. This standard provides water savings but maintains consumer utility for pot filling allowing a 2.2 gpm override. 2.2 gpm is the same level as the current Watersense standard. There is wide technological availability—of the 11,519 kitchen faucets and aerators listed in DOE's Compliance Certification Database, 7,173 or 62% meet the 1.8 gpm standard. In plumbing systems in older buildings are not expected to be negatively impacted as the standards allow for only 18% less water to flow.

This proposal would save 5,200 gallons of water per year and result in $1,000 in cost savings over the lifetime of the faucet for a typical residence.

Bibliography: [1]https://efiling.energy.ca.gov/GetDocument.aspx?tn=71768&DocumentContentId=8103#:~:text=The%20proposed%20standard%20for%20kitchen,flow%20rate%20to%202.2%20gpm.

[2]https://efiling.energy.ca.gov/GetDocument.aspx?tn=71768&DocumentContentId=8103#:~:text=The%20proposed%20standard%20for%20kitchen,flow%20rate%20to%202.2%20gpm.

[3]https://www.calmac.org/publications/Del13B_CS_Report_Appl-Stds_FINAL_2021-06-30.pdf

[4] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

[5]https://www.safeplumbing.org/files/safeplumbing.org/documents/misc/7-1-19-WaterSense-2019-Report.pdf

[6] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

[7] https://www.eia.gov/consumption/residential/data/2020/#waterheating

[8] https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_3

[9] https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm

[10] https://www.eia.gov/dnav/pet/pet_pri_wfr_dcus_nus_m.htm

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0. In their analysis to establish this standard in 2013, the California Energy Commission found no or very low incremental costs for compliant products.[2]

Estimated Immediate Cost Impact Justification (methodology and variables):

The California Energy Commission report found very little price difference between higher and lower efficiency faucets and faucet accessories. The CEC reviewed the whole sale catalog of NEOPERL, a major manufacturer, and found there was no cost difference between qualifying and non-qualifying product.[2]

Estimated Life Cycle Cost Impact:

This proposal would save 5,200 gallons of water per year and result in $1,000 in cost savings over the lifetime of the faucets in a typical dwelling unit.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

To estimate the roughly $1,000 in life cycle cost savings, a conservative assumption of saving 1,140 gallons of water per year resulting in 91kWh of electricity savings and 4.6 therms/year of savings from a natural gas or oil water heater was made based on savings estimates from the appliance standards awareness program[3] and an appliance standards evaluation report for California.[4] It was assumed that a typical dwelling unit has roughly 3.5 lavatory faucets and 1 kitchen faucet.[5] Water and waste water prices were estimated at $11 per thousand gallons and the effective useful life of the faucet was estimated to be 10 years.[6] It was assumed that 48% of water heaters were natural gas, 46% were electric and 6% were fuel oil based on the 2020 Residential Energy Consumption Survey.[7]Electricity was estimated to cost $0.15/kWh[8], fuel oil was estimated at $3.06/therm[10] and natural gas was estimated at $1.42/therm[9] using annual prices from the Energy Information Administration.

P70-24 Part I

P70-24 Part II

IRC: TABLE P2903.2

Proponents: Diana Burk, Energy Solutions, Energy Solutions (dburk@energy-solution.com)

2024 International Residential Code

Revise as follows:

TABLE P2903.2 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS [b]

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY
Lavatory faucet	~~2.2~~1.2 gpm at 60 psi
Shower head [a]	2.5 gpm at 80 psi
Sink faucet	~~2.2~~1.8 gpm at 60 psi[c]
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.c

a. A hand-held shower spray shall be considered to be a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Kitchen faucets shall be permitted to temporarily increase the flow above the maximum rate, but not to exceed 2.2 gpm at 60 psi provided that the faucet reverts to a maximum flow rate of 1.8 gpm at 60 psi upon valve closure.

Reason: Residential Lavatory Faucets: This proposal requires a maximum flow rate of 1.2 gallon per minute (gpm) at 60 psi standard for residential lavatory faucets. These standards have been adopted in multiple states, including California, Hawaii, Oregon, Washington, Maine, and New York. There is wide technological availability—of the 12,602 lavatory faucets and aerators listed in DOE's Compliance Certification Database, 10,607 or 85% meet the 1.2 gpm standard. In their analysis to establish this standard in 2013, the California Energy Commission found no or very low incremental costs for compliant products.[1] Plumbing and sewer systems in older buildings are not expected to be negatively impacted as the standards allow for only 20% less water to flow.

Res Kitchen Faucets: This proposal requires a maximum flow rate of 1.8 gpm (with a 2.2 gpm override) at 60 psi for kitchen faucets. These standards have been adopted in multiple states including Maine, Massachusetts, New Jersey, New York and Vermont. This standard provides water savings but maintains consumer utility for pot filling allowing a 2.2 gpm override. 2.2 gpm is the same level as the current Watersense standard. There is wide technological availability—of the 11,519 kitchen faucets and aerators listed in DOE's Compliance Certification Database, 7,173 or 62% meet the 1.8 gpm standard. In plumbing systems in older buildings are not expected to be negatively impacted as the standards allow for only 18% less water to flow.

For a typical single family home, this proposal would save 5,200 gallons of water per year and result in $1,000 in cost savings over the lifetime of the faucets.

Bibliography: [1]https://efiling.energy.ca.gov/GetDocument.aspx?tn=71768&DocumentContentId=8103#:~:text=The%20proposed%20standard%20for%20kitchen,flow%20rate%20to%202.2%20gpm.

[2]https://efiling.energy.ca.gov/GetDocument.aspx?tn=71768&DocumentContentId=8103#:~:text=The%20proposed%20standard%20for%20kitchen,flow%20rate%20to%202.2%20gpm.

[3]https://www.calmac.org/publications/Del13B_CS_Report_Appl-Stds_FINAL_2021-06-30.pdf

[4] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

[5]https://www.safeplumbing.org/files/safeplumbing.org/documents/misc/7-1-19-WaterSense-2019-Report.pdf

[6]https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

[7]https://www.eia.gov/consumption/residential/data/2020/#waterheating

[8] https://www.eia.gov/electricity/monthly/epm_table_grapher.php?t=epmt_5_3

[9] https://www.eia.gov/dnav/ng/ng_pri_sum_dcu_nus_a.htm

[10] https://www.eia.gov/dnav/pet/pet_pri_wfr_dcus_nus_m.htm

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0. In their analysis to establish this standard in 2013, the California Energy Commission found no or very low incremental costs for compliant products.[2]

Estimated Immediate Cost Impact Justification (methodology and variables):

The California Energy Commission report found very little price difference between higher and lower efficiency faucets and faucet accessories. The CEC reviewed the whole sale catalog of NEOPERL, a major manufacturer, and found there was no cost difference between qualifying and non-qualifying product.[2]

Estimated Life Cycle Cost Impact:

This proposal would save 5,200 gallons of water per year and result in $1,000 in cost savings over the lifetime of the faucet.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

To estimate the roughly $1,000 in life cost savings, a conservative assumption of saving 1,140 gallons of water per year resulting in 91 kWh of electricity savings and 4.6 therms/year of savings from a natural gas or oil water heater was made based on savings estimates from the appliance standards awareness program[3] and an appliance standards evaluation report for California.[4] It was assumed that a typical single family home which has roughly 3.5 lavatory faucets and 1 kitchen faucet.[5] Water and waste water prices were estimated at $11 per thousand gallons and the effective useful life of the faucet was estimated to be 10 years.[6] It was assumed that 48% of water heaters were natural gas, 46% were electric and 6% were fuel oil based on the 2020 Residential Energy Consumption Survey.[7]Electricity was estimated to cost $0.15/kWh[8], fuel oil was estimated at $3.06/therm[10] and natural gas was estimated at $1.42/therm[9] using annual prices from the Energy Information Administration.

P70-24 Part II

P71-24

IPC: TABLE 604.4

Proponents: Diana Burk, Energy Solutions, Energy Solutions (dburk@energy-solution.com)

2024 International Plumbing Code

Revise as follows:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Lavatory, private	2.2 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a, c]	2.0 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Urinal	~~1.0~~ 0.125 gallon per flushing cycle
Water closet	1.6 gallons per flushing cycle

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1-2020/CSA B125.1.

Reason: This proposal requires a maximum of 0.125 gallons per flush (gpf) for urinals. These standards have been adopted in multiple states including New York State, Washington and California. There is wide technological availability and very cost-effective water savings. The proposed standards are significantly more efficient than the current requirements in the 2024 International Plumbing Code. Urinal requirements provide significant additional benefit while still maintaining consumer satisfaction. There is wide technological availability—of the 166 urinals listed in DOE's Compliance Certification Database, 59 or 36% meet the 0.125 gpf standard. Since urinals only manage liquid waste and are installed almost exclusively in non-residential settings, it is not expected that plumbing challenges would be faced regarding insufficient sewage movement. For a typical office building which has roughly 6 urinals, this proposal would result in no increase in construction costs but would save approximately 14,040 gallons of water per year and result in $312 in water/sewer cost savings over the lifetime of the urinal.

Bibliography: [1] https://droughtresilience.com/wp-content/uploads/2018/08/CEC-400-2014-007-SD.pdf

[2]https://www.calmac.org/publications/Del13B_CS_Report_Appl-Stds_FINAL_2021-06-30.pdf

[3] https://www.safeplumbing.org/files/safeplumbing.org/documents/misc/7-1-19-WaterSense-2019-Report.pdf

[4] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0. There is no immediate cost impact.

Estimated Immediate Cost Impact Justification (methodology and variables):

In their analysis to establish this standard in 2015, the California Energy Commission found the incremental cost for urinals is zero because there is no cost premium for a compliant product.[1]

Estimated Life Cycle Cost Impact:

For a typical office building which has roughly 6 urinals, this proposal would save approximately 14,040 gallons of water per year and result in $312 in water/sewer cost savings over the lifetime of the urinal.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

To estimate the roughly $312 in lifecycle cost savings, it was assumed the urinal would save 2,340 gallons of water per year.[2] It was assumed that a typical office building has roughly 6 urinals.[3]Water and waste water prices were estimated at $11 per thousand gallons and the effective useful life of the urinal was estimated to be 12 years.[4]

P71-24

P72-24 Part I

IPC: TABLE 604.4

Proponents: Diana Burk, Energy Solutions, Energy Solutions (dburk@energy-solution.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

TABLE 604.4 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY[b]
Lavatory, private	2.2 gpm at 60 psi
Lavatory, public (metering)	0.25 gallon per metering cycle
Lavatory, public (other than metering)	0.5 gpm at 60 psi
Shower head[a, c]	2.0 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Urinal	1.0 gallon per flushing cycle
Water closet	~~1.6~~ 1.28 gallons per flushing cycle[d]

For SI: 1 gallon = 3.785 L, 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray is a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. Shower heads shall comply with all requirements for high-efficiency showerheads in ASME A112.18.1-2020/CSA B125.1.

d. The flush volume for a dual-flush water closet is defined as the composite, average flush volume of two reduced flushes and one full flush.

Reason: This proposal requires a maximum of 1.28 gallons per flush (gpf). 1.28 gpf is the same level as the current Watersense standard. There is wide technological availability and very cost-effective water savings. Of the 2,215 water closets listed in DOE's Compliance Certification Database, 566 or 25% meet the 1.28 gpf standard. Plumbing systems in older buildings are not expected to be negatively impacted as the standards allow for only 20% less water to flow. While this proposal results in significant water savings, the incremental impact for a building's plumbing system is negligible. For a typical office building which has roughly 13 toilets, this proposal would not increase construction costs but could save approximately 6,300 gallons of water per year and result in $850 in water/sewer cost savings over the lifetime of the toilet.

Bibliography: [1] https://droughtresilience.com/wp-content/uploads/2018/08/CEC-400-2014-007-SD.pdf

[2]https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

[3] https://www.safeplumbing.org/files/safeplumbing.org/documents/misc/7-1-19-WaterSense-2019-Report.pdf

[4] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0. There is no immediate cost impact.

Estimated Immediate Cost Impact Justification (methodology and variables):

In their analysis to establish this standard in 2015, the California Energy Commission found the incremental cost for toilets is zero because there is no cost premium for a compliant product.[1]

Estimated Life Cycle Cost Impact:

For a typical office building which has roughly 13 toilets, this proposal would not increase construction costs but could save approximately 6,300 gallons of water per year and result in $850 in water/sewer cost savings over the lifetime of the toilet.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

To estimate the roughly $850 in lifecycle cost savings, we assumed the toilet would save 488 gallons of water per year.[2] It was assumed that a typical office building has roughly 13 toilets.[3]Water and waste water prices were estimated at $11 per thousand gallons and the effective useful life of the toilet was estimated to be 12 years.[4]

P72-24 Part I

P72-24 Part II

IRC: TABLE P2903.2

Proponents: Diana Burk, Energy Solutions, Energy Solutions (dburk@energy-solution.com)

2024 International Residential Code

Revise as follows:

TABLE P2903.2 MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS [b]

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY
Lavatory faucet	2.2 gpm at 60 psi
Shower head [a]	2.5 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Water closet	~~1.6~~ 1.28 gallons per flushing cycle[c]

For SI: 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa.

a. A hand-held shower spray shall be considered to be a shower head.

b. Consumption tolerances shall be determined from referenced standards.

c. The flush volume for a dual-flush water closet is defined as the composite, average flush volume of two reduced flushes and one full flush.

Reason: This proposal requires a maximum of 1.28 gallons per flush (gpf). 1.28 gpf is the same level as the current Watersense standard. There is wide technological availability and very cost-effective water savings. Of the 2,215 water closets listed in DOE's Compliance Certification Database, 566 or 25% meet the 1.28 gpf standard. Plumbing systems in older buildings are not expected to be negatively impacted as the standards allow for only 20% less water to flow. While this proposal results in significant water savings, the incremental impact for a building's plumbing system is negligible.

For a typical single family home which has roughly 2.4 toilets, this could proposal would result in no increase in incremental costs and could save approximately 861 gallons of water per year and result in $584 in lifetime water/sewer cost savings over the 25 year lifetime of the toilet.

Bibliography: [1] https://droughtresilience.com/wp-content/uploads/2018/08/CEC-400-2014-007-SD.pdf

[2]https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

[3] https://www.safeplumbing.org/files/safeplumbing.org/documents/misc/7-1-19-WaterSense-2019-Report.pdf

[4] https://appliance-standards.org/sites/default/files/States%20Go%20First.pdf

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0. There is no immediate cost impact.

Estimated Immediate Cost Impact Justification (methodology and variables):

In their analysis to establish this standard in 2015, the California Energy Commission found the incremental cost for toilets is zero because there is no cost premium for a compliant product.[1]

Estimated Life Cycle Cost Impact:

For a typical single family home which has roughly 2.4 toilets, this could save approximately 861 gallons of water per year and result in $584 in lifetime water/sewer cost savings over the 25 year lifetime of the toilet.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

To estimate the roughly $584 in lifetime cost savings, we assumed the toilet would save 861 gallons of water per year.[2] It was assumed that a typical single family home has roughly 2.4 toilets.[3]Water and waste water prices were estimated at $11 per thousand gallons and the effective useful life of the toilet was estimated to be 25 years.[4]

P73-24 Part I

IPC: 604.8, ASSE Chapter 15 (New)

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

604.8 Water pressure-reducing valve or regulator.
Where water pressure within a building exceeds 80 psi (552 kPa) static, an *approved* water pressure-reducing valve conforming to ASSE 1003, ASSE 1103, or CSA B356 with strainer shall be installed to reduce the pressure in the building water distribution piping to not greater than 80 psi (552 kPa) static.

Exception: Service lines to sill cocks and outside hydrants, and main supply risers where pressure from the mains is reduced to 80 psi (552 kPa) or less at individual fixtures.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1103-202x Pilot operated Water Pressure Reducing Valves for Potable Water

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1103-202x *Pilot operated Water Pressure Reducing Valves for Potable Water*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: There are currently 2 types of pressure reducing valves allowed in the plumbing code. The ASSE 1003 Water Pressure Reducing Valves for Potable Water Distribution Systems, a directing acting valve in sizes ½" through 4" and the AWWA C530 Pilot Operated Control Valve. The ASSE 1103 valve is as the title states, a pilot operated valve in sizes 1-1/2" through 60". AWWA C530 valves were approved in the 2024 code cycle to provide an approved pressure reducing valve larger than 4" for systems that have larger volume requirements.

The new ASSE Standard 1103 "Pilot Operated Water Pressure Reducing Valves for Potable Water" will allow the use of pilot operated pressure control valves that are specifically intended for potable water applications. As such the standard requires compliance with NSF 61 and NSF 372.

The approval of this proposal will allow designers the flexibility to specify, and AHJs to approve, potable water pressure controllers with a valve specifically intended for use in potable water systems.

Bibliography: Link Date: 01/02/2024

Direct acting: https://www.zoro.com/zurn-water-pressure-reducing-valve-2-12-in-212-500xl/i/G5064236/?campaignid=19725397607&productid=G5064236&v=&gad_source=1

Pilot operated: https://masterbuildermercantile.com/products/zurn-wilkins-212-zw209-2-1-2-pressure-reducing-valve-pilot-controlled-lead-free

Cost Impact: Increase

Estimated Immediate Cost Impact:

Product Cost: 2½" Zurn ASSE 1003 PRV @ Zorro - $2,635 vs Pilot operated $2,089

Installation Cost: Same cost to install

Estimated Immediate Cost Impact Justification (methodology and variables):

Product Cost: 2½" Zurn ASSE 1003 PRV @ Zorro - $2,635 vs Pilot operated $2,089

Installation Cost: Same cost to install

Estimated Life Cycle Cost Impact:

Comparatively same cost for repair/maintenance kits for each, so no increase or reduction. 30year Lifetime repair cost estimated $200-$300, parts and labor.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Comparatively same cost for repair/maintenance kits for each, so no increase or reduction. 30year Lifetime repair cost estimated $200-$300, parts and labor.

P73-24 Part I

P73-24 Part II

IRC: P2903.3.2, ASSE Chapter 44 (New)

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com)

2024 International Residential Code

Revise as follows:

P2903.3.2 Maximum pressure.
The static water pressure shall be not greater than 80 psi (551 kPa). Where the *main* pressure exceeds 80 psi (551 kPa), an *approved* pressure-reducing valve conforming to ASSE 1003, ASSE 1103, or CSA B356 shall be installed on the domestic water branch *main* or riser at the connection to the water service pipe.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1103-202x Pilot operated Water Pressure Reducing Valves for Potable Water

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1103-202x *Pilot operated Water Pressure Reducing Valves for Potable Water*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1103-202x *Pilot operated Water Pressure Reducing Valves for Potable Water*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The addition of the new ASSE Standard 1103 Pilot Operated Water Pressure Reducing Valves for Potable Water will allow system designers another option for valve selection, particularly when sizes than 3” are required. These types of valves are capable of maintaining tighter control of the set pressure. The standard also requires their compliance with NSF 61 and NSF 372 in applications where the water is intended for human consumption.

Bibliography: Link Date: 01/02/2024

Direct acting: https://www.zoro.com/zurn-water-pressure-reducing-valve-2-12-in-212-500xl/i/G5064236/?campaignid=19725397607&productid=G5064236&v=&gad_source=1

Pilot operated: https://masterbuildermercantile.com/products/zurn-wilkins-212-zw209-2-1-2-pressure-reducing-valve-pilot-controlled-lead-free

Cost Impact: Increase

Estimated Immediate Cost Impact:

Product Cost: 2½” Zurn ASSE 1003 PRV @ Zorro - $2,635 vs Pilot operated $2,089

Installation Cost: Same cost to install

Estimated Immediate Cost Impact Justification (methodology and variables):

Product Cost: 2½” Zurn ASSE 1003 PRV @ Zorro - $2,635 vs Pilot operated $2,089

Installation Cost: Same cost to install

Estimated Life Cycle Cost Impact:

Life Cycle Cost: Comparatively same cost for repair/maintenance kits for each, so no increase or reduction. 30year Lifetime repair cost estimated $200-$300, parts and labor.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Life Cycle Cost: Comparatively same cost for repair/maintenance kits for each, so no increase or reduction. 30year Lifetime repair cost estimated $200-$300, parts and labor.

P73-24 Part II

P74-24

IPC: TABLE 605.3, TABLE 605.4, TABLE 605.5, TABLE 702.1, TABLE 702.2, TABLE 702.3, TABLE 702.4, TABLE 702.6

Proponents: Abraham MURRA, Abraham Murra Consulting, Abraham Murra Consulting

2024 International Plumbing Code

Revise as follows:

TABLE 605.3 WATER SERVICE PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe	ASTM D1527; ASTM D2282
Chlorinated polyvinyl chloride (CPVC) plastic pipe	ASTM D2846*; ASTM F441*; ASTM F442*; CSA B137.6*
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)	ASTM B75; ASTM B88; ASTM B251; ASTM B447
Cross-linked polyethylene (PEX) plastic pipe and tubing	ASTM F876; AWWA C904; CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F1281; ASTM F2262; CSA B137.10
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Ductile iron water pipe	AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel pipe	ASTM A53
Polyethylene (PE) plastic pipe	ASTM D2239; ASTM D3035; AWWA C901; CSA B137.1
Polyethylene (PE) plastic tubing	ASTM D2737; AWWA C901; CSA B137.1
Polyethylene/aluminum/polyethylene (PE-AL-PE) pipe	ASTM F1282; CSA B137.9
Polyethylene of raised temperature (PE-RT) plastic tubing	ASTM F2769; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic pipe	ASTM D1785*; ASTM D2241*; ASTM D2672; CSA B137.3*
Stainless steel pipe (Type 304/304L)	ASTM A269/A269M; ASTM A312; ASTM A778
Stainless steel pipe (Type 316/316L)	ASTM A269/A269M; ASTM A312; ASTM A778
Stainless steel tubing (Type 304/304L)	ASTM A269/A269M; ASTM A312; ASTM A778
Stainless steel tubing (Type 316/316L)	ASTM A269/A269M; ASTM A312; ASTM A778

*These standards, which are referenced in appliance standards ANSI Z21.10.1 • CSA 4.1, ANSI Z21.10.3 • CSA 4.3, ANSI Z21.13 • CSA 4.9, and CSA/ANSI Z21.47 • CSA 2.3, do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

TABLE 605.4 WATER DISTRIBUTION PIPE

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic pipe and tubing	ASTM D2846*; ASTM F441*; ASTM F442*; CSA B137.6*
Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC)	ASTM F2855
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, WK, L, WL, M or WM)	ASTM B75; ASTM B88; ASTM B251; ASTM B447
Cross-linked polyethylene (PEX) plastic tubing	ASTM F876; CSA B137.5
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	ASTM F1281; ASTM F2262; CSA B137.10
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Ductile iron pipe	AWWA C115/A21.15; AWWA C151/A21.51
Galvanized steel pipe	ASTM A53
Polyethylene/aluminum/polyethylene (PE-AL-PE) composite pipe	ASTM F1282
Polyethylene of raised temperature (PE-RT) plastic tubing	ASTM F2769; CSA B137.18
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Stainless steel pipe (Type 304/304L)	ASTM A312; ASTM A778
Stainless steel pipe (Type 316/316L)	ASTM A312; ASTM A778
Stainless steel tubing (Type 304/304L)	ASTM A269/A269M; ASTM A312; ASTM A778
Stainless steel tubing (Type 316/316L)	ASTM A269/A269M; ASTM A312; ASTM A778

*These standards, which are referenced in appliance standards ANSI Z21.10.1 • CSA 4.1, ANSI Z21.10.3 • CSA 4.3, ANSI Z21.13 • CSA 4.9, and CSA/ANSI Z21.47 • CSA 2.3, do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

TABLE 605.5 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic	ASTM D2468

MATERIAL	STANDARD
Cast iron	ASME B16.4
Chlorinated polyvinyl chloride (CPVC) plastic	ASSE 1061; ASTM D2846*; ASTM F437†; ASTM F438†; ASTM F439†; CSA B137.6*
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1476; ASTM F1548; ASTM F3226
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Fittings for cross-linked polyethylene (PEX) plastic tubing	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; ASTM F3347; ASTM F3348;CSA B137.5
Fittings for polyethylene of raised temperature (PE-RT) plastic tubing	ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; ASTM F3348; CSA B137.18
Gray iron and ductile iron	ASTM F1476; ASTM F1548; AWWA C110/A21.10; AWWA C153/A21.53;
Insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10
Malleable iron	ASME B16.3
Metal (copper alloy) insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1974
Polyethylene (PE) plastic pipe	ASTM D2609; ASTM D2683; ASTM D3261; ASTM F1055; CSA B137.1
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3*
Stainless steel (Type 304/304L)	ASTM A269;ASTM A312; ASTM A778; ASTM F1476; ASTM F1548; ASTM F3226
Stainless steel (Type 316/316L)	ASTM A269;ASTM A312; ASTM A778; ASTM F1476; ASTM F1548; ASTM F3226
Steel	ASME B16.9; ASME B16.11; ASME B16.28; ASTM F1476; ASTM F1548;ASTMF3226

*These standards, which are referenced in appliance standards ANSI Z21.10.1 • CSA 4.1, ANSI Z21.10.3 • CSA 4.3, ANSI Z21.13 • CSA 4.9, and CSA/ANSI Z21.47 • CSA 2.3, do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

†These standards do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

TABLE 702.1 ABOVE-GROUND DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661*; ASTM F628†; ASTM F1488; CSA B181.1*
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Galvanized steel pipe	ASTM A53
Glass pipe	ASTM C1053
Polyolefin pipe	ASTM F1412; ASTM F3371†; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200), and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665*; ASTM F891*; ASTM F1488; CSA B181.2*
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1

*These standards, which are referenced in appliance standards ANSI Z21.10.1 • CSA 4.1, ANSI Z21.10.3 • CSA 4.3, ANSI Z21.13 • CSA 4.9, and CSA/ANSI Z21.47 • CSA 2.3, do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

†These standards do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

TABLE 702.2 UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661*; ASTM F628†; ASTM F1488; CSA B181.1*
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F714; ASTM F1412; ASTM F3371†; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665*; ASTM F891*; ASTM F1488; CSA B181.2*
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3

MATERIAL	STANDARD
Stainless steel drainage systems, Type 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

*These standards, which are referenced in appliance standards ANSI Z21.10.1 • CSA 4.1, ANSI Z21.10.3 • CSA 4.3, ANSI Z21.13 • CSA 4.9, and CSA/ANSI Z21.47 • CSA 2.3, do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

†These standards do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

TABLE 702.3 BUILDING SEWER PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661*; ASTM D2680; ASTM F628†; ASTM F1488; CSA B181.1*
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters, including SDR 42 (PS 20), PS 35, SDR 35 (PS 45), PS 50, PS 100, PS 140, SDR 23.5 (PS 150) and PS 200; with a solid, cellular core or composite wall	ASTM D2751; ASTM F1488
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Concrete pipe	ASTM C14; ASTM C76; CSA A257.1; CSA A257.2
Copper or copper-alloy tubing (Type K or L)	ASTM B75; ASTM B88; ASTM B251
Polyethylene (PE) plastic pipe (corrugated wall)	ASTM F2947/F2947M
Polyethylene (PE) plastic pipe (profile wall)	ASTM F2763
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polypropylene (PP) plastic pipe	ASTM F2764; CSA B182.13
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665*; ASTM F891*; ASTM F1488
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters, including PS 25, SDR 41 (PS 28), PS 35, SDR 35 (PS 46), PS 50, PS 100, SDR 26 (PS 115), PS 140 and PS 200; with a solid, cellular core or composite wall	ASTM F891*; ASTM F1488; ASTM D3034; CSA B182.2; CSA B182.4
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Vitrified clay pipe	ASTM C4; ASTM C700

For SI: 1 inch = 25.4 mm.

*These standards, which are referenced in appliance standards ANSI Z21.10.1 • CSA 4.1, ANSI Z21.10.3 • CSA 4.3, ANSI Z21.13 • CSA 4.9, and CSA/ANSI Z21.47 • CSA 2.3, do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

†These standards do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

TABLE 702.4 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters	ASME A112.4.4; ASTM D2661*; ASTM F628†; CSA B181.1*
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters	ASTM D2751
Cast iron	ASME B16.4; ASME B16.12; ASTM A74; ASTM A888; CISPI 301
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29
Glass	ASTM C1053
Gray iron and ductile iron	AWWA C110/A21.10
Polyethylene	ASTM D2683
Polyolefin	ASTM F1412; ASTM F3371†; CSA B181.3
Polyvinyl chloride (PVC) plastic in IPS diameters	ASME A112.4.4; ASTM D2665*; ASTM F1866
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters	ASTM D3034
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D.	ASTM D2949
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Steel	ASME B16.9; ASME B16.11; ASME B16.28
Vitrified clay	ASTM C700

For SI: 1 inch = 25.4 mm.

*These standards, which are referenced in appliance standards ANSI Z21.10.1 • CSA 4.1, ANSI Z21.10.3 • CSA 4.3, ANSI Z21.13 • CSA 4.9, and CSA/ANSI Z21.47 • CSA 2.3, do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

†These standards do not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

TABLE 702.6 CHEMICAL WASTE DRAINAGE SYSTEM PIPE AND FITTINGS

MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC)	ASTM F2618†
Borosilicate glass	ASTM C1053
High silicon iron	ASTM A518/A518M
Polyolefin	ASTM F1412, CSA B181.3
Polyvinylidene fluoride (PVDF)	ASTM F1673, CSA B181.3

†ASTM F2618 does not specify requirements for venting of combustion gases. UL 1738 specifies requirements for pipe, fittings, and accessories intended for venting of combustion gases.

Staff Analysis: The proposed change is not within the scope of the IPC.

Reason: The purpose of the proposed notes to the tables is to make users of the IPC, including tradespersons, aware that those ASTM and CSA plastic piping standards expressly indicate that they do **not** contain specific provisions for venting of combustion gases.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal only adds statements for clarity.

P74-24

P75-24

IPC: TABLE 605.5, ASTM Chapter 15 (New), IAPMO Chapter 15 (New)

Proponents: Christopher Adam Smith, Viega, LLC, Codes and Standards Manager for Viega, LLC

2024 International Plumbing Code

Revise as follows:

TABLE 605.5 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic	ASTM D2468
Cast iron	ASME B16.4
Chlorinated polyvinyl chloride (CPVC) plastic	ASSE 1061; ASTM D2846; ASTM F437; ASTM F438; ASTM F439; CSA B137.6
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.26; ASME B16.51; ASSE 1061; ASTM F1476; ASTM F1548; ASTM F3226
Cross-linked polyethylene/aluminum/high-density polyethylene (PEX-AL-HDPE)	ASTM F1986
Fittings for cross-linked polyethylene (PEX) plastic tubing	ASSE 1061; ASTM F877; ASTM F1807; ASTM F1960; ASTM F2080; ASTM F2098; ASTM F2159; ASTM F2434; ASTM F2735; ASTM F3347; ASTM F3348; CSA B137.5
Fittings for polyethylene of raised temperature (PE-RT) plastic tubing	ASSE 1061; ASTM D3261; ASTM F1807; ASTM F2098; ASTM F2159; ASTM F2735; ASTM F2769; ASTM F3347; ASTM F3348; CSA B137.18
Gray iron and ductile iron	ASTM F1476; ASTM F1548; AWWA C110/A21.10; AWWA C153/A21.53;
Insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1281; ASTM F1282; ASTM F1974; CSA B137.9; CSA B137.10
Malleable iron	ASME B16.3
Metal (copper alloy) insert fittings for polyethylene/aluminum/polyethylene (PE-AL-PE) and cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX)	ASTM F1974
Polyethylene (PE) plastic pipe	ASTM D2609; ASTM D2683; ASTM D3261; ASTM F1055; ASTM F3536; CSA B137.1
Polypropylene (PP) plastic pipe or tubing	ASTM F2389; CSA B137.11
Polyvinyl chloride (PVC) plastic	ASTM D2464; ASTM D2466; ASTM D2467; CSA B137.2; CSA B137.3
Stainless steel (Type 304/304L)	ASTM A269; ASTM A312; ASTM A778; ASTM F1476; ASTM F1548; ASTM F3226; IAPMO/ANSI/CAN Z1117
Stainless steel (Type 316/316L)	ASTM A269; ASTM A312; ASTM A778; ASTM F1476; ASTM F1548; ASTM F3226; IAPMO/ANSI/CAN Z1117
Steel	ASME B16.9; ASME B16.11; ASME B16.28; ASTM F1476; ASTM F1548; ASTM F3226; IAPMO/ANSI/CAN Z1117

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F3536-22 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

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

IAPMO/ANSI/CAN Z1117 Standard for Press Connections

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F3536-22 *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 and Tubing* and IAPMO Z1117-2022 *Standard for Press Connections*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal adds ASTM F3536 "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" as a recognized fitting Standard for PE water service fittings in Table 605.5. The scope of ASTM F3536 covers plastic bodied mechanical fittings for PE or PEX water service pipe. These fittings, commonly produced by Philmac, have a history of successful field use. The ASTM Standard was written to recognize and standardize the performance requirements of this design, and includes sustained pressure, hydrostatic burst, and tensile force requirements. The F3536 Standard was published in 2022 narrowly missing the deadline for addition to the current 2024 edition of IPC, and thus this Proposal seeks to add it to the Code now.

It also seeks to add IAPMO/ANSI/CAN Z1117 "Standard for Press Connections" which is a harmonized standard for press-connect fittings used across North America. It is recognized and enforced in both the United States and Canada and encompasses multiple press-connect materials such as copper, steel, and stainless steel 304 and 316.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The addition of these standards does not increase the cost of construction. The addition of these standards allows for a wider selection of materials but does not make their use mandatory. By including these standards in the code, the options for installers will increase while the cost of construction should stay the same or even decrease.

P75-24

P76-24

IPC: 605.6, CSA Chapter 15 (New)

Proponents: Terry Burger, IAPMO Group, IAPMO Group (terry.burger@asse-plumbing.org)

2024 International Plumbing Code

Revise as follows:

605.6 Flexible water connectors.
Flexible water connectors exposed to continuous pressure shall conform to ASME A112.18.6/CSA B125.6. *Access* shall be provided to all flexible water connectors. Flexible water connectors with excess flow shut-off device shall comply with CSA B125.5/IAPMO Z600

Add new standard(s) as follows:

CSA

CSA Group
8501 East Pleasant Valley Road
Cleveland, OH 44131-5516

CSA B125.5/IAPMO Z600-2022 Flexible Water Connectors with Excess Flow Shut-off Devices.pdf

Staff Analysis: A review of the standard proposed for inclusion in the code, CSA B125.5/IAPMO Z600-2022 *Flexible water Connectors with Excess Flow Shut-off Devices*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Flexible connects that have integral excess flow devices are not certified to the_ASME A112.18.6/CSA B125.6 but rather to CSA B125.5/IAPMO Z600

Bibliography: CSA B125.5/IAPMO Z600

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Products are currently being listed to the CSA B125.5/IAPMO Z600 standard

P76-24

P77-24

IPC: TABLE 605.7

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Plumbing Code

Revise as follows:

TABLE 605.7 VALVES

PIPING MATERIAL	STANDARD
Chlorinated polyvinyl chloride (CPVC) plastic	ASME A112.4.14/CSA B125.14; ASME A112.18.1/CSA B125.1; ASTM F1970; CSA B125.3; IAPMO Z1157; MSS SP-122
Copper or copper alloy	ASME A112.4.14/CSA B125.14; ASME A112.18.1/CSA B125.1; ASME B16.34; CSA B125.3; IAPMO Z1157; MSS SP-67; MSS SP-80; MSS SP-110; MSS SP-139
Cross-linked polyethylene (PEX) plastic	ASME A112.4.14/CSA B125.14; ASME A112.18.1/CSA B125.1; CSA B125.3; IAPMO Z1157; NSF 359
Gray iron and ductile iron	AWWA C500; AWWA C504; AWWA C507; IAPMO Z1157; MSS SP-67; MSS SP-70; MSS SP-71; MSS SP-72; MSS SP-78
Polyethylene of Raised Temperature (PERT)	ASME A112.4.14/CSA B125.14; ASME A112.18.1/CSA B125.1; IAPMO Z1157
Polypropylene (PP) plastic	ASME A112.4.14/CSA B125.14; ASTM F2389; IAPMO Z1157
Polyvinyl chloride (PVC) plastic	ASME A112.4.14/CSA B125.14; ASTM F1970; IAPMO Z1157; MSS SP-122
Stainless steel (Type 304/304L)	ASME A112.4.14/CSA B125.14; IAPMO Z1157
Stainless steel (Type 316/316L)	ASME A112.4.14/CSA B125.14; IAPMO Z1157

Staff Analysis: Standards ASME A112.4.14/CSA B125.14, ASME A112,18.1/CSA B125.1 and IAPMO Z1157 are in the current code.

Reason: This proposal adds a row for PERT valves to match PERT piping.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds an optional valve material for use with PERT piping. As this is an option, it is not mandated to be used and therefore there is no impact to the cost of construction.

P77-24

P78-24 Part I

IPC: 605.15, 605.15.2

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

605.15 Chlorinated polyvinyl chloride/aluminum/chlorinated polyvinyl chloride (CPVC/AL/CPVC) pipe and tubing.
Joints between CPVC/AL/CPVC plastic pipe or CPVC fittings shall comply with Sections 605.15.1 and 605.15.2.

Revise as follows:

605.15.2 Solvent cementing.
Joint surfaces shall be clean and free from moisture, and an *approved* primer shall be applied. Solvent cement, orange in color and conforming to ASTM F493, shall be applied to joint surfaces. The joint shall be made while the cement is wet, and in accordance with ASTM D2855. Solvent cement joints shall be permitted above or below ground.

Exception: A primer is not required where all of the following conditions apply:

1. The solvent cement used is *third-party certified* as conforming to ASTM F493.
2. The solvent cement used is yellow <u>or green</u> in color.
3. The solvent cement is used only for joining $^{1}/_{2}$-inch (12.7 mm) through 2-inch-diameter (51 mm) CPVC/AL/CPVC pipe and CPVC fittings.
4. The CPVC fittings are manufactured in accordance with ASTM D2846.
5. The joint is made in accordance with ASTM F3328.

Reason: Green cement was previously added to the CPVC tubing section and should also appear in the composite CPVC tubing section as an option.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Allows for an additional color for cement and would not change costs.

P78-24 Part I

P78-24 Part II

IRC: P2906.9.1.3

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Residential Code

Revise as follows:

P2906.9.1.3 CPVC/AL/CPVC pipe.
Joint surfaces shall be clean and free from moisture, and an *approved* primer shall be applied. Solvent cement, orange in color and conforming to ASTM F493, shall be applied to all joint surfaces. The joint shall be made while the cement is wet, and in accordance with ASTM D2846 or ASTM F493. Solvent-cemented joints shall be installed above or below ground.

Exception: A primer shall not be required where all of the following conditions apply:

1. The solvent cement used is third-party certified as conforming to ASTM F493.
2. The solvent cement used is yellow <u>or green</u> in color.
3. The solvent cement is used only for joining $^{1}/_{2}$-inch (12.7 mm) through 1-inch (25 mm) diameter CPVC/AL/CPVC pipe and CPVC fittings.
4. The CPVC fittings are manufactured in accordance with ASTM D2846.

Reason: Green cement was previously added to the CPVC tubing section and should also appear in the composite CPVC tubing section as an option.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Adding a permitted color is not expected to change costs of construction.

P78-24 Part II

P79-24

IPC: 607.2.2.2

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Delete without substitution:

~~**607.2.2.2 Demand recirculation controls for distribution systems.**~~
~~A water distribution system having one or more recirculation pumps that pump water from a heated water supply pipe back to the heated water source through a cold water supply pipe shall be a demand recirculation water system. Pumps shall have controls that comply with both of the following:~~

1. ~~The control shall start the pump upon receiving a signal from the action of a user of a fixture or appliance, sensing the presence of a user of a fixture, or sensing the flow of hot or *tempered water* to a fixture fitting or appliance.~~
2. ~~The control shall limit the temperature of the water entering the cold water piping to 104°F (40°C).~~

Reason: The Plumbing Code has the following Language: *IPC 604.2 System Interconnection*

At the points of interconnection between the hot and cold water supply piping systems and the individual fixtures, appliances or devices, provisions shall be made to prevent flow between such piping systems.

Comment: The above language clearly requires the separation of hot and cold-water systems, and that “provisions shall be made to prevent flow between such piping systems.” These provisions typically include check valves and integral check valves in faucets and fixture fittings, which prevent hot water from crossing over into the cold water piping system or cold water crossing over into the hot water piping system. When crossover occurs, hot or warm water can be flushing fixtures, scalding can occur, bacteria, amoeba and pathogens can grow in cold water pipes, and in larger apartment buildings, you could be brushing your teeth with hot or warm water because another tenant decided to install an on-demand cross-connection pump device that is designed to pump hot water into your cold water pipes. Also, the mixing of hot and cold water can create areas of the piping system where temperatures are ideal for Legionella bacteria growth. When Pressure reducing valves or check valves are installed in systems this concept will not work.

Small, demand recirculation pumps were developed to intentionally created a cross-connection, where the device pumps previously heated hot water through the cold water pipes back to the water heater instead of installing a dedicated hot water return pipe. The plumbing code should not be promoting intentional cross-connections and Jerry-rigged plumbing systems. A dedicated return piping system is already required. I support this concept for single family homes where the homeowner lives with the consequences of installing this system. However in a commercial office building or condo building installing one of these systems could force hot water into other tenants cold water piping.

The on-demand recirculation systems, were only successful in the codes because it was popular, not because of safety, because it is not safe! This code provision is not safe and violates the basic principles of plumbing, in addition to being a direct violation of the code section on prohibition of system interconnections stated in code section, 604.2. This code provision creates a conflict in the code and a health and safety issue that could be a liability when an outbreak occurs. I spoke with a few backflow prevention industry people, and they were shocked that the plumbing code would allow such a device. Most of them were not aware of the new section 607.2.2.2 Demand Recirculation Controls for Distribution Systems.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Approximately $1,850 per on-demand circulator pump

Estimated Immediate Cost Impact Justification (methodology and variables):

Recirculation Systems are already required in the plumbing system when the developed length exceeds 50 feet. The code section proposed for deletion is in conflict with other code sections which prohibit cross connections between hot and cold water systems. Hot or warm water circulated back toward the water heater in the cold water piping system, as the stricken is code section allows, the previously heated hot water will rarely reach the water heater in large cold water distribution systems because the cold water flow rate is many times higher than the circulated water flow rate, so the recirculated flow will be swept away in the cold water distribution to other fixtures. The reason given for using these devices was to save water that was previously heated from being dumped down the drain, but the previously heated hot water that is pumped into the cold water pipes will simply be swept away with the cold water current in the cold water mains and flushed out other fixtures where warm water from the water heater with dissolved metals from the water heater anode rod and bacteria growing in the warm piping system will make the cold water unsuitable for uses like brushing teeth or cooking. When the warm water is flushed from cold water fixtures, it perpetually wastes energy for the life of the building. This cost can be estimated based on the number of times a person enters a bathroom in a given day. and cycles of the circulating pump. in addition to the initial cost of multiple pumps in a building vs one central pump.
Example of excessive costs: In a conventional multi-unit apartment building or similar structure with a central domestic hot water distribution system design there will typically be one, fractional horsepower hot water return circulating pump serving the entire building. With the demand circulator pumps located in every bathroom, and kitchen of an apartment building the following is a summary of the first cost for a circulation system relying on demand circulators within the system.

If the code language proposed to be stricken remains, a building can be constructed with no central hot water circulating pump. and a reliance on demand circulators at each apartment would then be required.

Given a 10-story apartment building, with 24 apartments on every floor where each apartment has two bathrooms and a kitchen sink with a demand circulator, there would be 10 floors x 24 apartments x 3 circulators per apartment unit = 720 On-demand circulating pumps. The cost of each on-demand circulator with proximity sensors is: $450 each materials; + $190 plumbing labor; + $450 electrical power materials. + 4 hours @ 190/hr = 760 electrical labor for dedicated wiring to panel with ground-fault circuit breaker = $1,850 per on-demand circulator pump x750 pumps = $1,387,500.00 initial cost.

The cost of a dedicated recirculation line would be a fraction of the cost of everyone installing an on-demand circulator.

This is a waste of materials and energy when a single circulating pump with balancing can provide adequate circulation for a whole building.

Estimated Life Cycle Cost Impact:

Example of excessive costs: In a conventional multi-unit apartment building or similar structure with a central domestic hot water distribution system design there will typically be one, fractional horsepower hot water return circulating pump serving the entire building.

With the demand circulator pumps located in every bathroom, and kitchen of an apartment building the following is a summary of the first cost for a circulation system relying on demand circulators within the system.

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The cost of a dedicated recirculation line would be a fraction of the cost of everyone installing an on-demand circulator.

This is a waste of materials and energy when a single circulating pump with balancing can provide adequate circulation for a whole building.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

In the United States the US Census bureau statistics say there are approximately 3 people per household. In a multifamily apartment or condominium building, if each person enters the bathroom 4 times a day, there will be approximately 12 circulator pump cycles per day per bathroom plus approximately 4 additional pump cycles for people walking by the proximity sensors triggering a pump cycle. If an apartment building with 720 circulating pumps run for 15 minutes every time a proximity sensor is triggered, then 750 circulating pumps would run for twenty four (24), 15-minute cycles per day vs a single pump running 12 or 24 hours a day.

The energy wasted by pre-heated water being flushed from other fixtures and the running of the circulator pumps would be massive in this 240 unit apartment building example, not to mention the long term dissatisfaction from tenants not getting clean, safe, cold water. The existing language is not safe and this method of circulation should be eliminated.

P79-24

P80-24

IPC: 607.2.3, 607.2.4 (New)

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

607.2.3 Piping for recirculation systems having temperature-actuated mixing valves.
Where a temperature-actuated mixing valve is used in a system with a hot water recirculating pump, the *hot water* or *tempered water* return line shall be routed to the cold water inlet pipe of the water heater and the cold water inlet pipe or the hot water return connection of the temperature-actuated mixing valve.

Add new text as follows:

607.2.4 Temperature Gauge at end of Hot Water Return Pipe. A temperature gauge shall be located within 10 feet before the hot water return pipe connection to the water heater.

Reason: ASHRAE 188 and ASHRAE Guideline 12 dealing with control of Legionella in Building water systems recommends having a water management program and maintaining the hot water distribution system above the maximum Legionella bacteria growth temperature of 122 F. This proposal calls for a temperature gauge at the lowest temperature location in the circulated hot water system which is the end of the hot water return pipe, just before the connection the the cold water makeup and the water heater or storage tank. Generally a minimum temperature of 122 to 124 F would need to be maintained at this location to assure that Legionella bacteria will not grow in the hot water system. This code change is intended to allow a building owner to adjust temperature controls with an ASSE 1017 valve to monitor and maintain about 124 F at a temperature gauge at the lowest temperature location in the hot water system. (The end of the Hot water recirculation system).

Effects of Temperature on Legionella Bacteria

Temperature[1]	Result
Below 68F (20C)	Legionella survives, but will not grow/multiply
68 F (20C)	Legionella will double its population in 8 days
77 F (25C)	Legionella will double its population in 3 days
68 to 122 F (20-50C)	Legionella bacteria growth temperature range[3]
95 to 115 F (35-46C)	Ideal Legionella bacteria growth temperature range
Abv 122F & Bel. 131 F	Legionella bacteria survives, will not grow/multiply[2,3]
131 F (55C)	Legionella bacteria dies in 5 to 6 hours[2]
140 F (60C)	Legionella bacteria dies in 32 minutes[2]
151 F (66C)	Legionella bacteria dies in 2 minutes[2]
158 F + (70C+)	Legionella bacteria dies instantly (Disinfection temp.)[2]

Notes:

1. These temperatures are based on laboratory tests. Field conditions may vary due to differences in water quality, insulating properties of host amoeba, biofilm,

   scale and sediment.

2. Verify that the water heater is capable of heating to non-growth or disinfection temperatures.

3. The coolest point in the hot water system (Hot water return pipe) should be a couple of degrees above the highest growth temperature as a safety factor.

   (122F + 2F = 124F, many temperature gauges have a + or – 2F accuracy Locate a temperature gauge just before HW Return connects to Water Heater/Mixing

Valve return tee.)

Cost Impact: Increase

Estimated Immediate Cost Impact:

This will cost about $10-$15 for a temperature gauge in the piping system to allow a building operator to monitor condition in the piping that are conducive to bacterial growth. This will significantly improve the safety of the building and potentially save lives.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of a temperature gauge in minimal in order for a building operator to know what is happening in the piping system.

Estimated Life Cycle Cost Impact:

Every time there is a positive test for legionella bacteria it can disrupt building operations. When there is a reported case and an outbreak, the costs can get into the hundreds of thousands of dollars in lost revenue, legal and professional fees, disinfection costs. If there are serious illnesses or deaths associated with an outbrek, the costs can rapidly get into the millions of dollars. The cost of a single temperature gauge at the lowest temperature location in the hot water system is minimal compared to what can happen it the temperature is not monitored and bacteria is allowed to growth and cause disease.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

The cost of not installing a temperature gauge can quickly get into the millions if bacteria causes an outbreak of Legionnaires disease.

P80-24

P81-24 Part I

IPC: 607.3

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

607.3 Thermal expansion control.
Where a storage water heater is supplied with cold water that passes through a check valve, pressure reducing valve or backflow preventer, a thermal expansion control device shall be connected to the water heater cold water supply pipe at a point that is downstream of all check valves, pressure reducing valves and backflow preventers. Thermal expansion tanks shall be sized in accordance with the tank manufacturer’s instructions and shall be sized such that the pressure in the water distribution system shall not exceed that required by Section 604.8.<u>Thermal expansion tanks shall be supported to the structure with a support rated for the weight of the tank and water in the tank, or shall be floor mounted tanks.</u>

P81-24 Part I

P81-24 Part II

IRC: P2903.4.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Residential Code

Revise as follows:

P2903.4.2 Backflow prevention device or check valve. Where a backflow prevention device, check valve or other device is installed on a water supply system using storage water heating equipment such that thermal expansion causes an increase in pressure, a device for controlling pressure shall be installed.<u>Where a thermal expansion tank is installed, the thermal expansion tank shall be supported to the structure with a support rated for the weight of the tank and water in the tank, or shall be floor mounted tanks.</u>

Reason: In many instances installers are relying on the water heater or storage tank or the water heater or storage tank piping to support the expansion tanks. When replacing the water heater or storage tank becomes necessary, this can be come problematic and/or dangerous for the installer when removing the existing tank. These tanks are not only an extensions of the potable water distribution systems, but they are also classified as appurtenances and should be supported in the same fashion as piping systems but independent of the piping systems.

Bibliography: See reason statement.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Between $70 - $200

Estimated Immediate Cost Impact Justification (methodology and variables):

Between $19 - $30 for a bracket designed to support the expansion tank and depending on the labor market, between $51 - $170 for the installation labor.

P81-24 Part II

P82-24

IPC: 607.3, IAPMO Chapter 15 (New)

Proponents: Terry Burger, IAPMO Group, IAPMO Group (terry.burger@asse-plumbing.org)

2024 International Plumbing Code

Revise as follows:

607.3 Thermal expansion control. Where a storage water heater is supplied with cold water that passes through a check valve, pressure reducing valve or backflow preventer, a thermal expansion control device shall be connected to the water heater cold water supply pipe at a point that is downstream of all check valves, pressure reducing valves and backflow preventers. Thermal expansion tanks shall be sized in accordance with the tank manufacturer's instructions and shall be sized such that the pressure in the water distribution system shall not exceed that required by Section 604.8. <u>Pre-pressurized water expansion tanks shall comply with IAPMO Z1088.</u>

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

<u>IAPMO Z1088-19e1</u> <u>Pre-pressurized Water Expansion Tanks</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO Z1088-19e1 *Pre-pressurized Water Expansion Tanks*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This standard provides the minimum safety and performance requirements for pre-pressurized expansion tanks.

Bibliography: IAPMO Z1088-19e1 Pre-pressurized Water Expansion Tanks

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Products are currently listed to this standard.

P82-24

P83-24

IPC: TABLE 608.1, 608.17.1.2, ASSE Chapter 15 (New)

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com)

2024 International Plumbing Code

Revise as follows:

TABLE 608.1 APPLICATION OF BACKFLOW PREVENTERS

Portions of table not shown remain unchanged.

DEVICE	DEGREE OF HAZARD[a]	APPLICATION[b]	APPLICABLE STANDARDS
Backflow preventer plumbing devices:			
Antisiphon-type fill valves for gravity water closet flush tanks	High hazard	Backsiphonage only	ASSE 1002/ASME A112.1002/CSA B125.12; CSA B125.3
Backflow preventer for carbonated beverage machines	Low hazard	Backpressure or backsiphonage Sizes 1/4″– 1/2″	ASSE 1022
Backflow preventer for carbonated and non-carbonated beverage machines.	Low Hazard	Backpressure or backsiphonage Sizes 1/4″–1/2″	ASSE 1032
Backflow preventer with intermediate atmospheric vents	Low hazard	Backpressure or backsiphonage Sizes 1/4″–3/4″	ASSE 1012; CSA B64.3
Backflow preventer with intermediate atmospheric vent and pressure-reducing valve.	Low hazard	Backpressure or backsiphonage Sizes 1/2″–3/4″	ASSE 1081
Dual-check-valve-type backflow preventer	Low hazard	Backpressure or backsiphonage Sizes 1/4″–2″	ASSE 1024; CSA B64.6
Hose connection backflow preventer	High or low hazard	Low head backpressure, rated working pressure, backpressure or backsiphonage Sizes 1/2″–1″	ASME A112.21.3; ASSE 1052; CSA B64.2.1.1
Hose connection vacuum breaker	High or low hazard	Low head backpressure or backsiphonage Sizes 1/2″, 3/4″, 1″	ASME A112.21.3; ASSE 1011; CSA B64.2; CSA B64.2.1
Laboratory faucet backflow preventer	High or low hazard	Low head backpressure and backsiphonage	ASSE 1035; CSA B64.7
Pipe-applied atmospheric-type vacuum breaker	High or low hazard	Backsiphonage only Sizes 1/8″–8″	ASSE 1001; CSA B64.1.1
Vacuum breaker wall hydrants, frost-resistant, automatic-draining-type	High or low hazard	Low head backpressure or backsiphonage Sizes 3/4″, 1″	ASME A112.21.3; ASSE 1019; CSA B64.2.2

For SI: 1 inch = 25.4 mm.

a. Low hazard—See Pollution (Section 202).

High hazard—See Contamination (Section 202).

b. See Backpressure, low head (Section 202, Backflow).

See Backsiphonage (Section 202, Backflow).

608.17.1.2 Coffee machines and noncarbonated drink dispensers.
The water supply connection to each coffee machine and each noncarbonated beverage dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1022 or ASSE 1024, ASSE 1032, or protected by an *air gap*.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

ASSE/ANSI 1032-23 — Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1032-23 *Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: ASSE/ANSI 1032-2023 *"Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers"* has been published and the title was updated to include the approval for applications that are carbonated and non-carbonated. The previous version of the standard did not include non-carbonated and was the basis for rejection in the last code cycle. ASSE technical committees reviewed the design and materials of the ASSE 1032 backflow preventors and verified that they exceed the requirements for non-carbonated applications. This title change will provide increased design flexibility and inclusion in the IPC will allow acceptance by AHJs.

Bibliography: Links date: 11-29-2023

Zurn 1022

https://www.grainger.com/product/454N98?gucid=N:N:PS:Paid:GGL:CSM-2295:4P7A1P:20501231&gad_source=1&gclid=EAIaIQobChMI6d_p9Z37ggMVRmJHAR1O-gkwEAQYASABEgLT8fD_BwE&gclsrc=aw.ds

Zurn 1032

https://www.grainger.com/product/454N98?gucid=N:N:PS:Paid:GGL:CSM-2295:4P7A1P:20501231&gad_source=1&gclid=EAIaIQobChMI6d_p9Z37ggMVRmJHAR1O-gkwEAQYASABEgLT8fD_BwE&gclsrc=aw.ds

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The approval of this proposal will allow designers the flexibility to specify, and AHJs to approve check valves specifically intended for use in potable water systems. Costs for the original purchase, installation and life cycle of the proposed additional valve are very similar to the currently approved check valve. These valves are small and are generally replaced versus being field repaired.

P83-24

P84-24 Part I

IPC: 608.9

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

608.9 Identification of nonpotable water systems.
Where nonpotable water <u>distribution</u> systems are installed, the piping conveying the nonpotable water shall be identified either by color marking, metal tags or tape in accordance with Sections 608.9.1 through 608.9.2.3.

P84-24 Part I

P84-24 Part II

IRC: P2901.2

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

P2901.2 Identification of nonpotable water systems.
Where *nonpotable* water <u>distribution</u> systems are installed, the piping conveying the nonpotable water shall be identified either by color marking, metal tags or tape in accordance with Sections P2901.2.1 through P2901.2.2.3.

Reason: This section has been misinterpreted to mean that all nonpotable water system piping needed to be labeled. For example, the collection piping for greywater. This section only applies to nonpotable water distribution systems.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal only clarifies which water systems need identified so that labeling is not applied where no labeling was intended.

P84-24 Part II

P85-24

IPC: 608.12, 608.12.1 (New), ASSE Chapter 15 (New)

Proponents: Erin Coffman, Water Systems Council, Water Systems Council

2024 International Plumbing Code

608.12 Potable water tanks.
Where in contact with potable water intended for drinking water, water tanks, coatings for the inside of tanks and liners for water tanks shall conform to NSF 61. The interior surface of a potable water tank shall not be lined, painted or repaired with any material that changes the taste, odor, color or potability of the water supply when the tank is placed in, or returned to, service.

Add new text as follows:

608.12.1 Pressurized potable water tanks. Pressurized potable water tanks for well water systems shall comply with ASSE 1099/WSC-PST.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1099-2022/WSC-PST-2000/2022 Performance Requirements for Pressurized Water Storage Tanks

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE #1093-2019 (R2023) WSC Standard PAS-97(2019) (R2023) *Performance Requirements for Pitless Adapters, Pitless Units, and Well Caps* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Currently, pressurized water storage tanks for water well systems are not stringently regulated; countries and municipalities may elect to implore oversight, or they may ignore the need to qualify pressure vessels within residences. In general, pressurized water tanks are not included within the scope of in-home inspections and see very little oversight in the majority of communities. As of now, some manufacturers elect to certify their production to ASSE-1099-2022/WSC-PST-2000/2022, but it is not mandatory from a plumbing code level. It is the contention of The Water Systems Council that all pressurized water storage vessels sold to the consumer market should be qualified through certification to ASSE-1099-2022/WSC-PST-2000/2022.

ASSE-1099-2022/WSC-PST-2000/2022effectively qualifies the structural integrity of pressurized water storage vessels through the prescription of construction materials, methods of manufacture, water quality extraction testing, labeling requirements, proof testing schedules and ultimate yield strength requirements. The tanks covered under this standard are up to 120 gallons in volume and designed for a maximum working pressure up to 150 PSI. These guidelines impress upon the industry the requirements for a safe and reliable product for the consumer market.

The consumer market for these products is predominantly residential dwellings in areas without municipal water service. The vessel is installed within the home as part of the plumbed domestic well water system. Water and air are stored within the pressure bearing components of the vessel for the duration of the product lifecycle; it is imperative to the safety of the residents that the integrity of pressure containment vessel is not compromised leading to the release of stored energy. This standard lays out simple and effective guidelines to ensure the continued integrity of the vessel over years of service under all expected conditions.

It would be in the best interest of the municipalities, contractors, and consumers for the structural integrity of these vessels to be covered by the International Plumbing Code through the adoption of ASSE-1099-2022/WSC-PST-2000/2022.

Bibliography: ASSE-1099-2022/WSC-PST-2000/2022

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Existing standard, products in the marketplace currently listed to the standard. Reference the product listing: https://www.watersystemscouncil.org/resources/well-standards/ansiwsc-pst/

P85-24

P86-24 Part I

IPC: 608.15, 608.15.1 (New), 608.15.1.1 (New)

Proponents: Dennis Hart, Fairfax County, Virginia, Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and Virginia Building and Code Officials Association (VBCOA) (dennis.hart@fairfaxcounty.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

608.15 Location of backflow preventers.
Access shall be provided to backflow preventers ~~as specified by the manufacturer's instructions~~.

Add new text as follows:

608.15.1 Backflow Prevention Assemblies. Backflow prevention assemblies indicated in Table 608.1 shall be installed between 12 inches (305 mm) and 60 inches (1525 mm) above grade, floor level or service platform.

608.15.1.1 Backflow prevention devices. Access shall be provided to backflow prevention devices.

P86-24 Part I

P86-24 Part II

IRC: P2902.6, P2902.6.1 (New), P2902.6.1.2 (New)

Proponents: Dennis Hart, Fairfax County, Virginia, Virginia Plumbing and Mechanical Inspectors Association (VPMIA) and Virginia Building and Code Officials Association (VBCOA) (dennis.hart@fairfaxcounty.gov)

2024 International Residential Code

Revise as follows:

P2902.6 Location of backflow preventers.
Access shall be provided to backflow preventers as ~~specified by the manufacturer's installation instructions~~.

Add new text as follows:

P2902.6.1 Backflow Prevention Assemblies. Backflow prevention assemblies indicated in Table 608.1 shall be installed between 12 inches (305 mm) and 60 inches (1525 mm) above grade, floor level or service platform.

P2902.6.1.2 Backflow prevention devices. Access shall be provided to backflow prevention devices.

Reason: Per the definition found in Chapter 2, "backflow preventers" include both backflow prevention assemblies, which require annual testing, and backflow prevention devices which typically do not. The current code specifies that access shall be provided to backflow prevention assemblies per the manufacturer's installation instructions, but there are some manufacturers of backflow prevention assemblies that do not provide specific requirements for access. Since the current code requires backflow prevention assemblies be installed per the manufacturer's installation instructions, and some manufacturers do not provide guidance, often there is inadequate access to inspect, test, service, repair or replace the backflow prevention assembly. This proposal provides minimum requirements to follow if the manufacturer does not provide adequate requirements for access to a backflow prevention assembly. This proposal also separates backflow prevention assemblies and backflow prevention devices and clarifies that access is required to backflow prevention devices either by the definition in Chapter 2, or by the manufacturers requirements if they are more restrictive. While a backflow prevention device may not be required to be tested annually and require less maintenance than a backflow prevention assembly, these devices still need to be accessible for repair and replacement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Access is already required for backflow preventers. This change simply provides more details to these access requirements that should not increase the cost of construction.

P86-24 Part II

P87-24

IPC: 608.17.1.1, ASSE Chapter 15 (New)

Proponents: George Istefan, Watts Water Technologies (george.istefan@wattswater.com)

2024 International Plumbing Code

Revise as follows:

608.17.1.1 Carbonated beverage dispensers.
The water supply connection to each carbonated beverage dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1022, ASSE 1032, or by an *air gap*. The portion of the backflow preventer device downstream from the second check valve of the device and the piping downstream therefrom shall not be affected by carbon dioxide gas.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

ASSE/ANSI 1032-23	Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE/ANSI 1032-23 *Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: ASSE/ANSI 1032-2023 *"Dual Check Valve Type Backflow Preventers for Carbonated Beverage Dispensers, Post Mix Type, and Non-Carbonated Beverage Dispensers"* has been published and the title was updated to include the approval for applications that are carbonated and non-carbonated. The previous version of the standard did not include non-carbonated and was the basis for rejection in the last code cycle. ASSE technical committees reviewed the design and materials of the ASSE 1032 backflow preventors and verified that they exceed the requirements for non-carbonated applications. This title change will provide increased design flexibility and inclusion in the IPC will allow acceptance by AHJs.

Bibliography: Links date: 11-29-2023

Zurn 1022

https://www.grainger.com/product/454N98?gucid=N:N:PS:Paid:GGL:CSM-2295:4P7A1P:20501231&gad_source=1&gclid=EAIaIQobChMI6d_p9Z37ggMVRmJHAR1O-gkwEAQYASABEgLT8fD_BwE&gclsrc=aw.ds

Zurn 1032

https://www.grainger.com/product/454N98?gucid=N:N:PS:Paid:GGL:CSM-2295:4P7A1P:20501231&gad_source=1&gclid=EAIaIQobChMI6d_p9Z37ggMVRmJHAR1O-gkwEAQYASABEgLT8fD_BwE&gclsrc=aw.ds

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The approval of this proposal will allow designers the flexibility to specify, and AHJs to approve check valves specifically intended for use in potable water systems. Costs for the original purchase, installation and life cycle of the proposed additional valve are very similar to the currently approved check valve. These valves are small and are generally replaced versus being field repaired.

P87-24

P88-24

IPC: 608.17.1.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

Revise as follows:

608.17.1.1 Carbonated beverage dispensers.
The water supply connection to each carbonated beverage dispenser shall be protected against backflow by a backflow preventer conforming to ASSE 1013, ASSE 1022 or by an *air gap*. The portion of the backflow preventer device downstream from the second check valve of the device and the piping downstream therefrom shall not be affected by carbon dioxide gas.

Staff Analysis: The proposed standard is in the current edition of the code.

Reason: Some designers could prefer to use an RPP because of their reliability over a long period of time and its testability to ensure that the device is still functioning as intended.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The addition to the code text provides for more choices for the designer. The code does not mandate the device selection.

P88-24

P89-24

IPC: 608.17.4.1

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com)

2024 International Plumbing Code

Revise as follows:

608.17.4.1 Additives or nonpotable source.
Where systems under continuous pressure contain chemical additives or antifreeze, or where systems are connected to a nonpotable secondary water supply, the potable water supply shall be protected against backflow by a reduced pressure principle backflow prevention assembly or a reduced pressure principle fire protection backflow prevention assembly <u>conforming to ASSE 1013 or ASSE 1047</u>. Where chemical additives or antifreeze are added to only a portion of an automatic sprinkler system or standpipe system, the reduced pressure principle backflow prevention assembly or the reduced pressure principle fire protection backflow prevention assembly shall be permitted to be located so as to isolate that portion of the system. Where systems are not under continuous pressure, the potable water supply shall be protected against backflow by an *air gap* or an atmospheric vacuum breaker conforming to ASSE 1001 or CSA B64.1.1.

Staff Analysis: The proposed standards are in the current edition of the code.

Reason: Adding the ASSE Standards Numbers to be included along with the titles of the standards will allow reference either to the name or the number of the standards.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is not adding any requirements to the current code section.

P89-24

P90-24

IPC: TABLE 608.1, 608.17.11 (New), ASSE Chapter 15 (New)

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com)

2024 International Plumbing Code

Revise as follows:

TABLE 608.1 APPLICATION OF BACKFLOW PREVENTERS

Portions of table not shown remain unchanged.

DEVICE	DEGREE OF HAZARD[a]	APPLICATION[b]	APPLICABLE STANDARDS
Other means or methods:			
Air gap	High or low hazard	Backsiphonage or backpressure	ASME A112.1.2
Air gap fittings for use with plumbing fixtures, appliances and appurtenances	High or low hazard	Backsiphonage or backpressure	ASME A112.1.3
Barometric loop	High or low hazard	Backsiphonage only	(See Section 608.14.4)
Dual check backflow preventer wall hydrants, freeze resistant	High or low hazard	Backsiphonage or Backpressure	ASSE 1053

For SI: 1 inch = 25.4 mm.

a. Low hazard—See Pollution (Section 202).

High hazard—See Contamination (Section 202).

b. See Backpressure, low head (Section 202, Backflow).

See Backsiphonage (Section 202, Backflow).

Add new text as follows:

608.17.11 Dual Check Backflow Preventer Wall Hydrants-Freeze Resistant Type. Dual check backflow preventer wall hydrants, freeze resistant type, shall conform to ASSE 1053.Such hydrants shall not be exposed to continuous pressure conditions.

-

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1053-2019(R2023) Performance Requirements for Dual Check Backflow Preventer Wall Hydrants-Freeze Resistant Type

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1053-2019(R2023) *Performance Requirements for Dual Check Backflow Preventer Wall Hydrants-Freeze Resistant Type*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Dual Check Backflow Preventer Wall Hydrants – Freeze Resistant Type. Dual Check Backflow Preventer Wall Hydrants – Freeze Resistant Type shall confirm to ASSE 1053. The device provides protection of the potable water supply from contamination due to backsiphonage or backpressure without damage to the device due to freezing. The device shall only be used on systems where there is low-head backpressure that does not exceed that generated by an elevated hose equal to or less than 10.0 ft (3.0 m) in height. The device shall not be subjected to more than 12 hours of continuous water pressure. The device consists of two independent checks, force-loaded or biased to a closed position, with an atmospheric vent located between the two check valves, which is force-loaded or biased to an open position, and a means for attaching a hose. They shall be installed in accordance with the manufacturer's instructions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Giving another option for the protection of the system.

P91-24

IPC: TABLE 608.1, 608.17.11 (New), ASSE Chapter 15 (New)

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com)

2024 International Plumbing Code

Revise as follows:

TABLE 608.1 APPLICATION OF BACKFLOW PREVENTERS

Portions of table not shown remain unchanged.

DEVICE	DEGREE OF HAZARD[a]	APPLICATION[b]	APPLICABLE STANDARDS
Other means or methods:			
Air gap	High or low hazard	Backsiphonage or backpressure	ASME A112.1.2
Air gap fittings for use with plumbing fixtures, appliances and appurtenances	High or low hazard	Backsiphonage or backpressure	ASME A112.1.3
Barometric loop	High or low hazard	Backsiphonage only	(See Section 608.14.4)
Freeze resistant sanitary yard hydrants	High or low hazard	Backsiphonage only	ASSE 1057

For SI: 1 inch = 25.4 mm.

a. Low hazard—See Pollution (Section 202).

   High hazard—See Contamination (Section 202).

b. See Backpressure, low head (Section 202, Backflow).

   See Backsiphonage (Section 202, Backflow).

Add new text as follows:

608.17.11 Freeze resistant sanitary yard hydrants. Freeze resistant sanitary yard hydrants shall conform to ASSE 1057. Such hydrants shall not be exposed to continuous pressure conditions.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1057-2012 Performance Requirements for Freeze Resistant Sanitary Yard Hydrants with Backflow Protection

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1057-2012 *Freeze Resistant Sanitary Yard Hydrant with Backflow Protection* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Freeze Resistant Sanitary Yard Hydrants with Backflow Protection. Freeze resistant sanitary yard hydrants with backflow prevention shall conform to ASSE 1057. Freeze Resistant Sanitary Yard Hydrants protect the potable water supply from backflow contamination and ground water contamination. Hydrants that comply with ASSE 1057 do not contain a stop and waste or weep hole feature. The standard lists five types of yard hydrants. Type 1, which provides protection with two check valves and an atmospheric vent and does not require removal of the hose to provide freeze protection; Type 2, which provides protection with two check valves and an atmospheric vent and requires removal of the hose to provide freeze protection; Type 3, which provides protection with one check valve and an atmospheric vent and does not require removal of the hose to provide freeze protection; Type 4, which provides protection with one check valve and an atmospheric vent and requires removal of the hose to provide freeze protection; and Type 5, which has an air gap or removable backflow protection device and requires removal of the backflow protection device and hose to provide freeze protection. They shall be installed in accordance with the manufacturer’s instructions.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Adds to options for something already required.

P91-24

P92-24

IPC: 608.18.9 (New), SECTION 202 (New), ASSE Chapter 15 (New)

Proponents: Erin Coffman, Water Systems Council, Water Systems Council

2024 International Plumbing Code

Add new text as follows:

608.18.9 **Pitless adapters, pitless units, and sanitary well caps.** Pitless adapters, pitless units, and sanitary well caps shall comply with ASSE 1093/WSC PAS-97.

Add new definition as follows:

Pitless Adapter.
A device designed to attach to one or more openings through a well casing. to provide access to water system parts within the well.

Pitless Unit. An assembly that extends the upper end of the well casing from below the frostline to above grade. Its purpose is to prevent the entrance of contaminants or pollutants into the well water supply, to conduct water from the well, to protect the water from freezing or extremes of temperature, and to provide full access to the well and to water system parts within the well.

Sanitary Well Cap.
A device that covers and encloses the upper termination of a pitless unit or the well casing to provides protection to the top, exposed portion of the well casing.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

#1093-2019 (R2023) WSC Standard PAS-97(2019)(R2023)	Performance Requirements for Pitless Adapters, Pitless Units, and Well Caps

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE #1093-2019 (R2023) WSC Standard PAS-97(2019) (R2023) *Performance Requirements for Pitless Adapters, Pitless Units, and Well Caps* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: A common system for supplying potable water is a private water well. There are approximately 47 million people that are using private wells for water supply in the United States (US Geological Survey).

Well pits are potentially unsanitary method of providing access to lateral pipe connections below ground level on individual water systems. There is a health and safety concern for some unregulated systems because pits will cause unsanitary conditions when not properly built and are commonly contaminated from near surface sources that can drain into the pit and well.

Pitless adapter wells are common replacements for above ground well houses and well pits, improving sanitation, convenience, frost protection, and vandalism security. The ASSE 1093/WSC PAS-97 is an ANSI designated standard which guides the end user with pitless well construction and sharply eliminates the possibility of contaminated water entering the well and system, allowing these systems to be more resilient to the surroundings.

While some products for well construction such as casing are covered in the UPC/IPC codes, there is a need to also include pitless adapters, pitless units, and sanitary well caps that provide the connection to the well casing. The pitless and the well cap are the connection of the water supply to the home from the well and protect the well from contamination. These well components are also often not covered by health departments or home inspections, as inspection requirements vary by state and local jurisdiction. Many state health departments do not have jurisdiction or require water well inspections. The source of water connection to the well and casing needs to be included in the plumbing code for the millions of homes with water wells.

The standard covers pitless adapters, pitless units, and sanitary well caps that are part of a pitless well system. These components are critical to well water supply systems as they protect the system's parts and potable water supply. The addition of the provision in the proposed Section 605.17 (Connections to Private Wells) will give the end user and local jurisdictions minimum necessary requirements for safety aspects and dependable performance standards. Additionally, Section 602.4 (Approved by Authority) is needed to guide the end user to Section 605.17 for private wells where permitted).

Bibliography: ASSE 1093-2019(R2023), WSC PAS-97 (2019) (R2023)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Existing standard, products in the marketplace are listed to the standard. Reference for product listings: https://www.watersystemscouncil.org/pas-97-listing-of-products-meeting-the-standard/

P92-24

P93-24

IPC: SECTION 609, 609.1, 609.3 (New), 609.3.1 (New), 609.3

Proponents: Jeff O'Neil, Chair, Committee on Healthcare (ahc@iccsafe.org)

2024 International Plumbing Code

SECTION 609
HEALTH CARE PLUMBING

609.1 Scope.
This section shall govern those aspects of health care plumbing systems that differ from plumbing systems in other structures. Health care plumbing systems shall conform to the requirements of this section in addition to the other requirements of this code. The provisions of this section shall apply to the special devices and equipment installed and maintained in the following *occupancies* : Group I-1, Group I-2, ambulatory care facilities, medical offices, research and testing laboratories, and Group F facilities manufacturing pharmaceutical drugs and medicines.

Add new text as follows:

609.3 Water. Water shall be provided in health care facilities in accordance with Section 609.3.1 and 609.3.2.

609.3.1 Hand-washing water. Hand-washing water shall be provided to all dedicated handwashing stations. Water with a temperature not less than 45 degrees F (13 C) and not greater than 85 F degrees (32 C) or not less than 105 degrees F (40 C) to 120 degrees F (49 C), shall be delivered from dedicated hand-washing stations. Water shall be delivered through an approved water-temperature limiting device that conforms to ASSE 1070/ASME A112.1070/CSA B125.70.

Revise as follows:

~~609.3~~ 609.3.2 Hot water.
Other than at dedicated hand washing stations, *hot* ~~*Hot*~~ *water* shall be provided to supply all of the hospital fixture, kitchen and laundry requirements. Special fixtures and equipment shall have hot water supplied at a temperature specified by the manufacturer. The hot water system shall be installed in accordance with Section 607.

Staff Analysis: The proposed standard is in the current edition of the code.

Reason: The purpose of this change is to allow for maximum amount of handwashing options in a hospital setting, while considering optimal operating performance of systems. In addition to the proven effectiveness of handwashing against COVID-19, other pathogens such as Legionella are a primary concern for healthcare facilities. Water systems are constantly being optimized to In addition, use of higher water temperature increases energy consumption, and therefore having alternate options for handwashing would be beneficial from an environmental standpoint. Even if ABHR is used, it is not recommended for use when hands are heavily soiled or greasy, also per the CDC (Show Me the Science – When & How to Use Hand Sanitizer in Community Settings | Handwashing | CDC). From that article, the "CDC recommends washing hands with soap and water whenever possible because handwashing reduces the amounts of all types of germs and chemicals on hands."

Hospital water systems do not directly reflect outside weather conditions in terms of temperature. Systems generally receive water from municipal mains at about 45 degrees minimum. To combat pathogens such as Legionella, CDC recommendations are to maintain cold water temperature at approximately 68 degrees, based on standard ASHRAE 12-2020. This is achieved by simple circulation of the water through the interior system of the hospital, where indoor air temperatures are maintained. Systems heat water, and also chilled water, to operational temperatures, but water from the cold water tap is not extreme in temperature. This dispels the notion of the "Minnesota Effect," which was a concern in the debate and discussion during the Committee Action Hearings on this code change.

Also, during proper handwashing, use of soap accounts for most of the 20 seconds recommended for hand scrubbing. Hands are only under the water briefly at the beginning, to rinse hands, and then at the end to rinse off the soap. Based on CDC observations, found at

Frequent Questions About Hand Hygiene | Handwashing | CDC the effectiveness of the soap is not related to water temperature. Per the CDC, on the topic of use of warm water or cold water for handwashing, “[u]se your preferred water temperature – cold or warm – to wash your hands. Warm and cold water remove the same number of germs from your hands. The water helps create soap lather that removes germs from your skin when you wash your hands. Water itself does not usually kill germs; to kill germs, water would need to be hot enough to scald your hands.” Other studies suggest that cold water handwashing is actually more effective than warm water handwashing, including elimination of a number of pathogens as noted in Quantifying the Effects of Water Temperature, Soap Volume, Lather Time, and Antimicrobial Soap as Variables in the Removal of Escherichia coli ATCC 11229 from Hands (https://meridian.allenpress.com/jfp/article/80/6/1022/200017/Quantifying-the-Effects-of-Water-Temperature-Soap). In brief, “the results of this study indicate that water temperature is not a critical factor for the removal of transient microorganisms from hands.”

Regarding data surrounding Legionella testing, ASHRAE 188-2017 requires a testing program to determine growth of Legionella at cooling towers and domestic water systems. The purpose for testing is to treat the water before the pathogen grows to lethal levels. In 2017, as noted in Legionellosis Report 2017 (pa.gov), the top jurisdictions had a total of 7,458 cases of Legionella. The monumental Legionnaires Disease outbreak of 1976 at the Bellevue Stratford Hotel in Philadelphia had 182 reported cases with 29 deaths, for a 15.9% death rate. There have been more recent outbreaks in 2017 at Lenox Hill Hospital in New York, and in relation to the Flint, MI water crisis in 2019. Water testing programs are instituted throughout the united states to avoid such a catastrophic result, so systems can be properly cleaned before they reach an outbreak level.The complexities of encouraging handwashing, while mitigating pathogens such as Legionella and COVID-19, are a balance that hospitals face regularly. This change to allow cold handwashing affords another tool to successfully create the safest environment possible.

This proposal is submitted by the ICC Committee for Healthcare (CHC).
The Committee on Healthcare (CHC) was established by the ICC Board of Directors in 2011 to pursue opportunities to study and develop effective and efficient provisions for Hospital, Nursing Homes, Assisted Living and Ambulatory Care Facilities. This committee was formed in cooperation with the American Society for Healthcare Engineering (ASHE). In July of 2017, the ICC Board made CHC a standing committee. In 2023 the CHC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the CHC website at CHC webpage.

Bibliography: 1. Carrico AR, Spoden M, Wallston KA, Vandenbergh MP. The Environmental Cost of Misinformation: Why the Recommendation to Use Elevated Temperatures for Handwashing is Problematic. Int J Consum Stud. 2013;37(4):433-441. doi:10.1111/ijcs.12012

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is an option for hospitals for water temperature and will not change the requirements for construction of the dedicated handwashing stations or the piping.

P93-24

P94-24

IPC: 610.1

Proponents: Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Revise as follows:

610.1 General.
New potable water systems and systems or portions of systems that have been shut down for renovations shall be purged of deleterious matter and disinfected prior to utilization. The method followed shall be documented and contain, at a minimum, the factors set forth below. ~~That prescribed by the health authority or water purveyor having jurisdiction or, in the absence of a prescribed method, the procedure described in either AWWA C651 or AWWA C652, or as described in this section.~~ This requirement shall apply to all domestic water distribution systems before they are put into service. ~~"on-site" or "in-plant" fabrication of a system or to a modular portion of a system.~~

1. Remove all strainers, filters, and equipment connections. ~~The pipe system shall be flushed with clean, potable water until dirty water does not appear at the points of outlet.~~
2. Flush the piping distribution system and branches with potable water at a flow velocity of at least three (3) feet per second for a minimum of three (3) seconds. For a building with greater than 100 feet of developed length of pipe from the building water entrance to the farthest fixture, flush three minutes for each 100 feet of developed length of pipe.
3. ~~2.~~3. The system or part thereof shall be filled with a water/chlorine solution containing a minimum of 10 parts per million of chlorine and not exceeding 20 parts per million of chlorine for a minimum of 10 hours and a maximum of 24 hours. Verify the maximum ppm chlorine level and contact time with the manufacturer for each pipe material on the project prior to the disinfection process. ~~The system or part thereof shall be filled with a water/chlorine solution containing not less than 50 parts per million (50 mg/L) of chlorine, and the system or part thereof shall be valved off and allowed to stand for 24 hours; or the system or part thereof shall be filled with a water/chlorine solution containing not less than 200 parts per million (200 mg/L) of chlorine and allowed to stand for 3 hours.~~
4. ~~3.~~ 4. Following the required minimum contact ~~standing~~ time, the system shall be flushed with clean potable water until the chlorine is purged from the system.
5. ~~4~~ 5. The procedure shall be repeated where shown by a bacteriological examination that contamination remains present in the system.
6. Document the method used in a: "Flushing, Disinfection, and Purge" report, which shall be provided to the code official and the building owner upon completion. The report shall include, at a minimum, the start and end times and the flushing time at each fixture; the ppm level; the start time of fill and the start time of post-disinfection flush; the ppm levels, contact times, and post purge time; and chlorine level post purge.

Reason: AWWA C651 and AWWA C652 standards for Disinfection of Water mains are not applicable and not easily converted for use in building piping systems. For example the smallest pipe size listed in the AWWA C651 Standard is 4-inch diameter pipe. The vast majority of plumbing pipes within buildings is of different pipe materials than identified in the water main standard. For pipes smaller than 4-inches, there is no direction for flow velocities for flushing. The chemicals and disinfection methods used in public water mains through fire hydrants are not applicable for plumbing pipes in buildings. There is no chemical compatibility information for the pipe materials used inside buildings.

Many new plumbing systems have been destroyed because the current disinfection method has a minimum chlorine level, but no maximum chlorine level. Excessive disinfection chemical concentrations and extended contact times without post disinfection purging have led to failed piping systems within a very short time after construction.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Flushing and disinfection is already required; this change just seeks to ensure that it is done correctly.

P94-24

P95-24

IPC: 611.1, Table 611.1 (New), ASSE Chapter 15 (New), NSF Chapter 15 (New)

Proponents: Jason Shank, ASSE International, ASSE International (jshank@plumbers55.com)

2024 International Plumbing Code

Revise as follows:

611.1 Design.
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 42, NSF 44, NSF 53 or NSF 62. Commercial and food service water treatment equipment shall comply with ASSE 1087. Table 611.1 shall be used to determine the applicable standards for the applications and uses for the requirements of this section.

Add new text as follows:

Table 611.1 Drinking Water Treatment Units

Application	Point of Use	Point of Entry
Aesthetic Contaminant Reduction Filters	NSF/ANSI 42 or CSA B483.1	NSF/ANSI 42 or CSA B483.1
Distillation Systems	NSF/ANSI 62 or CSA B483.1	NSF/ANSI 62 or CSA B483.1
Health Related Contaminant Reduction Filters	NSF/ANSI 53 or CSA B483.1	NSF/ANSI 53 or CSA B483.1
Reverse Osmosis	NSF/ANSI 58 or CSA B483.1	-
Ultraviolet Water Treatment	NSF/ANSI 55 or CSA B483.1	NSF/ANSI 55 or CSA B483.1
Water Softeners	-	Up to 1.25 in. inlet: NSF/ANSI 44, or CSA B483.1
		greater than 1.25 in, inlet : ASSE 1087

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1087 - 2022 Performance Requirements for Commercial and Food Service Water Treatment Equipment Utilizing Drinking Water

NSF

NSF International
789 N. Dixboro Road P.O. Box 130140
Ann Arbor, MI 48105

55 - 2022 Ultraviolet Microbiological Water Treatment Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, NSF 55-2022 *Ultraviolet (UV) Water Treatment Systems* and ASSE 1087-2022 *Commercial and Food Service Water Treatment Equipment Utilizing Drinking Water*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The proposal to add this language and chart is to define what ASSE 1087 standard covers in regards to the other standards listed currently in this section and what they cover in the Code. The table also includes the applications, point of use and point of entry for each standard listed in this section.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These are optional items in a building and are not required. It is up to the Owner of the building to decide if they wish these or not.

P95-24

P96-24 Part I

IPC: TABLE 702.1, TABLE 702.3, 702.3, TABLE 702.2, 702.2, 702.1, ASTM Chapter 15 (New)

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

TABLE 702.1 ABOVE-GROUND DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Galvanized steel pipe	ASTM A53
Glass pipe	ASTM C1053
Polyolefin pipe	ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200), and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; ASTM F1760; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1

TABLE 702.3 BUILDING SEWER PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM D2680; ASTM F628; ASTM F1488; CSA B181.1
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters, including SDR 42 (PS 20), PS 35, SDR 35 (PS 45), PS 50, PS 100, PS 140, SDR 23.5 (PS 150) and PS 200; with a solid, cellular core or composite wall	ASTM D2751; ASTM F1488
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Concrete pipe	ASTM C14; ASTM C76; CSA A257.1; CSA A257.2
Copper or copper-alloy tubing (Type K or L)	ASTM B75; ASTM B88; ASTM B251
Polyethylene (PE) plastic pipe (corrugated wall)	ASTM F2947/F2947M
Polyethylene (PE) plastic pipe (profile wall)	ASTM F2763
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polypropylene (PP) plastic pipe	ASTM F2764; CSA B182.13
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; ASTM F1760
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters, including PS 25, SDR 41 (PS 28), PS 35, SDR 35 (PS 46), PS 50, PS 100, SDR 26 (PS 115), PS 140 and PS 200; with a solid, cellular core or composite wall	ASTM F891; ASTM F1488; ASTM D3034; CSA B182.2; CSA B182.4
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Vitrified clay pipe	ASTM C4; ASTM C700

For SI: 1 inch = 25.4 mm.

702.3 Building sewer pipe.
Building sewer pipe shall conform to one of the standards listed in Table 702.3.

Revise as follows:

TABLE 702.2 UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1

MATERIAL	STANDARD
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F714; ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; ASTM F1760; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Type 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

702.2 Underground building sanitary drainage and vent pipe.
Underground building sanitary drainage and vent pipe shall conform to one of the standards listed in Table 702.2.

702.1 Above-ground sanitary drainage and vent pipe.
Above-ground soil, waste and vent pipe shall conform to one of the standards listed in Table 702.1.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

ASTM F1760-16(2020) Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F1760-16(2020) *Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: ASTM F1760 is ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content***, last updated in 2020. It is a piping material included in APPENDIX AG, as well as the UPC and NSPC codes.

Bibliography: ASTM F1760, ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content***

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs of construction, it only offers another optional material which could offer minor reductions in costs depending on market pricing vs. current options ($0-$100).

Estimated Immediate Cost Impact Justification (methodology and variables):

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs of construction, it only offers another optional material which could offer minor reductions in costs depending on market pricing vs. current options ($0-$100).

Estimated Life Cycle Cost Impact:

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs of project life cycle.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs post-construction.

P96-24 Part I

P96-24 Part II

IRC: P3002.1, TABLE P3002.1(1), TABLE P3002.1(2), TABLE P3002.2, ASTM Chapter 44 (New)

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Residential Code

P3002.1 Piping within buildings.
Drain, waste and vent (DWV) piping in *buildings* shall be as indicated in Tables P3002.1(1) and P3002.1(2) except that galvanized wrought-iron or galvanized steel pipe shall not be used underground and shall be maintained not less than 6 inches (152 mm) above ground. Allowance shall be made for the thermal expansion and contraction of plastic piping.

Revise as follows:

TABLE P3002.1(1) ABOVE-GROUND DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM D2680; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75/B75M; ASTM B88; ASTM B251/B251M; ASTM B306
Galvanized steel pipe	ASTM A53/A53M
Polyolefin pipe	ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; <u>ASTM F1760;</u> CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

TABLE P3002.1(2) UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

PIPE	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75/B75M; ASTM B88; ASTM B251; ASTM B306
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F714; ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; <u>ASTM F1760;</u> CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Stainless steel drainage systems, Type 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

TABLE P3002.2 BUILDING SEWER PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters, including SDR 42 (PS 20), PS35, SDR 35 (PS 45), PS50, PS100, PS140, SDR 23.5 (PS 150) and PS200; with a solid, cellular core or composite wall	ASTM D2751; ASTM F1488
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters, including PS 25, SDR 41 (PS 28), PS 35, SDR 35 (PS 46), PS 50, PS 100, SDR 26 (PS 115), PS140 and PS 200; with a solid, cellular core or composite wall	ASTM D3034; ASTM F891; ASTM F1488; CSA B182.2; CSA B182.4
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Concrete pipe	ASTM C14; ASTM C76; CSA A257.1; CSA A257.2
Copper or copper-alloy tubing (Type K or L)	ASTM B75/B75M; ASTM B88; ASTM B251/B251M
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with solid, cellular core or composite wall	ASTM D2665; ASTM D2949; ASTM D3034; ASTM F1412; <u>ASTM F1760;</u> CSA B182.2; CSA B182.4

MATERIAL	STANDARD
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949, ASTM F1488
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Vitrified clay pipe	ASTM C425; ASTM C700

For SI: 1 inch = 25.4 mm.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F1760-16(2020) *Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F1760-16(2020) *Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: ASTM F1760 is ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content***, last updated in 2020. It is a piping material included in IPC APPENDIX AG, as well as the UPC and NSPC codes.

Bibliography: ASTM F1760***, Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content***

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs of construction, it only offers another optional material which could offer minor reductions in costs depending on market pricing vs. current options ($0-$100).

Estimated Immediate Cost Impact Justification (methodology and variables):

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs of construction, it only offers another optional material which could offer minor reductions in costs depending on market pricing vs. current options ($0-$100).

Estimated Life Cycle Cost Impact:

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs post construction ($0-$1).

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Adding the standard ASTM F1760 ***Standard Specification for Coextruded Poly(Vinyl Chloride) (PVC) Non-Pressure Plastic Pipe Having Reprocessed-Recycled Content*** is not expected to alter costs post-construction ($0-$1).

P96-24 Part II

P97-24

IPC: TABLE 702.1, TABLE 702.2, TABLE 702.4

Proponents: Abraham MURRA, Abraham Murra Consulting, Georg Fischer

2024 International Plumbing Code

Revise as follows:

TABLE 702.1 ABOVE-GROUND DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Chlorinated polyvinylchloride (CPVC) plastic pipe, Schedule 80	ASTM F441/F441M, CSA B181.2
Galvanized steel pipe	ASTM A53
Glass pipe	ASTM C1053
Polyolefin pipe	ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200), and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1

TABLE 702.2 UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Chlorinated polyvinylchloride (CPVC) plastic pipe, Schedule 80	ASTM F441/F441M, CSA B181.2
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F714; ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Type 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

TABLE 702.4 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters	ASME A112.4.4; ASTM D2661; ASTM F628; CSA B181.1
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters	ASTM D2751
Cast iron	ASME B16.4; ASME B16.12; ASTM A74; ASTM A888; CISPI 301
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29
Chlorinated polyvinylchloride (CPVC), Schedule 80	ASTM F439, CSA B181.2
Glass	ASTM C1053
Gray iron and ductile iron	AWWA C110/A21.10
Polyethylene	ASTM D2683
Polyolefin	ASTM F1412; ASTM F3371; CSA B181.3
Polyvinyl chloride (PVC) plastic in IPS diameters	ASME A112.4.4; ASTM D2665; ASTM F1866
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters	ASTM D3034
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D.	ASTM D2949
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Steel	ASME B16.9; ASME B16.11; ASME B16.28
Vitrified clay	ASTM C700

For SI: 1 inch = 25.4 mm.

Staff Analysis: The proposed standards are in the current edition of the code.

Reason: CPVC is a widely used and accepted piping material and adding it to Tables 702.1, 702.2, and 702.3 will give users of the IPC a broader choice of materials.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal adds a piping material, thus giving users more options to choose from, without any cost impact because of the new alternative.

P97-24

P98-24

IPC: TABLE 702.1, TABLE 702.2, TABLE 702.4

Proponents: Abraham MURRA, Abraham Murra Consulting, Georg Fischer

2024 International Plumbing Code

Revise as follows:

TABLE 702.1 ABOVE-GROUND DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy pipe	ASTM B42; ASTM B43; ASTM B302
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Galvanized steel pipe	ASTM A53
Glass pipe	ASTM C1053
Polyolefin pipe	ASTM F1412; ASTM F3371; CSA B181.3
Polypropylene (PP) plastic pipe	ASTM F1412; ASTM F3371; CSA B182.13
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200), and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1

TABLE 702.2 UNDERGROUND BUILDING DRAINAGE AND VENT PIPE

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2661; ASTM F628; ASTM F1488; CSA B181.1
Cast-iron pipe	ASTM A74; ASTM A888; CISPI 301
Copper or copper-alloy tubing (Type K, L, M or DWV)	ASTM B75; ASTM B88; ASTM B251; ASTM B306
Polyethylene (PE) plastic pipe (SDR-PR)	ASTM F714
Polyolefin pipe	ASTM F714; ASTM F1412; ASTM F3371; CSA B181.3
Polypropylene (PP) plastic pipe	ASTM F1412; ASTM F3371; CSA B182.13
Polyvinyl chloride (PVC) plastic pipe in IPS diameters, including Schedule 40, DR 22 (PS 200) and DR 24 (PS 140); with a solid, cellular core or composite wall	ASTM D2665; ASTM F891; ASTM F1488; CSA B181.2
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D. and a solid, cellular core or composite wall	ASTM D2949; ASTM F1488
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Type 316L	ASME A112.3.1

For SI: 1 inch = 25.4 mm.

TABLE 702.4 PIPE FITTINGS

MATERIAL	STANDARD
Acrylonitrile butadiene styrene (ABS) plastic pipe in IPS diameters	ASME A112.4.4; ASTM D2661; ASTM F628; CSA B181.1
Acrylonitrile butadiene styrene (ABS) plastic pipe in sewer and drain diameters	ASTM D2751
Cast iron	ASME B16.4; ASME B16.12; ASTM A74; ASTM A888; CISPI 301
Copper or copper alloy	ASME B16.15; ASME B16.18; ASME B16.22; ASME B16.23; ASME B16.26; ASME B16.29
Glass	ASTM C1053
Gray iron and ductile iron	AWWA C110/A21.10
Polyethylene	ASTM D2683
Polyolefin	ASTM F1412; ASTM F3371; CSA B181.3
Polypropylene (PP)	ASTM F1412; ASTM F3371; CSA B182.13
Polyvinyl chloride (PVC) plastic in IPS diameters	ASME A112.4.4; ASTM D2665; ASTM F1866
Polyvinyl chloride (PVC) plastic pipe in sewer and drain diameters	ASTM D3034
Polyvinyl chloride (PVC) plastic pipe with a 3.25-inch O.D.	ASTM D2949
Polyvinylidene fluoride (PVDF) plastic pipe	ASTM F1673; CSA B181.3
Stainless steel drainage systems, Types 304 and 316L	ASME A112.3.1
Steel	ASME B16.9; ASME B16.11; ASME B16.28
Vitrified clay	ASTM C700

For SI: 1 inch = 25.4 mm.

Staff Analysis: The proposed standards are in the current edition of the code.

Reason: PP is a widely used and accepted piping material and adding it to Tables 702.1, 702.2, and 702.3 will give users of the IPC a broader choice of materials.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal adds a piping material, thus giving users more options to choose from, without any cost impact because of the new alternative.

P98-24

P99-24 Part I

IPC: 702.2, ASTM Chapter 15 (New)

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov); Brian Conner, Charlotte Pipe and Foundry (bconner@charlottepipe.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

702.2 Underground building sanitary drainage and vent pipe.
Underground building sanitary drainage and vent pipe shall conform to one of the standards listed in Table 702.2. <u>Thermoplastic pipe and fittings shall be installed in accordance with ASTM D2321.</u>

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

<u>D2321-20</u> <u>Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D2321-20 *Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications*,with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P99-24 Part I

P99-24 Part II

IRC: P3002.1, P3002.2, ASTM Chapter 44 (New)

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov); Brian Conner, Charlotte Pipe and Foundry (bconner@charlottepipe.com)

2024 International Residential Code

Revise as follows:

P3002.1 Piping within buildings.
Drain, waste and vent (DWV) piping in *buildings* shall be as indicated in Tables P3002.1(1) and P3002.1(2) except that galvanized wrought-iron or galvanized steel pipe shall not be used underground and shall be maintained not less than 6 inches (152 mm) above ground. Allowance shall be made for the thermal expansion and contraction of plastic piping. <u>Thermoplastic pipe and fittings shall be installed in accordance with ASTM D 2321.</u>

P3002.2 Building sewer.
Building sewer piping shall be as indicated in Table P3002.2 Forced main sewer piping shall conform to one of the standards for ABS plastic pipe, copper or copper-alloy tubing, PVC plastic pipe or pressure-rated pipe indicated in Table P3002.2. <u>Thermoplastic pipe and fittings shall be installed in accordance with ASTM D 2321.</u>

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

<u>D2321-20</u>	<u>Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM D2321-20 *Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Every manufacturer of thermoplastic pipe has in their instruction a reference to the ASTM D 2321 standard for underground installations. The problem is that there is nothing in the code that also references this important standard except section 303.2. Inspectors do not necessarily have the time to read through every manufacturer's installation instructions during an inspection, however, if the installation standard was referenced in the code then the jurisdiction would be responsible for providing access to the standard for verification purposes.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal will make it easier to ensure installation are in compliance with the manufacturer's requirements and should not technically have any impact on the cost of construction if the installers were following these requirements as they should have been.

P99-24 Part II

P100-24 Part I

IPC: TABLE 308.5, 308.5, 702.7, 705.9, 705.9.1, 705.9.2, 705.16.5

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

TABLE 308.5 HANGER SPACING

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
Acrylonitrile butadiene styrene (ABS) pipe	4	10[b]
Aluminum tubing	10	15
Cast-iron pipe	5[a]	15
Chlorinated polyvinyl chloride (CPVC) pipe and tubing, 1 inch and smaller	3	10[b]
Chlorinated polyvinyl chloride (CPVC) pipe and tubing, 1 $^1/_4$ inches and larger	4	10[b]
Copper or copper-alloy pipe	12	10
Copper or copper-alloy tubing, 1 $^1/_4$-inch diameter and smaller	6	10
Copper or copper-alloy tubing, 1 $^1/_2$-inch diameter and larger	10	10
Cross-linked polyethylene (PEX) pipe, 1 inch and smaller	2.67 (32 inches)	10[b]
Cross-linked polyethylene (PEX) pipe, 1 $^1/_4$ inches and larger	4	10[b]
Cross-linked polyethylene/aluminum/cross-linked polyethylene (PEX-AL-PEX) pipe	2.67 (32 inches)	4
~~Lead pipe~~	~~Continuous~~	~~4~~
Polyethylene/aluminum/polyethylene (PE-AL-PE) pipe	2.67 (32 inches)	4
Polyethylene of raised temperature (PE-RT) pipe, 1 inch and smaller	2.67 (32 inches)	10[b]
Polyethylene of raised temperature (PE-RT) pipe, 1 $^1/_4$ inches and larger	4	10[b]
Polypropylene (PP) pipe or tubing, 1 inch and smaller	2.67 (32 inches)	10[b]
Polypropylene (PP) pipe or tubing, 1 $^1/_4$ inches and larger	4	10[b]
Polyvinyl chloride (PVC) pipe	4	10[b]
Stainless steel drainage systems	10	10[b]
Steel pipe	12	15

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.

b. For sizes 2 inches and smaller, a guide shall be installed midway between required vertical supports. Such guides shall prevent pipe movement in a direction perpendicular to the axis of the pipe.

308.5 Interval of support.

Pipe shall be supported in accordance with Table 308.5.

Exception: The interval of support for piping systems designed to provide for expansion/contraction shall conform to the engineered design in accordance with Section 316.1.

Delete without substitution:

~~**702.7 Lead bends and traps.**~~

~~The wall thickness of lead bends and traps shall be not less than $^1/_8$ inch (3.2 mm).~~

~~**705.9 Lead.**~~

~~Joints between lead pipe or fittings shall comply with Sections 705.9.1 and 705.9.2.~~

~~**705.9.1 Burned.**~~

~~Burned joints shall be uniformly fused together into one continuous piece. The thickness of the joint shall be not less than the thickness of the lead being joined. The filler metal shall be of the same material as the pipe.~~

~~**705.9.2 Wiped.**~~

~~Joints shall be fully wiped, with an exposed surface on each side of the joint not less than $^3/_4$ inch (19.1 mm). The joint shall be not less than $^3/_8$ inch (9.5 mm) thick at the thickest point.~~

~~**705.16.5 Lead pipe to other piping material.**~~

~~Joints between lead pipe and other piping material shall be made by a wiped joint to a caulking ferrule, soldering nipple or bushing or shall be made with an *approved* adapter fitting.~~

Reason: If we are finally removing lead pipe from use in old service lines, it should be also be removed from the plumbing code, as it does not serve the code to continue suggesting it's usage. It's just historical lingering text at this point.

Cost Impact: The code change proposal will not increase or decrease the cost of construction

Not using a material no one is using seems cost neutral.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Proposal removes a rarely used material from the support table, so no cost impact or minor decrease because other materials would be cheaper than lead pipe ($0-$10) is estimated. I don't think we could install lead pipe anymore.

Estimated Immediate Cost Impact Justification (methodology and variables):

Proposal removes a rarely used material from the support table, so no cost impact or minor decrease because other materials would be cheaper than lead pipe ($0-$10) is estimated. I don't think we could install lead pipe anymore.

Estimated Life Cycle Cost Impact:

Not expected to have a cost impact over life of building or project ($0-$1).

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Not expected to have a cost impact over life of building or project ($0-$1).

P100-24 Part I

P100-24 Part II

IRC: P3003.8, P3003.8.1, P3003.8.2, P3003.13.5

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Residential Code

Delete without substitution:

~~**P3003.8 Lead**~~**.**
~~Joints between lead pipe or fittings shall comply with Sections P3003.8.1 and P3003.8.2.~~

~~**P3003.8.1 Burned.** Burned joints shall be uniformly fused together into one continuous piece. The thickness of the joint shall be not less than the thickness of the lead being joined. The filler metal shall be of the same material as the pipe.~~

~~**P3003.8.2 Wiped.** Joints shall be fully wiped, with an exposed surface on each side of the joint not less than $^3/_4$ inch (19 mm). The joint shall be not less than $^3/_8$ inch (9.5 mm) thick at the thickest point.~~

~~**P3003.13.5 Lead pipe to other piping material.** Joints between lead pipe and other piping material shall be made by a wiped joint to a caulking ferrule, soldering nipple, or bushing or shall be made with an *approved* adapter fitting.~~

Reason: It's time to remove lead piping not just from service lines, but the residential code as well.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Proposal removes a rarely used material from the support table, so no cost impact or minor decrease because other materials would be cheaper than lead pipe ($0-$10) is estimated. I don't think we could install lead pipe anymore.

Estimated Immediate Cost Impact Justification (methodology and variables):

Proposal removes a rarely used material from the support table, so no cost impact or minor decrease because other materials would be cheaper than lead pipe ($0-$10) is estimated. I don't think we could install lead pipe anymore.

Estimated Life Cycle Cost Impact:

None expected over the life of the building or project ($0-$1)

Estimated Life Cycle Cost Impact Justification (methodology and variables):

None expected over the life of the building or project ($0-$1)

P100-24 Part II

P100-24 Part III

IMC®: TABLE 305.4

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Mechanical Code

Revise as follows:

TABLE 305.4 PIPING SUPPORT SPACING[a]

PIPING MATERIAL	MAXIMUM HORIZONTAL SPACING (feet)	MAXIMUM VERTICAL SPACING (feet)
ABS pipe	4	10[c]
Aluminum pipe and tubing	10	15
Cast-iron pipe[b]	5	15
Copper or copper-alloy pipe	12	10
Copper or copper-alloy tubing	8	10
CPVC pipe or tubing, 1 inch and smaller	3	10[c]
CPVC pipe or tubing, $1^1/_4$-inches and larger	4	10[c]
~~Lead pipe~~	~~Continuous~~	~~4~~
PE-RT 1 inch and smaller	$2^2/_3$ (32 inches)	10[c]
PE-RT $1^1/_4$ inches and larger	4	10[c]
PEX tubing 1 inch and smaller	$2^2/_3$ (32 inches)	10[c]
PEX tubing $1^1/_4$ inches and larger	4	10[c]
Polypropylene (PP) pipe or tubing, 1 inch and smaller	$2^2/_3$ (32 inches)	10[c]
Polypropylene (PP) pipe or tubing, $1^1/_4$ inches and larger	4	10[c]
PVC pipe	4	10[c]
Steel pipe	12	15
Steel tubing	8	10

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. See Section 301.18.

b. The maximum horizontal spacing of cast-iron pipe hangers shall be increased to 10 feet where 10-foot lengths of pipe are installed.

c. Mid-story guide.

Reason: This proposal would remove lead pipe from the Mechanical code piping support table. It is rarely used and we are removing it from other applications.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Proposal removes a rarely used material from the support table, so no cost impact or minor decrease because other materials would be cheaper than lead pipe ($0-$10) is estimated, as no increase in cost seems probably.

Estimated Immediate Cost Impact Justification (methodology and variables):

Proposal removes a rarely used material from the support table, so no cost impact or minor decrease because other materials would be cheaper than lead pipe ($0-$10) is estimated.

Estimated Life Cycle Cost Impact:

Proposal removes a rarely used material from the support table, so no cost impact ($0-$10) during life of building.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

Proposal removes a rarely used material from the support table, so no cost impact ($0-$10) during life of building

P101-24 Part I

IPC: 708.1.11.2, ASME Chapter 15, ASME Chapter 15 (New)

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

708.1.11.2 Floor cleanout assemblies.
Where it is necessary to protect a cleanout plug from the loads of vehicular traffic, cleanout assemblies in accordance with ASME ~~A112.36.2M~~ ASME A112.36.2/CSA B79.2 shall be installed.

ASME

ASME
ASME
Two Park Avenue
New York, NY 10016-5990

~~A112.36.2M—1991 (R2022)~~ ~~Cleanouts~~

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

A112.36.2/CSA B79.2-2022 Cleanouts

Staff Analysis: A review of the standard proposed for inclusion in the code, ASME A112.36.2/CSA B79.2-2022 *Cleanouts*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P101-24 Part I

P101-24 Part II

IRC: P3005.2.10.3, ASME Chapter 44, ASME Chapter 44 (New)

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Residential Code

Revise as follows:

P3005.2.10.3 Floor cleanout assemblies.
Where it is necessary to protect a cleanout plug from the loads of vehicular traffic, cleanout assemblies in accordance with ~~ASME A112.36.2M~~ ASME A112.36.2/CSA B79.2 shall be installed.

ASME

ASME
ASME
Two Park Avenue
New York, NY 10016-5990

~~A112.36.2M—1991 (R2022)~~ ~~Cleanouts~~

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

A112.36.2/CSA B79.2 Cleanouts

Staff Analysis: A review of the standard proposed for inclusion in the code, ASME A112.36.2/CSA B79.2-2022 *Cleanouts*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The ASME A112.36.2 was harmonized with CSA B79. The intent of this proposal is to replace the current standard with the new standard.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The ASME standard was harmonized with the CSA standard, no additional requirements were added, clarification change.

P101-24 Part II

P102-24

IPC: TABLE 709.1

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

TABLE 709.1 DRAINAGE FIXTURE UNITS FOR FIXTURES AND GROUPS

FIXTURE TYPE	DRAINAGE FIXTURE UNIT VALUE AS LOAD FACTORS	MINIMUM SIZE OF TRAP (inches)
Automatic clothes washers, commercial[a, g]	3	2
Automatic clothes washers, residential[g]	2	2
Bathroom group as defined in Section 202 (1.6 gpf water closet)[f]	5	—
Bathroom group as defined in Section 202 (water closet flushing greater than 1.6 gpf)[f]	6	—
Bathtub[b] (with or without overhead shower or whirlpool attachments)	2	1 1/2
Bidet	1	1 1/4
Combination sink and tray	2	1 1/2
Dental lavatory	1	1 1/4
Dental unit or cuspidor	1	1 1/4
Dishwashing machine[c], domestic	2	1 1/2
Drinking fountain	~~1/2~~ 0	1 1/4
Emergency floor drain	0	2
Floor drains[h]	2[h]	2
Floor sinks	Note h	2
Kitchen sink, domestic	2	1 1/2
Kitchen sink, domestic with food waste disposer, dishwasher or both	2	1 1/2
Laundry tray (1 or 2 compartments)	2	1 1/2
Lavatory	1	1 1/4
Shower (based on the total flow rate through showerheads and body sprays)Flow rate:5.7 gpm or lessGreater than 5.7 gpm to 12.3 gpmGreater than 12.3 gpm to 25.8 gpmGreater than 25.8 gpm to 55.6 gpm	2 3 5 6	1 1/2 2 3 4
Service sink	2	1 1/2
Sink	2	1 1/2
Urinal	4	Note d
Urinal, 1 gallon per flush or less	2[e]	Note d
Urinal, nonwater supplied	1/2	Note d
Wash sink (circular or multiple) each set of faucets	2	1 1/2
Water closet, flushometer tank, public or private	4[e]	Note d
Water closet, private (1.6 gpf)	3[e]	Note d
Water closet, private (flushing greater than 1.6 gpf)	4[e]	Note d
Water closet, public (1.6 gpf)	4[e]	Note d
Water closet, public (flushing greater than 1.6 gpf)	6[e]	Note d

For SI: 1 inch = 25.4 mm, 1 gallon = 3.785 L, gpf = gallon per flushing cycle, 1 gallon per minute (gpm) = 3.785 L/m.

a. For traps larger than 3 inches, use Table 709.2.

b. A showerhead over a bathtub or whirlpool bathtub attachment does not increase the drainage fixture unit value.

c. See Sections 709.2 through 709.4.1 for methods of computing unit value of fixtures not listed in this table or for rating of devices with intermittent flows.

d. Trap size shall be consistent with the fixture outlet size.

e. For the purpose of computing loads on building drains and sewers, water closets and urinals shall not be rated at a lower drainage fixture unit unless the lower values are confirmed by testing.

f. For fixtures added to a bathroom group, add the dfu value of those additional fixtures to the bathroom group fixture count.

g. See Section 406.2 for sizing requirements for fixture drain, branch drain and drainage stack for an automatic clothes washer standpipe.

h. See Sections 709.4 and 709.4.1.

Reason: A DFU value is not necessary for a drinking fountain. Approximately 90% of the water discharged at a drinking fountain leaves with the user and is not discharged down the drain. Any residual amount of water that does make it down the drain can easily be accommodated by any drainage system.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal would result in no additional materials or labor as the proposal only clarifies a drainage value in the table.

P102-24

P103-24

IPC: TABLE 710.1(2), 710.1

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

TABLE 710.1(2) ~~HORIZONTAL FIXTURE BRANCHES AND~~ STACKS AND CONNECTIONS TO STACKS[a]

DIAMETER OF PIPE (inches)	MAXIMUM NUMBER OF DRAINAGE FIXTURE UNITS (dfu)			
	Total for ~~horizontal~~fixture drain or fixture branch connection	Stacks[b]		
		Total discharge into one branch interval	Total for stack of three branch intervals or less	Total for stack greater than three branch intervals
$1\frac{1}{2}$	3	2	4	8
2	6	6	10	24
$2\frac{1}{2}$	12	9	20	42
3	20	20	48	72
4	160	90	240	500
5	360	200	540	1,100
6	620	350	960	1,900
8	1,400	600	2,200	3,600
10	2,500	1,000	3,800	5,600
12	3,900	1,500	6,000	8,400
15	7,000	Note c	Note c	Note c

For SI: 1 inch = 25.4 mm.

a. Does not include branches of the building drain. Refer to Table 710.1(1).

b. Stacks shall be sized based on the total accumulated connected load at each story or branch interval. As the total accumulated connected load decreases, stacks are permitted to be reduced in size. Stack diameters shall not be reduced to less than one-half of the diameter of the largest stack size required.

c. Sizing load based on design criteria.

710.1 Maximum fixture unit load.
The maximum number of *drainage fixture units* ~~connected~~ discharging to a given size of *building sewer*, *building drain* or horizontal *branch* of the *building drain* shall be determined using Table 710.1(1). The maximum number of *drainage fixture units* ~~connected~~ discharging to a given size of ~~horizontal~~ fixture drain or fixture *branch connection* ~~or~~ to a vertical soil or waste *stack* shall be determined using Table 710.1(2).

Reason: The current code language is often confusing to users. The first charging statement in 710.1 refers people to table 710.1 for sizing horizontal branches of building drains. The second sentence refers the user to 710.1(2) for sizing "horizontal branches or vertical soil or waste stacks". Since the column in table 710.1(2) is labeled " Total for horizontal branch", users are often confusing this to mean all horizontal branches when in fact the intent is for sizing connections to the stack. In order to eliminate further confusion, it is also being suggested to change the phrases "connected to a given size of" to " discharging to a given size of", reserving connected for the connections to stacks.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There would be absolutely no cost impact as this proposal is just for clarification purposes. The reason statement explains.

P103-24

P104-24 Part I

IPC: 714.3, 714.1

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

714.3 ~~Location~~ <u>Installation</u>.
Backwater valves shall be installed so that *access* is provided to the working parts.

714.1 Sewage backflow. Where plumbing fixtures are installed on a floor with a finished floor elevation below the elevation of the manhole cover of the next upstream manhole in the public *sewer,* such fixtures shall be protected by a backwater valve installed in the *building drain*, or horizontal *branch* serving such fixtures. ~~Plumbing fixtures installed on a floor with a finished floor elevation above the elevation of the manhole cover of the next upstream manhole in the public *sewer* shall not discharge through a backwater valve.~~The backwater valve shall be of the normally open type.

> ~~**Exception:** In existing buildings, fixtures above the elevation of the manhole cover of the next upstream manhole in the public *sewer* shall not be prohibited from discharging through a backwater valve.~~<u>**Exception:** Normally closed backwater valve installations for *existing buildings* shall not be prohibited.Normally closed backwater valves shall be provided with a venting method in accordance with one of the methods in Chapter 9 upstream of the backwater valve.</u>

P104-24 Part I

P104-24 Part II

IRC: P3008.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Residential Code

Revise as follows:

P3008.2 Allowable installations. Where plumbing fixtures are installed on a floor with a finished floor elevation above the elevation of the manhole cover of the next upstream manhole in the public sewer~~, and~~ a backwater valve ~~is~~ shall be installed in the *building drain* or *horizontal branch* serving such fixtures.~~, the~~ The backwater valve shall be of the normally open type.

> **Exception:** Normally closed backwater valve installations for *existing buildings* shall not be prohibited.Normally closed backwater valves shall be provided with a venting method in accordance with one of the methods in Chapter 9 upstream of the backwater valve.

Reason: The title of the section was improper to begin with, "Location", the entire section was referencing installation requirements. The remainder of the proposal is focused on the fact that most floor drains are installed as part of a combination waste and vent system, however, since most backwater valves are manufactured as normally closed backwater valves, this interrupts the pathway for venting in a combination waste and vent system. Additionally, a normally closed backwater valve poses a resistance to flow until a certain amount of flow is present to force the valve open. This results in slowing the flow below the desired flow rate and impedes the ability of the waste flow to scour the pipe as it flows. A normally open backwater valve will avoid both of these associated complications from backwater valves. Additionally, allowing normally closed backwater valves to be installed to serve an entire existing building results in restricting the ability of the sewer systems to use building DWV system to assist in providing a venting pathway to atmosphere. This results in less pathways and increased positive and/or negative pressures within the sewer network and ultimately can negatively impact the DWV system of surrounding buildings.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal doesn't create any additional requirements and should technically result in lower overall maintenance costs.

P104-24 Part II

P105-24

IPC: 715.2, CSA Chapter 15 (New)

Proponents: Abraham MURRA, Abraham Murra Consulting, Jets Vacuum AS, Norway

2024 International Plumbing Code

Revise as follows:

715.2 System design.
Vacuum drainage systems shall be designed in accordance with the vacuum drainage system manufacturer's instructions. The system layout, including piping layout, tank assemblies, vacuum pump assembly and other components necessary for proper function of the system shall be in accordance with CSA B45.13/IAPMO Z1700 and with the manufacturer's instructions. Plans, specifications and other data for such systems shall be submitted to the code official for review and approval prior to installation.

Add new standard(s) as follows:

CSA

CSA Group
8501 East Pleasant Valley Road
Cleveland, OH 44131-5516

CSA B45.13:19/IAPMO Z1700-2019	Vacuum waste-collection systems

Staff Analysis: A review of the standard proposed for inclusion in the code, CSA B45.13:19/IAPMO Z1700-2019 *Vacuum waste-collection systems*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Adding a reference to CSA B45.13/IAPMO Z1700 —a consensus standard that specifies requirements for materials, construction, performance testing, and markings— in the system design section of the IPC will standardize vacuum waste-collection systems. Mandating that such systems comply only with the manufacturer's instructions allows installation of substandard systems that do not benefit users or regulators.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Adding CSA B45.13/IAPMO Z1700 as a referenced standard to the IPC should not have a cost impact as major manufacturers of vacuum waste-collection systems are already listed to the standard.

P105-24

P106-24

IPC: 717.1, ASSE Chapter 15 (New)

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Revise as follows:

717.1 General.
This section shall govern the relining of existing *building sewers* and building drainage piping. Required Inspections shall be conducted by a ANSI/ASSE/IAPMO Series 28000 qualified inspector.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

ANSI/ASSE/IAPMO Series 28000-Standard 28001-xx	Professional Qualifications Standard for Inspectors of CIPP (Cured-in-Place-Pipe) Rehabilitation of Building Sewer and Drain, Waste and Vent Piping Systems (DRAFT)

Reason: The new ANSI/ASSE/IAPMO Series 2800 standard assures that the inspector and inspection of piping using CIPP is done appropriately. Unfortunately, many inspectors are not knowledgeable concerning CIPP rehabilitation, and the necessary requirements demanded for proper installation and inspection. This requirement is necessary and needed in the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Proper inspection is not only a cost built into the code but necessary to protect it's users ultimate health and safety.

P106-24

P107-24

IPC: 717.1

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Revise as follows:

717.1 General.
This section shall govern the relining of existing *building sewers* and building drainage <u>system</u> piping.

Reason: The title and scope of both Secton 717 and 718 are for Building sewers and Building drains. Building drains can include sanitary and storm water. A more inclusive and proper scope for both 717 and 718 would be to use Drainage System piping instead of drainage piping which are both defined in Section 3 of the code. This would eliminate confusion and recognize all piping covered under the requirements of these Sections.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Just as my reason states: This code change simply clarifies current requirements in the code and would add no additional cost to installation and technology currently used in Section 717.

P107-24

P108-24

IPC: 717.2

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Revise as follows:

717.2 Applicability.
The relining of existing *building sewers* and building drainage piping shall be limited to gravity drainage piping 2"~~4~~ inches (~~102~~50 mm) in diameter and larger. The relined piping shall be of the same nominal size as the existing piping.

Attached Files

- **TECH BRIEF - NuDrain Flow Analysis - 20201117 Rev Lvl 1.1.pdf**
  https://www.cdpaccess.com/proposal/10434/30667/files/download/4388/

Reason: CIPP in building drains is routinely used in sizes down to 2". The scope of ASTM F1216-22 governs the usage of CIPP down to 2".

Documentation is provided that shows the ability to routinely preserve flow capacity while increasing scouring velocities in sizes down to 2", with typical CIPP thicknesses. It is recognized that the DFU design capacity requires preservation. The nominal pipe size is not altered.

The provided flow analysis chart does not take into consideration the inherent conservatism of DFU design being based upon data from cast iron pipe collected in the 1930s. As far as actually maintaining the original design DFUs, all CIPP relined pipes should be compared to iron pipe flows as the basis of their original DFU design capacity. What is apparent, is that CIPP does not negatively alter nominal sizing nor DFU capacity at typical installed thicknesses. Scouring velocity also greatly improves, further helping to correct for minor flow issues in the existing piping.

Bibliography: ASTM F1216-22 Scope

"1.1 This practice describes the procedures for the reconstruction of pipelines and conduits (**2 in.** to 108 in. diameter) by the installation of a resin-impregnated, flexible tube which is inverted into the existing conduit by use of a hydrostatic head or air pressure."

NuFlow Flow Analysis Chart to be attached.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal merely expands the applicable size range down to 2" with the same comparative cost impacts as are typical of relining / rehabilitation for repair or replacement with Cured-in-Place Pipe (CIPP) versus exhume and replace with other piping materials, as already otherwise approved for use within Sections 717 and 718 of the Code.

This proposal to expand the size range down to 2” creates no significant cost impact alteration as compared to the considerations behind the existing code inclusion of CIPP.

P108-24

P109-24

IPC: 717.4

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Revise as follows:

717.4 Permitting.
For replacement work, a reviewed permit shall be required. Prior to permit issuance, the code official shall review and evaluate the preinstallation recorded video camera survey to determine if the piping system is able to be relined in accordance with the proposed lining system manufacturer's installation requirements, and applicable referenced standards. Replacement work shall include applications where the pipe is broken or missing and where the cured-in-place-pipe is replacing the structural function of the existing pipe. For repair work, review and evaluation of the preinstallation recorded video camera survey shall not be required prior to permit issuance. Repair work does not require removal or replacement of the piping systems and shall include relining to stop joint leakage, restoration of design flow, or to protect from internal corrosion of the existing, otherwise code compliant piping. Prior to permit issuance, the code official shall review and approve construction documents as per Section 105.5.1.

Reason: Current language effectively requires pre-installation review & evaluation to issue permits for all Cured-in-Place Pipe (CIPP) projects, whereas Section 105.2 currently exempts "plumbing" work unless "it becomes necessary to remove and replace with new material." Many "repair" applications with CIPP would otherwise be deemed exempt from permitting by the language of Section 105.2, as CIPP is widely used to "repair" leaks and to more permanently clear stoppages in conjunction with cleaning of scaling and tuberculation.

We do concur with the value of routine permitting with CIPP work. We propose, however, that AHJs have the option of not having to conduct a mandatory "review and evaluation" of pre-CCTV video prior to issuing permits for basic "repair" work, so as to ease the burden on local AHJs when dealing with lower risk "repair" applications of CIPP. We propose that a distinction be made for mandatory "review and evaluation" prior to issuing permits for plumbing "replacement" applications of CIPP, where the CIPP is intended to function as the new structural "replacement" pipe.

This proposal strikes a closer balance to the general permitting practices for other plumbing pipe materials within the IPC as governed by Section 105.2. The local AHJ can then use discretion with their preferred permitting process for CIPP according to their experience and comfort level.

The applications of concern necessitating mandatory preinstallation "review and evaluation" of pre-CCTV video for code officials to ensure that the code requirements will continue to be met, all pertain to "replacement" applications of CIPP. The "repair" applications as defined within this proposal are inherently less likely to alter the code approved design compliance of the completed CIPP "repair." Regardless, post-installation inspection and review for permit closing will verify the as-built code compliance of the CIPP.

We feel that this proposal will significantly reduce the burden on AHJ staff while still providing proper code compliance oversight with the usage of CIPP.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

As proposed, permits will still be required for CIPP projects, so there is no permitting cost difference to the cost of construction.

However, the time cost to AHJ staff will be significantly reduced versus mandatory review of pre-installation CCTV video prior to permitting for all (even lower risk "repair") CIPP applications.

AHJs will still have the local authority to require a "reviewed" permit should they so desire. The proposed language simply permits AHJs to issue non-reviewed permits and verify compliance at permit closing for applications where CIPP is being used for a "repair" [that would otherwise be completely non-permitted as per the requirements of IPC Section 105.2] with the option to place trust in the professionalism of the licensed plumber while still verifying code compliance with review and inspection during permit closure. This brings section 717.4 more in line with the permitting practices for all other code approved plumbing pipe products, while still providing for greater oversight through "required" permitting even for "repair" work that does not involve "removal and replacement."

P110-24

IPC: 717.5

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Revise as follows:

717.5 Prohibited applications.
Where review of the preinstallation recorded video camera survey reveals that piping systems are not installed correctly or defects exist , that will not be corrected by relining, then relining shall not be permitted without correction of such defects prior to cured-in place-pipe relining. ~~The defective portions of piping shall be exposed and repaired with pipe and fittings in accordance with this code. Defects include, but are not limited to, backgrade or insufficient slope, complete pipe wall deterioration or complete separations such as from tree root invasion or improper support.~~

Reason: The deleted language is erroneous regarding the capabilities and limitations of CIPP and confusingly complicated. The revised opening language more appropriately covers the guidance required by AHJs to make informed decisions on when to prohibit the use of CIPP.

There seems to be the erroneous assumption that CIPP is only ever a "repair" option and not capable of being a "replacement" option. The industry consensus standards and their design equations (as found in the design appendix of ASTM F1216) provide for the use of CIPP as a structural replacement as well as a performance repair system.

The installation of CIPP as a "repair" in conjunction with the preparation of the existing pipe for relining can readily correct defects such as flow disruption by scaling or tuberculation (which can be mistaken for backgrade or insufficient slope) prior to cleaning. Although CIPP cannot correct significant line and grade issues, the improved flow characteristics (including the increased scouring velocity) frequently rectifies any sedimentation issues associated with minor bellies in piping. Properly designed in compliance with the IPC, CIPP does NOT reduce the nominal sizing, the original design flow capacity, or the original design DFU count.

CIPP can also reliably eliminate leakage and root penetration from failed joint seals and even function as "replacement" piping for missing sections of buried piping. CIPP can structurally "replace" pipe sections with "channel rot" and can also structurally "replace" pipes with missing pipe sections; there are also reliable methods to fill voids around the pipe wall while restoring the proper flow line for code compliance. Soil voiding in such smaller diameter CIPP applications is expected to fully reconsolidate within 2 to 3 years to restore proper soil support, with the CIPP structurally spanning the void in the interim.

Where existing pipe defects are capable of being corrected through pipe "replacement" with CIPP, there should be no reason to disallow a reviewed permit installation of certified and listed CIPP systems by a responsible, licensed contractor. The 2024 code language is unnecessarily restrictive.

Bibliography: The ASTM F1216 design appendix provides an industry consensus design approach for use of CIPP as a structural replacement for piping.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The clarifications are in regard to proper applicability for use as either "repair" or "replacement."

P110-24

P111-24

IPC: 717.6, ASTM Chapter 15 (New)

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Revise as follows:

717.6 Relining materials.
The relining materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. Cured-in-place-pipe reline materials shall comply with ASTM F1216, ASTM F1743, ASTM F2561, ASTM F2599 or ASTM F3541. Fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F1216-22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
F1743-22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)
F2599-22	Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Liner
F3541-22	Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)

Staff Analysis: A review of the standards proposed for inclusion in the code, ASTM F1216-22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube*, ASTM F1743-22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)* and ASTM F2599-22 *Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Liner1,* ASTM F3541-22 *Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)1,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

The proposed standard ASTM F2561 is in the current edition of the code.

Attached Files

- **Value Engineering Considerations.pdf**
  https://www.cdpaccess.com/proposal/10453/30661/files/download/4716/
- **Example Project Cost Analysis Documentation (2).docx**
  https://www.cdpaccess.com/proposal/10453/30661/files/download/4715/

Reason: The scope of Section 717 with its detailed guidance is clearly intended to include usage with Cured-in-Place Pipe (CIPP) reline materials. The Fold & Form PVC reline materials standards (ASTM F1871 & ASTM F1504) have never had a product certified and listed by ICC-ES and have exceptionally minimal usage in Building Sewer applications only.

This section needs to include the ASTM standards to which ICC-ES is actively certifying and listing CIPP systems to provide more thorough guidance to AHJs; currently, products are certified and listed to ASTM F1216-22 (with ICC required mandatory language) for inversion and ASTM F1743-22 (expected mandatory language revision in 2024 -- currently balloting) for pull-in-place CIPP.

We also propose that the recently passed standard of ASTM F3541-22 be included within this section. ASTM F3541 is for segmental relining by CIPP and closely reflects the actual installation practices utilized within Building Sewer and Building Drain applications. ASTM F3541 includes by reference the same performance property requirements of ASTM F1743 to which ICC-ES currently certifies CIPP systems.

We are also recommending the inclusion of ASTM F2599 (segmental CIPP lining by inversion with patented gaskets) and ASTM F2561 (utility sewer lateral to utility main connection CIPP lining with patented gaskets) that are currently included in the otherwise redundant (same title scope) Section 718. Note that no CIPP systems has ever been certified and listed for use to these standards. Any products applicable to ASTM F2599 or ASTM F2561 will also comply with the same performance property requirements of ASTM F1216 to which ICC-ES already certifies CIPP systems. As such, the inclusion of these proprietary standards is a bit redundant.

Bibliography: F1216-22 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

ASTM F1743-24 (expected) [F1743-22] Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)

ASTM F2561-20 Standard Practice for Rehabilitation of a Sewer Service Lateral and Its Connection to the Main Using a One Piece Main and Lateral Cured-in-Place Liner

ASTM F2599-22 Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Liner

ASTM F3541-22 Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal only requests referencing standards of materials already otherwise governed by this Code section (thereby is editorial in nature or a clarification), and as such there is no new cost impact.

The addition of existing and newly referenced standards into Section 717 provides no significant cost impact alteration as compared to the existing costs impacts behind the existing code inclusion.

For those interested, we will further expound upon the comparative cost impacts between relining / rehabilitation with Cured-in-Place Pipe (CIPP) versus exhumation and replacement with other piping materials.

The unit costs of CIPP "materials" are typically about the same as other code approved piping alternatives. But depending upon the project scope and site conditions, the unit costs of CIPP "as constructed" are HIGHLY variable as compared to the alternative of exhuming existing piping and replacing with other code approved piping alternatives (refer to the attached project cost analysis documentation).

CIPP "project costs" are significantly driven by the site conditions (and the ancillary "costs" of facility operational disruption tend to also weigh into choosing relining / rehabilitation versus exhumation & replacement) rather than the piping materials cost differences. Hence, a more direct cost comparison to other piping materials' costs is not truly relevant or particularly useful.

So, we will explore how site conditions and operational disruptions create relevant "cost impacts" deserving of thoughtful consideration.

SITE CONDITIONS: Where surface structure restoration costs are exceptionally high, avoidance of such site restoration costs through the remote installation of CIPP (with limited site disruption) can provide significant project cost savings as compared to exhuming the existing piping and replacing with alternative code approved piping materials. The "ancillary" surface structure restoration costs associated with piping exhumation, removal, and replacement is frequently the primary driver of project cost differentials.

Exhumation and replacement can often negatively impact load bearing components of a structure resulting in exceptionally high restoration costs that can be avoided by pipe relining / rehabilitation with CIPP.

Relining / rehabilitation with CIPP can also greatly reduce site safety risks associated with exhumation and prospectively confined space entry. Exhumation and replacement can have environmental and health impacts such as disruption of encapsulated asbestos, lead paint or other hazardous materials, requiring high remediation and disposal costs, as well as subjecting workers and facility occupants to unnecessary risks. Relining / rehabilitation with CIPP can be leveraged to avoid such risks and costs.

Where surface structure restoration and/or remediation costs and risks are high, the higher materials, specialty labor, and equipment costs associated with CIPP installation are generally absorbed and frequently exceeded, resulting in the potential for significant cost savings with CIPP.

OPERATIONAL DISRUPTION & BROADER SOCIAL COSTS: In addition to direct construction costs and risks, the indirect costs and risks of operational disruption often weigh into any project "cost" comparison between a relining / rehabilitation installation with CIPP versus exhumation and replacement with other piping materials.

With facilities such as hospitals, jails, court houses, schools, etc. (even the Pentagon & White House on multiple occasions), the "social costs" of operational disruption from exhumation and replacement are frequently deemed to be entirely unacceptable. Relining / rehabilitation with CIPP can reduce the "social costs" to a more acceptable level.

Schools with emergency piping issues do not have the facility capacity and cannot afford the “social costs” to the community that would be caused by unscheduled shutting down of classrooms for extensive exhumation and replacement of piping during the school year. Jails and other government facilities often have security and operational concerns that are alleviated through remote pipe relining / rehabilitation with CIPP versus direct secure zone entry and disruption that is required for exhumation and replacement.

P111-24

P112-24

IPC: 717.6

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Revise as follows:

717.6 Relining materials.
The relining materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. ~~Fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.~~

Reason: No products have ever been certified and listed by ICC-ES to ASTM F1504 or ASTM F1871. There has been very limited to practically no usage of such Fold & Form PVC products for Building Sewer relining and without Section 303 compliance they should not be used.

Removing Fold & Form PVC standards from Section 717 clarifies the intent of Section 717 as having primary applicability to the widely used Cured-in-Place Pipe (CIPP) systems.

If and when Fold & Form PVC products seek Section 303 compliance through certification & listing, it can be proposed for a new section more relevant to Fold & Form capabilities and limitations.

Bibliography: ASTM F1504-21e1 Standard Specification for Folded Poly(Vinyl Chloride) (PVC) Pipe for Existing Sewer and Conduit Rehabilitation

ASTM F1871-20
Standard Specification for Folded/Formed Poly (Vinyl Chloride) Pipe Type A for Existing Sewer and Conduit Rehabilitation

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no increase or decrease in cost impact as no products compliant with the standards proposed to be removed have ever been certified and listed for use, and therefore, are not code compliant for usage anyway.

The products compliant with ASTM F1504 and ASTM F1871 (Fold & Form PVC pipe) require "direct" access through an access chamber or excavation at both ends of the existing piping, whereas the more commonly used CIPP relining methods only require "remote" access at one end of the existing piping; as a result, the Fold & Form PVC relining methods tend to be significantly higher cost than the CIPP relining methods, contributing to the exceedingly rare (almost non-existent) usage of Fold & Form PVC relining in building sewer applications. This is further attested to by the complete lack of products ever ICC-ES certified to either ASTM F1504 or ASTM F1871 for proper code compliant permitted usage.

P112-24

P113-24

IPC: 717.6, 717.7 (New), 717.8 (New), ASTM Chapter 15 (New)

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Revise as follows:

717.6 Relining materials.
The relining materials shall be manufactured in compliance with applicable standards and certified as required in Section 303.~~Fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.~~

Add new text as follows:

<u>**717.7 Fold in form.** Sectional repair using fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.</u>

<u>**717.8 Cured-in-Place-Pipe.** Sectional repair using push or pull in place cure-in-place pipe (CIPP) shall be in compliance with ASTM F3541 using gaskets in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration. Sectional repair using inversion cure-in-place pipe (CIPP)shall be in compliance with ASTMF1216 or ASTM F2599 using gaskets in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration. Main and lateral cured-in-place rehabilitation of building sewer and sewer service lateral pipe and their connections to the main sewer pipe shall be in accordance with ASTM F2561 using gaskets in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.</u>

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

<u>F1216-22</u>	<u>Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube</u>
<u>F3541-22</u>	<u>Standard Practice for Sectional Repair of Existing Gravity Fow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-in-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F1216-22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube1,2* and ASTM F3541-22 *Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)1,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: ASTM F3541 is the preferred method of rehabilitation using CIPP technology inside the building parameter and ASTM F1216 is referenced for requirements in all other CIPP standards in Section 718. adding more clarification regarding Hydrophilic gaskets and rings is consistent with the requirements in Section 718 currently and is an health and safety issue.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

there is no material cost added to this code as the standards referenced are currently referenced in the code and the standards reference each other in most cases such as ASTM F1216 and ASTM F3541. ASTM F3240, and the required use of hydrophilic gaskets, is in Section 718 where the minimal cost is already recognized by the code.

P113-24

P114-24

IPC: 717.6, 717.7 (New)

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

717.6 Relining materials.
The relining materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. Fold-and-form pipe reline materials shall be manufactured in compliance with ASTM F1504 or ASTM F1871.

Add new text as follows:

<u>**717.7 Cured-in-place-pipe.** Sectional cured-in-place pipe rehabilitation of building sewer piping and sewer service lateral piping shall be in accordance with ASTM F2599. Main and lateral cure-in-place pipe rehabilitation of building sewer and sewer service lateral pipe and their connections to the main sewer pipe shall be in accordance with ASTM F2561. Hydrophilic rings or gaskets in cure-in-place rehabilitation of building sewer piping and sewer service laterals shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.</u>

Staff Analysis: The proposed standards are in the current edition of the code.

Reason: This code change simply moves Section 718 into Section 717. Both Sections cover the rehabilitation of building sewers and building drains.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal simply moves existing requirements in Section 718 into Section 717 and thus cost allowance is already in code.

P114-24

P115-24

IPC: 717.10 (New), 717.10

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Add new text as follows:

717.10 Pressure Testing. The rehabilitated piping system shall be tested in accordance with Section 312.

Revise as follows:

~~717.10~~ 717.11 Approval.
Upon verification of compliance with the requirements of Sections 717.1 through ~~717.9~~ 717.10, the code official shall approve the installation.

Reason: All sanitary drainage systems must be pressure tested in accordance with Section 312 as is noted in Section 701.6 and 716.8 in Chapter 7. It also needs to be clarified in Section 717 and 718 that this is necessary.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Pressure testing is required in multiple Sections of the code currently and the cost allowance is already recognized.

P115-24

P116-24

IPC: SECTION 202 (New), 718.1, ASTM Chapter 15 (New)

Proponents: Joanne Carroll, Subtegic Group Inc., Subtegic Group Inc (jcarroll@subtegic.com)

2024 International Plumbing Code

Add new definition as follows:

CURED-IN-PLACE PIPE (CIPP). A system consisting of a flexible textile tube saturated with a thermosetting resin used to rehabilitate existing pipe in-place by insertion and cure within an existing pipe.

Revise as follows:

718.1 Cured-in-place pipe (CIPP).
The cured-in-place pipe (CIPP) materials shall be manufactured in compliance with applicable standards and certified as required in Section 303. ~~Sectional cure-in-place~~ CIPP rehabilitation of building drain and *building sewer* piping ~~and *sewer* service lateral piping~~ shall be installed in accordance with ASTM F1216, ASTM F3541, or F2599. ~~Main and lateral cure-in-place~~ CIPP rehabilitation of a *building sewer* ~~and *sewer* service lateral pipe~~ and ~~their~~ its connection~~s~~ to the main *sewer* pipe shall be installed in accordance with ASTM F2561. Seamless molded ~~H~~ hydrophilic ~~rings or~~ gaskets in ~~cure-in-place~~ CIPP rehabilitation of ~~*building sewer* piping and *sewer* service~~ lateral~~s~~ pipelines shall be installed in accordance with ASTM F3240 ~~to ensure water tightness and elimination of ground water penetration~~.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F1216 - 2022	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
F3541 - 2022	Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)

Staff Analysis: A review of the standard proposed for inclusion in the code, ASTM F1216-2022 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube* and ASTM F3541-2022 *Standard Practice for Sectional Repair of Existing Gravity Flow, Non-Pressure Pipelines and Conduits by Pushed or Pulled-In-Place Installation of Cured-In-Place Thermosetting Resin Pipe (CIPP)*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: As is the case with all plumbing-related pipe, materials, fittings and fixtures, in order to ensure quality and appropriateness for the intended use, CIPP lining materials must be manufactured in accordance with an industry standard.

The addition of CIPP installation standards ASTM F1216 and ASTM F3541 cover the requirements for the installation of CIPP when using the inversion or pushed or pulled-in place installation methods.

Reference to ASTM F2561 is made to clearly describe the scope of F2561 as appropriate for the reference to installation of CIPP for the rehabilitation of a building sewer and its connection to the main. Reference to ASTM F3240 is clarified to the scope of ASTM F3240 that is specific to covering the requirements for the installation of seamless molded hydrophilic gaskets in the CIPP rehabilitation of main and lateral pipelines.

Bibliography: Scope from ASTM F2561 - "*1.1 This practice covers requirements and test methods for the reconstruction of a sewer service lateral pipe having an inner diameter of 3 to 12 in. (7.6 to 30.5 cm) and its connection to the main pipe having an inner diameter of 6 to 24 in. (15.2 to 61.0 cm) and up the lateral a maximum of 150 ft (46 m) without excavation.*"

Scope from ASTM F3240 - "*1.1 This practice covers the requirements for the installation of seamless molded hydrophilic gaskets (SMHG) in cured-inplace pipe (CIPP) rehabilitation of main and lateral pipelines.*"

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The change proposal adds industry standards and provides clarity for the application of CIPP already included in the code.

P116-24

P117-24 Part I

IPC: 718.1, ASTM Chapter 15 (New)

Proponents: Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

718.1 Cure-in-place.
~~Sectional~~ ~~c~~Cure-in-place rehabilitation of *building sewer* piping and *sewer* service lateral piping shall be in accordance with ASTM F1216, ASTM F1743, ASTM F2561, or ASTM F2599. ~~Main and lateral cure-in-place rehabilitation of *building sewer* and *sewer* service lateral pipe and their connections to the main *sewer* pipe shall be in accordance with ASTM F2561.~~ Hydrophilic rings or gaskets in cure-in-place rehabilitation of *building sewer* piping and *sewer* service laterals shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428-2959

F1216 - 22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
ASTM F1743 - 22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured in-Place Thermosetting Resin Pipe (CIPP)

Staff Analysis: The proposed standard ASTM F2561 is in the current edition of the code.
A review of the standard proposed for inclusion in the code, ASM F1216 - 22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube* and ASTM F1743 - 22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured in-Place Thermosetting Resin Pipe (CIPP)*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Cure-in-place pipe lining is a commonly used method of rehabilitating existing sewer piping and laterals. The 2021 International Plumbing Code added this new Section 718, but left off several important ASTM reference standards that are necessary to allow different methods of cure-in-place lining to be used properly. This proposal adds two additional reference standards as noted.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change is simply adding options for methods of rehabilitating existing sewers and laterals by cured-in-place lining. Owners and designers may chose to rehabilitate sewers via this method, and then chose which standards are most appropriate for their project. Therefore, nothing new is being mandated by this change; the change only provides more options.

P117-24 Part I

P117-24 Part II

IRC: P3012.1 (New), ASTM Chapter 44 (New)

Proponents: Kevin Duerr-Clark, NYS DOS, NYS DOS (kevin.duerr-clark@dos.ny.gov); Brian Tollisen, NYS Department of State, NYS Department of State (brian.tollisen@dos.ny.gov); China Clarke, New York State Dept of State, Manager Technical Support Unit (china.clarke@dos.ny.gov); Chad Sievers, NYS, NYS DOS (chad.sievers@dos.ny.gov); John R Addario - NYS Department of State, NEW YORK STATE CODES DIVISION, New York State Department of State Division of Building Standards and Codes (john.addario@dos.ny.gov); Jeanne Rice, NYSDOS (jeanne.rice@dos.ny.gov)

2024 International Residential Code

Add new text as follows:

P3012.1 Cure-in-place. Cure-in-place rehabilitation of building sewer piping and sewer service lateral piping shall be in accordance with ASTM F1216, ASTM F1743, ASTM F2561, or ASTM F2599. Hydrophilic rings or gaskets in cure-in-place rehabilitation of building sewer piping and sewer service laterals shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.

Add new standard(s) as follows:

ASTM

ASTM International
100 Barr Harbor Drive, P.O. Box C700
West Conshohocken, PA 19428

F1216 - 22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube
F1743 - 22	Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured in-Place Thermosetting Resin Pipe (CIPP)
F2599-22	Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Line
F3240-19 (2023)	Standard Practice for Installation of Seamless Molded Hydrophilic Gaskets (SMHG) for Long-Term Watertightness of Cured-in-Place Rehabilitation of Main and Lateral Pipelines

Staff Analysis: The proposed standard ASTM F2561 is in the current edition of the code.

A review of the standards proposed for inclusion in the code,

ASTM F1216 - 22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube*

ASTM F1743 - 22 *Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured in-Place Thermosetting Resin Pipe (CIPP)*

ASTM F2599-22 *Standard Practice for Sectional Repair of Damaged Pipe By Means of an Inverted Cured-In-Place Line*

ASTM F3240-19 (2023) *Standard Practice for Installation of Seamless Molded Hydrophilic Gaskets (SMHG) for Long-Term Watertightness of Cured-in-Place Rehabilitation of Main and Lateral Pipelines Standard Practice for Rehabilitation of a Sewer Service Lateral and Its Connection to the Main Using a One Piece Main and Lateral Cured-in-Place Liner*,with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: Cure-in-place pipe lining is a commonly used method of rehabilitating existing sewer piping and laterals. The 2021 International Plumbing Code added a new Section 718 to the IPC, but nothing was added for the Residential Provisions and 718 left off several important ASTM reference standards that are necessary to allow different methods of cure-in-place lining to be used properly. This proposal pulls in the language from the IPC and adds two additional reference standards as noted.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This code change is simply adding options for methods of rehabilitating existing sewers and laterals by cured-in-place lining. Owners and designers may chose to rehabilitate sewers via this method, and then chose which standards are most appropriate for their project. Therefore, nothing new is being mandated by this change; the change only provides more options.

P117-24 Part II

P118-24

IPC: SECTION 718, 718.1

Proponents: Luther Grant Whittle, Nu Flow Technologies, "self" (gwhittle@nuflow.com)

2024 International Plumbing Code

Delete without substitution:

~~SECTION 718~~
~~REHABILITATION OF BUILDING SEWERS AND BUILDING DRAINS~~

~~**718.1 Cure-in-place.**~~
~~Sectional cure-in-place rehabilitation of *building sewer* piping and *sewer* service lateral piping shall be in accordance with ASTM F2599. Main and lateral cure-in-place rehabilitation of *building sewer* and *sewer* service lateral pipe and their connections to the main *sewer* pipe shall be in accordance with ASTM F2561. Hydrophilic rings or gaskets in cure-in-place rehabilitation of *building sewer* piping and *sewer* service laterals shall be in accordance with ASTM F3240 to ensure water tightness and elimination of ground water penetration.~~

Attached Files

- **Value Engineering Considerations.pdf**
  https://www.cdpaccess.com/proposal/10474/30655/files/download/4714/
- **Example Project Cost Analysis Documentation (2) (2).docx**
  https://www.cdpaccess.com/proposal/10474/30655/files/download/4713/
- **Cast Iron IPC CIPP Example.pdf**
  https://www.cdpaccess.com/proposal/10474/30655/files/download/4712/
- **Lining IPC CIPP Example.pdf**
  https://www.cdpaccess.com/proposal/10474/30655/files/download/4711/

Reason: Section 718 is redundant with Section 717, having the exact same scope. The CIPP standards referenced are suggested to be added to the more comprehensive Section 717 in a separate proposal.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Consolidating the redundant Section 718 with Section 717.

The elimination of the "redundant" section 718 through consolidation with Section 717 (which inappropriately has the exact same scope of application as per their section titles), does not inherently alter the code inclusive availability of any methods or materials and therefore does NOT affect the cost of construction. All IPC compliant, listed and certified Cured-in-Place Pipe (CIPP) materials, including those governed by the ASTM standards currently referenced within Section 718, are also capable of compliance with the "same" scope of application defined more completely within Section 717.

All CIPP systems are currently ICC-ES certified and listed to ASTM F1216 or ASTM F1743; the ASTM standards referenced within Section 718 also rely upon certification to the performance requirements of ASTM F1216, as referenced from within those ASTM standards. No CIPP products have ever been certified and listed to ASTM F2561, ASTM F2599, or ASTM F3240 (a gasket standard, not a CIPP standard).

As the proposal to eliminate Section 718 does not eliminate the availability or code approved usage of any CIPP materials or methods (which ALL still have the ability to comply with Section 717), the proposal is "editorial in nature or a clarification" (removing an inherent redundancy within the Code) and therefore has no impact on the cost of construction. Section 717 has greater depth of guidance to AHJs regarding the proper usage of ALL pipe relining systems, including CIPP, and the CIPP standards listed within Section 718 likewise need to be governed by the same depth of guidance for use as is provided within Section 717. Furthermore, in the separate proposal, 10453, the ASTM CIPP standards (ASTM F2561 and ASTM F2599) found within Section 718 are among the CIPP industry standards proposed for more appropriate inclusion into Section 717, instead of the redundant Section 718 that is proposed for removal.This proposal has no intention to eliminate (nor effect of eliminating) the option of using ANY currently code approved CIPP materials or methods of construction, and therefore has NO cost impact; this proposal merely consolidates redundant sections of the Code.For those interested, we will further expound upon the comparative cost impacts between relining / rehabilitation with Cured-in-Place Pipe (CIPP) versus exhumation and replacement with other piping materials.

The unit costs of CIPP "materials" are typically about the same as other code approved piping alternatives. But depending upon the project scope and site conditions, the unit costs of CIPP "as constructed" are HIGHLY variable as compared to the alternative of exhuming existing piping and replacing with other code approved piping alternatives (refer to the attached project cost analysis documentation).

CIPP "project costs" are significantly driven by the site conditions (and the ancillary "costs" of facility operational disruption tend to also weigh into choosing relining / rehabilitation versus exhumation & replacement) rather than the piping materials cost differences. Hence, a more direct cost comparison to other piping materials' costs is not truly relevant or particularly useful.

So, we will explore how site conditions and operational disruptions create relevant "cost impacts" deserving of thoughtful consideration.

SITE CONDITIONS: Where surface structure restoration costs are exceptionally high, avoidance of such site restoration costs through the remote installation of CIPP (with limited site disruption) can provide significant project cost savings as compared to exhuming the existing piping and replacing with alternative code approved piping materials. The "ancillary" surface structure restoration costs associated with piping exhumation, removal, and replacement is frequently the primary driver of project cost differentials.

Exhumation and replacement can often negatively impact load bearing components of a structure resulting in exceptionally high restoration costs that can be avoided by pipe relining / rehabilitation with CIPP.

Relining / rehabilitation with CIPP can also greatly reduce site safety risks associated with exhumation and prospectively confined space entry. Exhumation and replacement can have environmental and health impacts such as disruption of encapsulated asbestos, lead paint or other hazardous materials, requiring high remediation and disposal costs, as well as subjecting workers and facility occupants to unnecessary risks. Relining / rehabilitation with CIPP can be leveraged to avoid such risks and costs.

Where surface structure restoration and/or remediation costs and risks are high, the higher materials, specialty labor, and equipment costs associated with CIPP installation are generally absorbed and frequently exceeded, resulting in the potential for significant cost savings with CIPP.

OPERATIONAL DISRUPTION & BROADER SOCIAL COSTS: In addition to direct construction costs and risks, the indirect costs and risks of operational disruption often weigh into any project "cost" comparison between a relining / rehabilitation installation with CIPP versus exhumation and replacement with other piping materials.

With facilities such as hospitals, jails, court houses, schools, etc. (even the Pentagon & White House on multiple occasions), the "social costs" of operational disruption from exhumation and replacement are frequently deemed to be entirely unacceptable. Relining / rehabilitation with CIPP can reduce the "social costs" to a more acceptable level.

Schools with emergency piping issues do not have the facility capacity and cannot afford the "social costs" to the community that would be caused by unscheduled shutting down of classrooms for extensive exhumation and replacement of piping during the school year. Jails and other government facilities often have security and operational concerns that are alleviated through remote pipe relining / rehabilitation with CIPP versus direct secure zone entry and disruption that is required for exhumation and replacement.

P118-24

P119-24

IPC: 802.1.5

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

802.1.5 Nonpotable clear-water waste.
Where devices and equipment such as process tanks, filters, drips, and boilers, plumbing appliances, or other mechanical equipment discharge nonpotable water to the building drainage system, the discharge shall be through an indirect waste pipe by means of an air break or an air gap to an approved waste receptor.

Reason: This section has only referenced process tanks, boilers, filters and drips, condensate is a non-potable clearwater waste that is often generated at mechanical equipment such as furnaces and air conditioners, as well as condensing water heaters and tankless water heaters. This proposal will include a wider range of nonpotable clear water waste and address how to dispose of it.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is for clarification only and does not impart any additional requirements.

P119-24

P120-24

IPC: SECTION 202 (New), 802.1.9 (New)

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Add new definition as follows:

DUMP SINK

.

A sink provided in food service operations for the sole purpose of dumping leftover liquids from drinking containers, these sinks can be stand-alone fixtures or in combination with a 3-compartment sink.

Add new text as follows:

802.1.9 Dump sinks. When dump sinks are required, they shall discharge directly or indirectly through an air gap or air break to the drainage system.

Reason: Public health agencies are requiring these fixtures in an effort to keep food service operation staff from dumping leftover liquids/beverages into food preparation sinks where they could cause a potential contamination issue. This proposal is intended to provide direction for how these fixtures should be viewed and how they will be permitted to discharge to the drainage systems.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

These sinks are already being required by public health agencies so there would be no additional costs.

P120-24

P121-24

IPC: 802.4, 802.4.3

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

802.4 Waste receptors.
For other than hub drains that receive only clear-water waste and standpipes, a removable strainer or basket shall cover the outlet of waste receptors. Waste receptors shall not be installed in concealed spaces. Waste receptors shall not be installed in plenums, crawl spaces, attics, interstitial spaces above ceilings and below floors. *Ready access* shall be provided to waste receptors.

Exception: *Access* shall be provided for automatic clothes washer standpipe drains for rodding.

802.4.3 Standpipes.
Standpipes shall be individually trapped. Standpipes shall extend not less than 18 inches (457 mm) but not greater than 42 inches (1067 mm) above the trap weir. ~~*Access* shall be provided to standpipes and drains for rodding.~~

Reason: It is imperative that indirect waste receptors are provided with 'Ready Access" since they receive indirect waste discharge. Without the clear view of the waste receptor, a backup in the drainage system can result in damage due to the concealed location of the waste receptor. The portion of this section which previously indicated standpipes shall be provided with "Access" allows for all standpipes to be concealed in some fashion. Allowing for "Access" to be provided specifically for automatic clothes washer standpipe makes sense due to the fact there is a minimum and maximum height the standpipe is permitted to extend above the trap which results in many of these being concealed by the automatic clothes washers. However, if only providing "Access" is permitted for all types of standpipes, it results in standpipes located under counters behind cabinet doors where they will not be observable to the occupants.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal does not positively or negatively impact costs, it just clarifies which waste receptors are required to be provided with "Ready Access" and which ones are required to be provided with "Access".

P121-24

P122-24

IPC: 903.1.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

903.1.2 Roof used for recreational or assembly purposes.
Where a roof is to be used as a promenade, restaurant, bar, or sunbathing deck, as an observation deck, or for similar purposes, open vent pipes, including side wall vent terminations, shall terminate not less than 7 feet (2134 mm) above the roof.

Reason: In many cases side wall vent terminals have not been considered in the application of this section. Many code users have improperly assumed this section only applied to thru roof vent terminations. This has led to situations where fumes/vapors from a side wall vent terminal located below an occupiable room area are drawn up or otherwise entering the occupiable roof area. The language should be made more clear that this includes side wall vents as an air contamination source.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The requirement is already in the code, this proposal just clarifies to users that side wall vent terminations should be included in the implementation of this section.

P122-24

P123-24

IPC: 903.1.2

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

903.1.2 Roof used for recreational or assembly purposes. Where a roof is to be used as a promenade, restaurant, bar, or sunbathing deck, as an observation deck, or for similar purposes, open vent pipes shall terminate not less than 7 feet (2134 mm) above the roof. As an alternative, open vent pipes shall terminate to a stack type air admittance valve conforming to ASSE 1050. Such air admittance valves shall be installed in accordance with the manufacturer's instructions and fitted with a with a UV-rated cover.

Staff Analysis: The proposed standards are in the current edition of the code.

Attached Files

- **Studor Engineered Products Manual - 10th Edition (1).pdf**
  https://www.cdpaccess.com/proposal/9704/30403/files/download/4658/
- **Cost Impact Calculations - Rooftop Stack AAV.pdf**
  https://www.cdpaccess.com/proposal/9704/30403/files/download/4657/

Reason: Stack type AAVs have been used for decades for rooftop promenades, restaurants, bars, sunbathing decks, or observation decks to eliminate sewer gas odors on the rooftop environment.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of installing a stack-type air admittance valve to a rooftop application is approximately $450 less than adding at least seven (7) feet of pipe and securing it to the roof with guy wires.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P123-24

P124-24

IPC: 904.2, 904.2.1 (New), 904.2.2 (New)

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

904.2 ~~Stack vents and vent stacks~~ ~~Vent stack required.~~ ~~A vent *stack* shall be required for every drainage *stack* that has five *branch intervals* or more.~~ Stack vents and vent stacks shall be provided in accordance with section 904.2.1 and 904.2.2, and shall be sized in accordance with Section 906.1.

Exception: Drainage *stacks* installed in accordance with Section 913 and Section 917.

Add new text as follows:

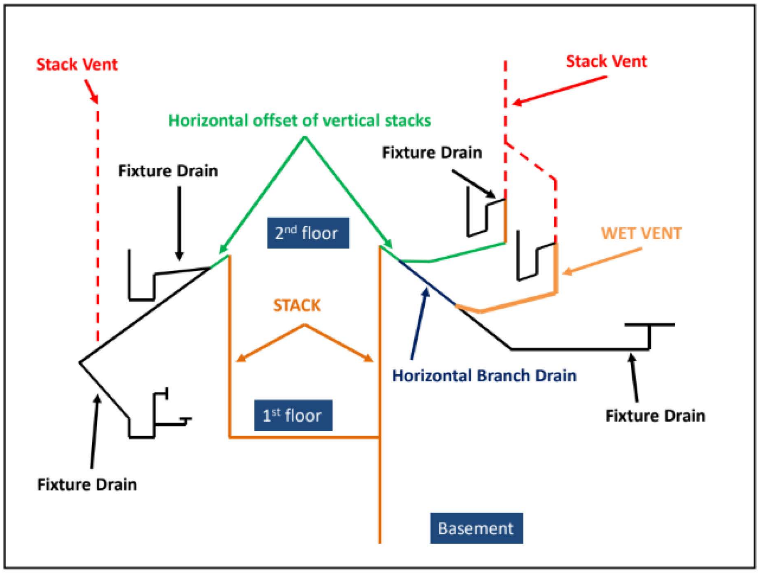
904.2.1 Stack vent required. Each soil or waste stack shall be provided with a stack vent at the interconnection between the stack and the uppermost drainage connection to the stack.

904.2.2 Vent stack required. A vent *stack* shall be required for every drainage *stack* that has five *branch intervals* or more.

Exception: Drainage *stacks* installed in accordance with Section 913.

Reason: Though technically the definition of a stack vent ensures a soil or waste stack has a stack vent, clarification is need as to where it should be applied. Many installation have been installed where the stack is simply terminated to a 90 degree fitting to a horizontal pipe which connects to a bathroom group or other fixtures, however, this wide interpretation can lead to installers providing piping configurations that leave fixture traps unprotected.

Consider a vertical stack that originated in the basement of a 2-story home with a master bath on the second story with a water closet, 2 lavatories, a show and a whirlpool tub. A 2 inch branch is installed below the first floor and extends 12 feet before turning vertically to the 2nd floor where the shower and whirlpool are to be connected. The drain travels through 1 full story which by definition makes it a "stack". The stack connects to a 90 degree fitting and turns horizontally. The shower is connected via a wye fitting and the drain extends another 2 feet where a vertical vent is connected. From there it extends to the whirlpool. Many would look at this and consider it a circuit vent or a version of a wet vent, however, that is just not the case. This configuration did not create a horizontal branch drain because the stack did not have a stack vent applied at the interconnection of the horizontal drain and the stack. The vent connection applied is actually the stack vent which is upstream of the shower drain leaving the trap unprotected. When water is discharge from the 80 gallon whirlpool, the flow of the water blocks the venting pathway for the shower trap and when the waste eater reaches the stack and begin to fall, the negative pressure generated within the piping system results in positive pressure from the atmosphere pushing the shower trap seal around , siphoning the trap, until the positive pressure can enter the system to balance out the negative pressure. See attached isometric.



Bibliography: See reason statement

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal technically should have no impact on cost and is entirely for clarification purposes only, see reason statement.

P124-24

P125-24 Part I

IPC: 905.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

905.2 Grade. Horizontal ~~Vent~~ vent and *branch vent* pipes shall be installed level, or sloped ~~so graded and connected as~~ to drain back to the drainage pipe by gravity.

P125-24 Part I

P125-24 Part II

IRC: P3104.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Residential Code

Revise as follows:

P3104.2 Grade. Horizontal ~~Vent~~ vent and branch vent pipes shall installed level, or be ~~graded~~ sloped~~, connected and supported to allow moisture and condensate~~ to drain back to the ~~soil or waste~~ drainage pipe by gravity.

Reason: The intent of this section is to ensure vent systems are installed in a manner that does not result in a situation where condensate can collect in sufficient quantities which would result in a blockage of a vent. A vent pipe that is run level could not retain enough water to cause this to occur, at best, a residual amount of water could be left behind on the invert of the pipe due to surface tension. This residual water would never be enough to block or substantially restrict the emission or admission of air for balancing the system.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal adds no additional requirements for an installation, but rather provides more options for compliance.

P125-24 Part II

P126-24

IPC: 906.2

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

906.2 Vents other than stack vents or vent stacks. The diameter of individual vents, *branch vents*, circuit vents and relief vents shall be not less than one-half the ~~required diameter of the drain served~~ diameter of the largest rough-in drain to be served**.** The required size of the drain shall be determined in accordance with Table 710.1(2). Vent pipes shall be not less than $1^{1}/_{4}$ inches (32 mm) in diameter. Vents exceeding 40 feet (12 192 mm) in *developed length* shall be increased by one nominal pipe size for the entire *developed length* of the vent pipe. Relief vents for soil and waste *stacks* in buildings having more than 10 *branch intervals* shall be sized in accordance with Section 908.2.

Reason: There exists a contradiction in the current code text between section 906.2 and section 905.6. One requires the vent to be sized based on the required size of the drain served while the other requires the vent to be sized based on the rough-in size of the drain served. Leaving section 906.2 as is also can create compliance issue in the future. Jurisdictions typically are only required to keep records for 2 to 4 years for construction documents. If a building was designed with pipe sizes one size larger than "required" in an effort to allow for future expansion, the installed vent will be undersized once the DFU value added reaches the point where the larger size pipe is required. In such a design, the additional DFU load added may not happen within 2 to 4 years, maybe it happens 10 years down the road and no one involved has the records or remembers the vent was sized based on the "required size" of the drain served. A best practice here is to always require the vent to be sized based on the installed size of the drain.

905.6 Vent for future fixtures.

Where the drainage piping has been roughed-in for future fixtures, a rough-in connection for a vent shall be installed. The vent size shall be not less than one-half the diameter of the rough-in drain to be served. The vent rough-in shall connect to the vent system, or shall be vented by other means as provided for in this chapter. The connection shall be identified to indicate that it is a vent.

Bibliography: See reason statement.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The increased cost will be minimal as it will only require the vents to be sized appropriately for the given size of the largest drainage pipe served. Based on retail prices a conservative estimate for the increase is a range of approximately $4 - $20 per 10 foot length of pipe.

Estimated Immediate Cost Impact Justification (methodology and variables):

The increased cost will be minimal as it will only require the vents to be sized appropriately for the given size of the largest drainage pipe served. The overall impact would be determined by the length of the associated vent and the mark -up in material cost by the contractor. As an example, Lowe's lists the price of 10 ft. sections of PVC pipe as follows:

1-1/2 inch - $11.37

2 inch - $15.78

3 inch - $29.47

4 inch - $48.31

P126-24

P127-24

IPC: 907.1, ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

907.1 Vent for horizontal offset of drainage stack.
Horizontal offsets of drainage *stacks* shall be vented where five or more *branch intervals* are located above the offset. The offset shall be vented by venting the upper section of the drainage *stack* and the lower section of the drainage *stack*<u>, or in single stack drainage systems, a positive pressure reduction device conforming to ASSE 1030 shall be installed in accordance with the manufacturer's instructions</u>.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

<u>1030-2016</u>	<u>Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems</u>

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The current language does not address single stack drainage systems where positive pressure reduction devices conforming to ASSE 1030 are used to protect the trap seals from positive pressure transients in the drainage system.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

- **PPRD Manual.pdf**
  https://www.cdpaccess.com/proposal/9710/30405/documentation/145586/attachments/download/4540/
- **Cost Impact Calculations - PPRD.pdf**
  https://www.cdpaccess.com/proposal/9710/30405/documentation/145586/attachments/download/4539/
- **Studor Engineered Products Manual - 10th Edition.pdf**
  https://www.cdpaccess.com/proposal/9710/30405/documentation/145586/attachments/download/4236/

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P127-24

P128-24

IPC: 907.2, ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

907.2 Upper section.
The upper section of the drainage *stack* shall be vented as a separate *stack* with a vent *stack* connection installed in accordance with Section 904.4, or in single stack drainage systems, a positive pressure reduction device conforming to ASSE 1030 shall be installed above the offset in the stack in accordance with the manufacturer's instructions. The offset shall be considered to be the base of the *stack*.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The current language does not address single stack drainage systems with offsets where positive pressure reduction devices (PPRDs) conforming to ASSE 1030 are used to protect the trap seals on branches from positive pressure transients. PPRDs are used to reduce positive pressures at the base of the stack.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

Estimated Life Cycle Cost Impact:

P128-24

P129-24

IPC: 907.3, ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

907.3 Lower section.

The lower section of the drainage *stack* shall be vented by a yoke vent connecting between the offset and the next lower horizontal *branch*. The yoke vent connection shall be permitted to be a vertical extension of the drainage *stack*. The size of the yoke vent and connection shall be not less than the size required for the vent *stack* of the drainage *stack*, or in single stack drainage systems, a positive pressure reduction device conforming to ASSE 1030 shall be installed in accordance with the manufacturer's instructions and stack type air admittance valves shall be installed at the top of offset drainage stacks in accordance with ASSE 1050.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The current language does not address single stack drainage systems with offsets where positive pressure reduction devices conforming to ASSE 1030 are used to protect the trap seals on branches from positive pressure transients.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P129-24

P130-24

IPC: 908.1, ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

908.1 Where required.

Soil and waste *stacks* in buildings having more than 10 *branch intervals* shall be provided with a relief vent at each tenth interval installed, beginning with the top floor.When a single stack drainage system is installed utilizing a combination of air admittance valves and positive pressure reduction devices (PPRDs), a PPRD shall be permitted to serve as a relief vent for the stack when the PPRDs are located no greater than six (6) branch intervals apart, and installed in accordance with the manufacturer's instructions.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The current code language does not address relief vents for single stack drainage systems. Positive pressure reduction devices conforming to ASSE 1030 installed in accordance with the manufacturer's instructions provide relief from positive pressure transients in waste stacks.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P130-24

P131-24

IPC: 915.1

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

915.1 Type of fixtures.
A *combination waste and vent system* shall not serve fixtures other than floor drains,hub drains, sinks, lavatories and drinking fountains. *Combination waste and vent systems* shall not receive the discharge from a clinical sink.

Reason: In most cases, hub drains receive identical waste discharge as what is received by sinks, floor drains, lavatories and drinking fountains. It is reasonable to expect that these traps will be protected as well as the traps associated to the other listed fixtures for this type of venting method if designed and installed in the same manner.

Bibliography: See reason statement.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Assuming an individual or common venting method was previously chosen to vent the hub drain, under the current code requirement, and as per this proposal it would be permitted to be vented using a combination waste and vent system, the decrease in cost would be dependent on the total distance a vent would be required to be installed otherwise.

Expected immediate saving would range between $172.74 - $246.62 for every 20 feet of vent pipe that would no longer be required to be installed.

Estimated Immediate Cost Impact Justification (methodology and variables):

Allowing for hub drains to be vented as part of a combination waste and vent system would result in lowering the cost of construction compared to some of the other venting options available such as individual vents and common vents.

The overall impact would be determined by the length of the associated vent and the mark -up in material cost by the contractor.

As an example, Lowe's lists the price of 10 ft. sections of PVC pipe as follows:
1-1/2 inch - $11.37
2 inch - $15.78
3 inch - $29.47
4 inch - $48.31
If we assume a labor rate of $150/hr., and 20 feet of pipe with 1 hour of installation time, the overall savings would be as follows per pipe size:

1-1/2 inch - $22.74 - Labor - $150 - Total $172.74
2 inch - $36.51 - Labor - $150 - Total $186.51
3 inch - $58.94 - Labor - $150 - Total $208.94
4 inch - $96.62 - Labor - $150 - Total $246.62

P131-24

P132-24

IPC: 915.2.3

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

915.2.3 Connection.
The *combination waste and vent system* shall be provided with a dry vent connected at any point within the system or the system shall connect to a horizontal drain that serves vented fixtures located on the same floorlevel that are not isolated by a normally closed backwater valve. *Combination waste and vent systems* connecting to *building drains* receiving only the discharge from one or more *stacks* shall be provided with a dry vent. The vent connection to the combination waste and vent pipe shall extend vertically to a point not less than 6 inches (152 mm) above the *flood level rim* of the highest fixture being vented before offsetting horizontally.

Reason: Fixtures that are vented using the combination waste and vent method can be totally separated from the venting pathway if a normally closed backwater valve has been installed on the fixture drain or fixture branch. placing a dry vent upstream of the normally closed backwater valve, or installing a normally open backwater valve will prevent this condition from occurring.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Any cost impact would be the responsibility of the design professional designing the project. The code does not dictate how to design a system in order to avoid cost impacts. This proposal just ensures whichever pathway the designer chooses that the fixtures or traps connected will be appropriately protected by a compliant venting method.

P132-24

P133-24

IPC: 915.2.5

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Revise as follows:

915.2.5 Fixture branch or drain.
The *fixture branch* or *fixture drain* shall connect to the combination waste and vent within a distance specified in Table 909.1. The combination waste and vent pipe shall be considered to be the vent for the fixture. <u>Each fixture drain shall connect horizontally to the combination waste and vent system.</u>

Reason: Combination waste and vent systems rely on the upper half of the pipe remaining empty in order to provide a pathway for venting. If fixtures are permitted to connect vertically, the venting pathway can/will be interrupted by the discharge. This problem was addressed in the circuit venting method, however, it has never been addressed in the combination waste and vent method.

Bibliography: See reason statement.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is for clarification only and aimed at keeping venting methodology consistent with methodology in circuit venting.

P133-24

P134-24

IPC: 918.1, ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com); Ronald George, Plumb-Tech Design & Consulting Services LLC, Self (ron@plumb-techllc.com)

2024 International Plumbing Code

Revise as follows:

918.1 General.
Vent systems utilizing air admittance valves shall comply with this section. Stack-type air admittance valves shall conform to ASSE 1050. Individual and branch-type air admittance valves shall conform to ASSE 1051. Positive pressure reduction devices used in systems with air admittance valves shall conform to ASSE 1030.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposed change adds a reference to positive pressure reduction devices and the affiliated standard.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

- **Studor Engineered Products Manual - 10th Edition.pdf**
  https://www.cdpaccess.com/proposal/9350/30427/documentation/145718/attachments/download/4294/

Justification for no cost impact:

The proposal is simply adding a statement that the device must meet a standard but does not mandate that the device be installed. There is no requirement for the device and therefore there is no cost impact.

P134-24

P135-24

IPC: 918.3.1, ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

918.3.1 Horizontal branches.
Individual and branch-type air admittance valves shall vent only fixtures that are on the same floor level and connect to a *horizontal branch drain*. Where the horizontal *branch* is located more than four *branch intervals* from the top of the *stack*, the horizontal *branch* shall be provided with a relief vent that shall connect to a vent *stack*~~, or~~ stack *vent,* ~~or~~ extend outdoors to the open air, or a positive pressure reduction device (PPRD) installed in accordance with the manufacturer's instructions. The relief vent or PPRD shall connect to the *horizontal branch drain* between the *stack* and the most downstream *fixture drain* connected to the *horizontal branch drain*. The relief vent shall be sized in accordance with Section 906.2 and installed in accordance with Section 905. The relief vent shall be permitted to serve as the vent for other fixtures.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Attached Files

- **Cost Impact Calculations - PPRD.pdf**
  https://www.cdpaccess.com/proposal/9716/30434/files/download/4673/

Reason: This code change is to address ASSE 1030 - Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems. This new standard for a venting method that relieves positive pressures in the drainage system. These devices are specifically designed to work in concert with air admittance valves in all building types including high rise buildings where positive pressures can develop in drainage systems.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P135-24

P136-24

IPC: 918.3.2, ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Revise as follows:

918.3.2 Stack.
Stack-type air admittance valves shall be ~~prohibited from serving~~ permitted to serve as the vent terminal for vent *stacks* or *stack vents* ~~that serve drainage *stacks* having more than six *branch intervals*~~where the stack has a positive pressure reduction device that is designed to relieve positive pressures in the stack and conforms to ASSE 1030. Air admittance valves and positive pressure reduction devices shall be installed in accordance with the manufacturer's design and installation manual..

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: With the recent development of a standard for positive pressure reduction devices, there is no reason to limit stack type air admittance valves to a maximum of six branch intervals. This code change addresses this new technology.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is just a clarification that stack type AAVs are allowed to be installed in buildings over six stories in height when installed with positive pressure reduction devices.

P136-24

P137-24 Part I

IPC: 918.5

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

918.5 Access and ventilation.
A ccess shall be provided to all air admittance valves. Such valves shall be installed in a location that allows air to enter the valve <u>and shall be installed in accordance with the manufacturer's instructions</u>.

Reason: This is to add that access to air admittance valves should also be in accordance with the manufacturer's instructions.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is adding that the manufacturer's instructions need to be followed.

P137-24 Part I

P137-24 Part II

IRC: P3114.5

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Residential Code

Revise as follows:

P3114.5 Access and ventilation. Access shall be provided to *air admittance valves*. Such valves shall be installed in a location that allows air to enter the valve and shall be in accordance with the manufacturer's instructions
.

Reason: This is to add that access to air admittances valves should also be in accordance with the manufacturer's instructions.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is adding that the manufacturer's installation instructions need to be followed.

P137-24 Part II

P138-24 Part I

IPC: 918.7

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

918.7 Vent required.
Within each plumbing system, to relieve positive pressure from surcharging public sewers, not less than one stack vent or vent stack shall extend outdoors to the open air.

Reason: This proposed code language clarifies the reason why one stack vent or vent stack is extended outdoors to the open air.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost increase or decrease, this language is just to clarify the need for a vent to open air.

P138-24 Part I

P138-24 Part II

IRC: P3114.7

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Residential Code

Revise as follows:

P3114.7 Vent required. Within each plumbing system, to relieve positive pressure from surcharging public sewers, not less than one stack vent or a vent stack shall extend outdoors to the open air.

Reason: This proposed code language clarifies the reason why one stack vent or vent stack is extended outdoors to the open air.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost increase or decrease, this language is just to clarify the need for a vent to open air.

P138-24 Part II

P139-24 Part I

IPC: 918.8

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

918.8 Prohibited installations.
Air admittance valves shall not be installed in nonneutralized special waste systems as described in Chapter 8 except where such valves are in compliance with ASSE 1049, are constructed of materials *approved* in accordance with Section 702.5, and are tested for chemical resistance in accordance with ASTM F1412. Air admittance valves shall not be located in spaces utilized as supply or return air plenums. Air admittance valves shall not be used to vent sumps or tanks except where the vent system for the sump or tank has been designed by an engineer<u>, or where the valve is installed in accordance with the manufacturer's engineered instructions</u>. Air admittance valves shall not be installed on outdoor vent terminals for the sole purpose of reducing clearances to gravity air intakes or mechanical air intakes.

Reason: Manufacturers have engineered solutions for sumps or tank installations.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of a venting a sump pump with an AAV in an existing building should be about $600 less than the cost of venting a sump pump conventionally.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P139-24 Part I

P139-24 Part II

IRC: P3114.8

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Residential Code

Revise as follows:

P3114.8 Prohibited installations.
Air admittance valves shall not be used to vent sumps or tanks except where the vent system for the sump or tank has been designed by an engineer, or where the valve is installed in accordance with the manufacturer's instructions. *Air admittance valves* shall not be installed on outdoor vent terminals for the sole purpose of reducing clearances to gravity or mechanical air intakes.

Reason: Manufacturers have engineered solutions for sumps or tank installations.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

- **Cost Impact Calculations - Sump Pump.pdf**
  https://www.cdpaccess.com/proposal/9728/30484/documentation/146060/attachments/download/4546/
- **Studor Engineered Products Manual - 10th Edition.pdf**
  https://www.cdpaccess.com/proposal/9728/30484/documentation/146060/attachments/download/4325/

Estimated Immediate Cost Impact:

The cost of a venting a sump pump with an AAV in an existing building is less than the cost of venting a sump pump conventionally

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P139-24 Part II

P140-24 Part I

IPC: 918.8

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Revise as follows:

918.8 Prohibited installations.
Air admittance valves shall not be installed in nonneutralized special waste systems as described in Chapter 8 except where such valves are in compliance with ASSE 1049, are constructed of materials *approved* in accordance with Section 702.5, and are tested for chemical resistance in accordance with ASTM F1412. Air admittance valves shall not be located in spaces utilized as supply or return air plenums. Air admittance valves shall not be used to vent sumps or tanks except where the vent system for the sump or tank has been designed by an engineer. ~~Air admittance valves shall not be installed on outdoor vent terminals for the sole purpose of reducing clearances to gravity air intakes or mechanical air intakes.~~

Reason: This language is restrictive in nature and this topic is already covered in section 903.5 under the location of vent terminals. Designer's or contractor's purpose or intent is not enforceable. Air admittance valves have been used successfully for preventing sewer gas from escaping vent terminals and being drawn into air intakes since stack type air admittance valves were first developed.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost increase or decrease, this removes language that was unenforceable with respect to an intended purpose.

P140-24 Part I

P140-24 Part II

IRC: P3114.8

Proponents: Ken Smithart Jr, IPS Corporation, Studor

2024 International Residential Code

Revise as follows:

P3114.8 Prohibited installations.
Air admittance valves shall not be used to vent sumps or tanks except where the vent system for the sump or tank has been designed by an engineer. ~~Air admittance valves shall not be installed on outdoor vent terminals for the sole purpose of reducing clearances to gravity or mechanical air intakes.~~

Reason: This language is restrictive in nature and this topic is already covered in the vent terminal section of the IRC under the location of vent terminals. Designer's or contractor's purpose or intent is not enforceable. Air admittance valves have been used successfully for preventing sewer gas from escaping vent terminals and being drawn into air intakes since stack type air admittance valves were first developed.

Bibliography: Studor Engineered Products Manual - 10th Edition

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

There is no cost increase or decrease, this removes language that was unenforceable with respect to an intended purpose.

P140-24 Part II

P141-24

IPC: 918.9 (New), ASSE Chapter 15 (New)

Proponents: Ken Smithart Jr, IPS Corporation, Studor (ken.smithart@ipscorp.com)

2024 International Plumbing Code

Add new text as follows:

918.9 Positive Pressure Reduction Devices. Vent systems utilizing positive pressure reduction devices shall comply with this section. Positive pressure reduction devices shall conform to ASSE 1030.

Add new standard(s) as follows:

ASSE

ASSE International
18927 Hickory Creek Drive, Suite 220
Mokena, IL 60448

1030-2016	Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems

Staff Analysis: A review of the standard proposed for inclusion in the code, ASSE 1030-2016 *Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Attached Files

- **Cost Impact Calculations - PPRD.pdf**
  https://www.cdpaccess.com/proposal/9724/30473/files/download/4686/

Reason: This is adding language regarding the use of positive pressure reduction devices and a requirement to comply with the new industry standard for these devices.

Bibliography: ASSE 1030 standard for Performance Requirements for Positive Pressure Reduction Devices for Sanitary Drainage Systems
Studor Engineered Products Manual - 10th Edition

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The cost of a single stack pipe system is less than that of an equivalent conventional two-stack pipe system.

Estimated Immediate Cost Impact Justification (methodology and variables):

See Cost Impact Calculations attachment.

P141-24

P142-24

IPC: 1002.4.1, 1002.4.1.6 (New)

Proponents: Jim Williams, JK Plastics, JK Plastics (jimwilliams@jk-plastics.com)

2024 International Plumbing Code

Revise as follows:

1002.4.1 Trap seal protection.
Trap seals of *emergency floor drain* traps, ~~and~~ trap seals subject to evaporation and trap seals subjected to water discharged at high rates of velocity via an ejector type pump shall be protected by one of the methods in Sections 1002.4.1.1 through ~~1002.4.1.5~~ 1002.4.1.6.

Add new text as follows:

1002.4.1.6 Check Valve type trap seal protection device- Automatic clothes washer standpipe trap..
A check valve type trap seal protection device shall protect the automatic clothes washer standpipe trap seal from evaporation or water discharged at high rates of velocity. The protection device shall consist of a one-way valve designed to only allow air to enter the plumbing drainage system (air admittance valve) and an elastomeric sealing gasket to seal the automatic clothes washer's discharge hose. Such protective devices shall conform with Sections 406.2 & 802.4.3. Air admittance valves shall conform to ASSE 1050 or ASSE 1051. The devices shall be installed in accordance with the manufacture's requirements.

Staff Analysis: The proposed standard is in the current edition of the code.

Reason: The trap protecting the standpipe of an automatic clothes washer is the only trap in a dwelling which is not fed by gravity. This is a unique situation where not only is the trap of an automatic clothes washer routinely subjected to evaporation, but also to large volumes of water discharged at high rates of velocity from an ejector pump which forces the protective water seal out of the trap and creates a "dry-trap" allowing dangerous sewer gases to enter the dwelling. While the emergency floor drain trap seal is protected by a barrier-type protection device, there is no protection device for the automatic clothes washer standpipe trap seal. This check-valve type protection device will provide the necessary protection to the automatic clothes washer standpipe trap seal.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The estimated immediate cost impact would be approximately $89.95 completely installed (cost of device $39.95 + labor $50.00).

Estimated Immediate Cost Impact Justification (methodology and variables):

The minimal increase of less than $100 in construction cost would be greatly outweighed by the benefits to public health and safety.

Estimated Life Cycle Cost Impact:

The estimated life cycle cost impact would be $0.00.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

There would be no additional future cost impact. Once the device is installed there would be no maintenance required or need for replacement.

P142-24

P143-24

IPC: SECTION 202 (New), CHAPTER 10, SECTION 1003, 1003.1, 1003.2, 1003.3.8, 1003.9, 1003.3, 1003.3.1, 1003.3.2, 1003.3.3, 1003.3.4, 1003.3.5, 1003.3.5.1, TABLE 1003.3.5.1, 1003.3.5.2, 1003.3.6, 1003.3.7, 1003.3.7 (New), 1003.3.7.1 (New), 1003.3.7.2 (New), 1003.3.7.3 (New), 1003.3.7.4 (New), 1003.3.7.5 (New), 1003.3.7.5.1 (New), 1003.3.7.5.2 (New), 1003.3.7.6 (New), 1003.3.7.7 (New), 1003.3.8 (New), Table 1003.3.8 (New), 1003.3.9 (New), 1003.3.10 (New), 1003.3.10.1 (New), 1003.3.10.2 (New), 1003.3.10.2.1 (New), 1003.3.10.2.1.1. (New), 1003.3.10.2.2 (New), 1003.3.10.2.3 (New), 1003.3.11 (New), 1003.3.11.1 (New), 1003.3.11.2 (New), 1003.3.11.2.1 (New), 1003.3.11.2.2 (New), 1003.10

Proponents: James Richardson, City of Columbus (Ohio), City of Columbus (Ohio) (jarichardson@columbus.gov)

2024 International Plumbing Code

Add new definition as follows:

Calculated peak flow rate. Maximum possible grease laden waste discharge into a fats, oils, and grease interceptor expressed in gallons per minute (GPM).

Designed Service Interval. The amount of time the design professional has designated as the maximum time between grease interceptor services for a specific design. This time can be in days, weeks, months, or events, but shall not exceed 90 days between services.

Fast food/quick service restaurant. Any food service operation that serves food primarily with disposable containers and flatware and discharges non-domestic wastewater.

Full service restaurant. Any food service operation that serves food on plates or serving trays that requires washing, with or without flatware that requires washing and discharges non-domestic wastewater.

Nondomestic Wastewater.
Not regular sewage due to volume or character of water. Can contain substances like industrial chemicals, pesticides, rags, paints, excessive oil and grease. Permit and pretreatment may be required before this type of wastewater discharges into the sanitary drainage system.

Peak flow rate. All potential grease laden waste discharge into a fats, oils, and grease interceptor expressed in gallons per minute (GPM).

CHAPTER 10 TRAPS, INTERCEPTORS AND SEPARATORS

SECTION 1003
INTERCEPTORS AND SEPARATORS

Revise as follows:

1003.1 Where required.
Interceptors and separators shall be provided to prevent the discharge of oil, grease, sand and other substances harmful or hazardous to the *public sewer*, the private sewage system or the sewage treatment plant or processes.

> **Exception:** A grease interceptor or an automatic grease removal device shall not be required for individual dwelling units or any *private* living quarters.

1003.2 Approval.
The size, type and location of each interceptor and of each separator shall be designed and installed in accordance with the manufacturer's instructions and the requirements of this section based on the anticipated conditions of use. Wastes that do not require treatment or separation shall not be discharged into any interceptor or separator.

Revise as follows:

~~1003.3.8~~ 1003.2.1 Direct connection.
The discharge piping from ~~a grease~~ interceptors shall be directly connected to the sanitary drainage system.

~~1003.9~~ 1003.2.2 Venting of interceptors and separators.
Interceptors and separators shall be designed so as not to become air bound. Interceptors and separators shall be vented in accordance with one of the methods in Chapter 9.

1003.3 Grease interceptors.
Grease interceptors shall comply with the requirements of Sections 1003.3.1 through 1003.3~~.8~~.11.2.2.

1003.3.1 Grease interceptors and automatic grease removal devices required.
A grease interceptor or automatic grease removal device shall be required to receive the drainage from fixtures and equipment with grease-laden waste located in food preparation areas, such as in restaurants, hotel kitchens, hospitals, school kitchens, bars, factory cafeterias and clubs. Fixtures and equipment shall include pot sinks, prerinse sinks; soup kettles or similar devices; wok stations; floor drains or sinks into which kettles are drained; automatic hood wash units and dishwashers without prerinse sinks. Grease interceptors and automatic grease removal devices shall receive waste only from fixtures and equipment that allow fats, oils or grease to be discharged. Where lack of space or other constraints prevent the installation or replacement of a grease interceptor, one or more grease interceptors shall be permitted to be installed on or above the floor and upstream of an existing grease interceptor.

1003.3.2 Food waste disposers restriction.
A food waste disposer shall not discharge to a grease interceptor.

1003.3.3 Additives to grease interceptors.
Dispensing systems that dispense interceptor performance additives to grease interceptors shall not be installed except where such systems dispense microbes for the enhancement of aerobic bioremediation of grease and other organic material, or for inhibiting growth of pathogenic organisms by anaerobic methods. Such microbial dispensing systems shall be installed only where the grease interceptor manufacturer's instructions allow such systems and the systems conform to ASME A112.14.6. Systems that discharge emulsifiers, chemicals or enzymes to grease interceptors shall be prohibited.

Revise as follows:

~~1003.3.4 Grease interceptors and automatic grease removal devices not required~~.
~~A grease interceptor or an automatic grease removal device shall not be required for individual dwelling units or any *private* living quarters.~~

1003.3.4~~1003.3.5~~ Hydromechanical grease interceptors, fats, oils and greases disposal systems and automatic grease removal devices.
Hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be sized in accordance with ASME A112.14.3, ASME A112.14.4, ASME A112.14.6, CSA B481.3 or PDI G101. Hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be designed and tested in accordance with ASME A112.14.3, ASME A112.14.4, CSA B481.1, PDI G101 or PDI G102. Hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be installed in accordance with the manufacturer's instructions. Where manufacturer's instructions are not provided, hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be installed in compliance with ASME A112.14.3, ASME A112.14.4, ASME A112.14.6, CSA B481.3 or PDI G101.

~~1003.3.5.1~~ 1003.3.4.1 Hydromechanical ~~Grease~~ grease interceptor and grease removal device retention capacity.
Hydromechanical ~~Grease~~ grease interceptors and automatic grease removal devices shall ~~have~~ be certified for the grease retention capacity indicated in Table ~~1003.3.5.1~~ 1003.3.4.1, or more, for the flow-through rates indicated in Table 1003.3.4.1.

TABLE ~~1003.3.5.1~~ 1003.3.4.1 RETENTION CAPACITY OF HYDROMECHANICAL GREASE INTERCEPTORS[a], AND AUTOMATIC GREASE REMOVAL DEVICES

TOTAL FLOW-THROUGH RATING (gpm)	GREASE RETENTION CAPACITY (pounds)
4	8
6	12
7	14
9	18
10	20
12	24
14	28
15	30
18	36
20	40
25	50
35	70
50	100
75	150
100	200

For SI: 1 gallon per minute = 3.785 L/m, 1 pound = 0.454 kg.

a. For total flow-through ratings greater than 100 (gpm), double the flow-through rating to determine the grease retention capacity (pounds).

~~1003.3.5.2~~ 1003.3.4.2 Rate of flow controls.
Hydromechanical ~~Grease~~ grease interceptors and grease removal devices shall be equipped with devices to control the rate of water flow so that the water flow does not exceed the rated flow. ~~The~~ External flow-control devices shall be vented and terminate not less than 6 inches (152 mm) above the flood rim level or be installed in accordance with the manufacturer's instructions.

~~1003.3.6~~1003.3.5 Automatic grease removal devices.
Where automatic grease removal devices are installed, such devices shall be located downstream of each fixture or multiple fixtures in accordance with the manufacturer's instructions. The automatic grease removal device shall be sized to pretreat the measured or calculated flows for all connected fixtures or equipment. *Ready access* shall be provided for inspection and maintenance.

~~1003.3.7~~ 1003.3.6 Gravity grease interceptors and gravity grease interceptors with fats, oils, and greases disposal systems.
The required capacity of gravity grease interceptors and gravity grease interceptors with fats, oils, and greases disposal systems shall be determined by multiplying the peak drain flow into the interceptor in gallons per minute by a retention time of 30 minutes. Gravity grease interceptors shall be designed and tested in accordance with IAPMO/ANSI Z1001. Gravity grease interceptors with fats, oils, and greases disposal systems shall be designed and tested in accordance with ASME A112.14.6 and IAPMO/ANSI Z1001. Gravity grease interceptors and gravity grease interceptors with fats, oils, and greases disposal systems shall be installed in accordance with manufacturer's instructions. Where manufacturer's instructions are not provided, gravity grease interceptors and gravity grease interceptors with fats, oils, and greases disposal systems shall be installed in compliance with ASME A112.14.6 and IAPMO/ANSI Z1001.

Add new text as follows:

1003.3.7 Meals served per day. Meals served per day shall be calculated based on the occupancy type and service type in accordance with section 1003.3.7.1 through section 1003.3.7.7

1003.3.7.1 Convenience Store. Convenience store meals per day shall be calculated at 1000 meals per day.

1003.3.7.2 Hotel breakfast bars. Hotel breakfast bar meals per day shall be calculated multiplying total guest rooms times 2.

1003.3.7.3 Carryout only pizza shops. Carryout only pizza shop meals per day shall be assumed to be 250 meals per day.

1003.3.7.4 Nursing homes, school cafeterias, adult daycare facilities, child daycare facilities and similar occupancies. Nursing homes, school cafeterias, adult daycare facilities, child daycare facilities and similar occupancy meals per day shall be calculated using total allowable occupancy times the number of meal services per day. Meals services can be any combination of the following, breakfast, lunch, or dinner.

1003.3.7.5 Restaurants. Restaurant meals per day shall be calculated in accordance with 1003.3.7.5.1 or 1003.3.7.5.2

1003.3.7.5.1 Fast food/quick service restaurants. Fastfood/quick service restaurant meals per day shall be calculated as 40 meals times total service hours per day.

1003.3.7.5.2 Full service restaurants. Full service restaurant meals per day shall be calculated as 50 meals times total service hours per day.

1003.3.7.6 Event spaces. Event spaces, such as but not limited to, banquet halls, fraternal organizations, churches, and golf/country clubs shall have meals calculated based on the maximum anticipated number of events per year. Meals per event shall be calculated as 1 meal per allowable occupant. This total anticipated meals per year shall then be used to establish a service interval correlating the storage capacity of the fats, oils and grease interceptor with the number of events per year. Capacity should be selected so that the service interval stays within a 3-month maximum interval.

1003.3.7.7 Ballparks, arenas, and stadiums. Ballpark, arena, and stadium shall have meals calculated based on the maximum anticipated number of events per year. Meals per event shall be calculated by multiplying total allowable occupancy times 2. This total anticipated meals per event shall then be used to establish a service interval correlating the rentetion capacity of the fats, oils and grease interceptor with the number of events per year. Capacity shall be selected so that the service interval stays within a 3-month maximum interval.

> **Exception:** Where there are multiple food service operations within the ballpark, arena, or stadium, the meals per event can be divided by the total number of food service operations when each food service operation is provided with a dedicated fats, oils, and grease interceptor. Each dedicated interceptor retention capacity shall be selected so that the service interval stays within a 3-month maximum interval.

1003.3.8 Grease discharge per meal. Fats, oils, and grease discharge per meal shall be referenced from Table 1003.3.8 based on the occupancy type and service type.

Table 1003.3.8 Fats, oils, and grease discharge per meal values

Restaurant Type	Grease Production Values	Examples
Low grease producer	0.005 lbs(2.268 g)/meal (no flatware)	Elementary cafeteria, grocery meat department, hotel breakfast bar, deli/sub shop, sushi, carryout pizza
	0.0065 lbs(2.268 g)/meal (with flatware)	
Medium grease producer	0.025 lbs(2.268 g)/meal (no flatware)	Cafe, coffee shop, Convenience store, Greek cuisine, Indian cuisine, Japanese cuisine, Korean cuisine, Vietnamese cuisine
	0.0325 lbs(2.268 g)/meal (with flatware)	
High grease producer	0.035 lbs(2.268 g)/meal (no flatware)	Full-fare family, fast-food hamburger, hamburger bar and grill, German cuisine, Italian cuisine, fast-food Mexican cuisine
	0.0455 lbs(2.268 g)/meal (with flatware)	
Very high grease producer	0.058 lbs(2.268 g)/meal (no flatware)	Full-fare BBQ, fast-food fried chicken, full-fare Mexican cuisine, steak and seafood restaurants, Chinese cuisine, Hawaiian cuisine
	0.075 lbs(2.268 g)/meal (with flatware)	

1003.3.9 Designed Service Interval. The designed service interval for fats, oils, and grease interceptors shall be established by the designer and shall be included in the design.The designed service interval for fats, oils, and grease interceptors shall be within 90 days between intervals. The designed service interval shall be within the interceptor storage capacity for the connected food service operation or event space.

Exception: The designed service interval for concrete interceptors shall be within 30 days.

1003.3.10 Flow rates. Flow rates for hydromechanical interceptors and automatic grease removal devices shall be calculated as indicated in section 1003.3.10.1, flow rates for gravity interceptors shall be calculated as indicated in section 1003.3.10.2.

1003.3.10.1 Peak flow rate. The peak flow rate shall include all fixtures listed in section 1003.3.1 that discharge fats, oils, and grease laden waste to a hydromechanical interceptor or an automatic grease removal device. Total discharge shall be expressed in gallons per minute (GPM).

1003.3.10.2 Calculated peak flow rate. Calculated peak flow rate shall shall be calculated using equation 10-01, and shall include all fixtures listed in section 1003.3.1 that discharge fats, oils, and grease laden waste to a gravity interceptor, this can include pre-rinse sinks with or without food waste disposals.

(Equation 10-01) TD/60=CPFR

where: TD = Total possible discharge for 1 hour for all fixtures discharging fats, oils, and grease to the interceptor.
60 = minutes in one hour

CPFR = Calculated Peak Flow Rate in Gallon per Minute (GPM)

1003.3.10.2.1 Sinks. Calculated peak flow rate shall be the maximum discharge expressed in gallons per minute (GPM) that could occur based on fill time for the number of fixture vessel and sizes (total gallons), faucet discharge in GPM, plus a drain down period of 1 minute for sinks unless the manufacturer has a published drain down time period. Sink volume shall be calculated in gallons in accordance with section 1003.3.10.2.1.1.

Exception: For gravity interceptors, pre-rinse sink discharge shall be calculated using faucet GPM x 60. For hydromechanical interceptor and automatic grease removal devices, the pre-rinse sink faucet discharge shall be added to the single cycle discharge of all fixtures connected to the interceptor.

1003.3.10.2.1.1. Sink Volume. Each sink vessel volume shall be calculated using equation10-2. For multiple vessel sinks, the volume for each vessel shall be added together to establish the total volume for the sink.

Exception: The volume of each vessel of a food utensil, dishes, pots and pans sink shall be calculated using equation 10-3. The volume for each vessel shall be added together to establish the total volume for the sink.

(10-2) ((L x W x D)/1728) x 7.47

where:

L = Length in inches
W = Width in inches

D = Depth in inches

1728 converts cubic inches into cubic feet

7.47 gallons per cubic foot.

(10-3) (((L x W x D)/1728) x.75[a]) x 7.47.

where:

L = Length in inches

W = Width in inches

D = Depth in inches

1728 converts cubic inches into cubic feet

7.47 gallons per cubic foot.

a. Food utensil, dishes, pots, and pans sinks are assumed to have 1/4 the volume taken up by dirty utensils, dishes, pots, and pans.

1003.3.10.2.2 Dishwashers. Calculated peak flow rate for dishwasher shall be based on the number of possible cycles per hour and gallons per cycle converted to GPM.

(10-4) C x G = GPH

where:

C = cycles or racks possible per hour

G = gallons per cycles

GPH = Gallons per Hour

1003.3.10.2.3 Other waste receptors. Other types of fats, oils, and grease waste receptors discharge shall be calculated using equation 10-5.

(10-5) G x C = GPH

where:

G = gallons per cycle

C = cycles per hour

GPH = gallon per hour

1003.3.11 Grease interceptor sizing. Grease interceptors shall be sized in accordance with 1003.3.11.1, or 1003.3.11.2.

1003.3.11.1 Gravity grease interceptor sizing. Gravity grease interceptors shall be sized as follows:

1. Required volume to allow separation to occur shall be established by multiplying the calculated peak flow rate in GPM by 30 minutes retention time.
2. Anticipated pounds of fats, oils, and grease discharge per day/event shall be established by multiplying meals per day/event by the appropriate fats, oils, and grease discharge per meal value in table 1003.3.8.

   Exception: For event spaces, areas, ballparks, and stadiums, the anticipated pounds of fats, oils, and grease discharge per day/event shall be established by multiplying meals per event by 0.075 lbs.
3. The designed service interval in days shall be multiplied by the anticipated pounds of fats, oils and grease discharge per day.

   Exception: For event spaces, areas, ballparks, and stadiums, the designed service interval shall be established using the number of events that can occur between intervals, but in no case shall exceed 90 days.
4. The anticipated pounds of fats, oils and grease discharge per designed service interval shall be converted to gallons using equation 10-6.

5. The anticipated gallons of fats, oils and grease discharge shall be added to the required volume established in step 1 to establish the minimum total volume of the gravity interceptor.
    (10-6) P/6.4=Gwhere: P = Pounds of anticipated fats, oils, and grease discharge for the designed service interval.
    6.4 = Average weight of fats, oils, and grease in pounds per gallon.

    G = Converted pounds of anticipated fats, oils, and grease discharge to gallons of anticipated fats, oils, and grease discharge.

1003.3.11.2 Hydromechanical interceptor and automatic grease removal device sizing. Hydromechanical interceptors shall be sized in accordance with section 1003.3.10.2.1 and automatic grease removal devices shall be sized in accordance with section 1003.3.10.2.2.

1003.3.11.2.1 Hydromechanical interceptor sizing. Hydromechanical interceptors shall be sized as follows:

1. Anticipated pounds of fats, oils, and grease discharge per day shall be established by multiplying meals per day by the appropriate fats, oils, and grease discharge per meal value in table 1003.3.8.

    Exception: For event spaces, areas, ballparks, and stadiums, the anticipated pounds of fats, oils, and grease discharge per day shall be established by multiplying meals per event by 0.075 lbs.

2. The designed service interval in days shall be multiplied by the anticipated pounds of fats, oils and grease discharge per day/event.

    Exception: For event spaces, arenas, ballparks, and stadiums, the designed service interval shall be established using the number of events that can occur between intervals, but in no case shall exceed 90 days.

3. A hydromechanical interceptor shall be selected with a flow rate that can accommodate the peak flow rate established in 1003.3.9 with a 1 minute drain down period and enough retention capacity to accommodate the anticipated pounds of fats, oils, and grease discharge for the design service interval established in step 2.

    Exception: A 2 minute drain down may be used provided the retention capacity and flow rate can be accommodated by the interceptor.

1003.3.11.2.2 Automatic grease removal device sizing. Automatic grease removal devices shall be sized as follows:

1. Anticipated pounds of fats, oils, and grease discharge per day/event shall be established by multiplying meals per day/event by the appropriate fats, oils, and grease discharge per meal value in table 1003.3.8.

    Exception: For event spaces, areas, ballparks, and stadiums, the anticipated pounds of fats, oils, and grease discharge per day/event shall be established by multiplying meals per event by 0.075 lbs.

2. The designed service interval shall be established as a number of services per day and hours between services.

    Exception: For event spaces, arenas, ballparks, and stadiums, the designed service interval shall be at the completion of each event.

3. The anticipated pounds of fats, oils, and grease discharge per day/event shall be divided by the number of service intervals per day/event.

    Exception: Event spaces, arenas, ballparks, and stadiums.

4. The anticipated fats, oils, and grease discharge established in step 3 shall be used to establish the minimum storage capacity of the automatic grease removal device.

    Exception: For event spaces, arenas, ballparks, and stadiums, the anticipated fats, oils, and grease discharge per event shall be used to establish the minimum storage capacity for the automatic grease removal device.

Revise as follows:

~~1003.10~~ 1003.9 Access and maintenance of interceptors and separators.
Access shall be provided to each interceptor and separator for service and maintenance. Interceptors and separators shall be maintained by periodic removal of accumulated grease, scum, oil, or other floating substances and solids deposited in the interceptor or separator.

Attached Files

- **SIZING FOG WASTE INTERCEPTORS.docx.pdf**
  https://www.cdpaccess.com/proposal/9947/30659/files/download/4556/

Reason: The current section for sizing interceptors includes only part of the data needed to properly size an interceptor. Data collect via the "2011 Brown Grease Supply Study" resulted in the ability to identify the amount of fats, oils, and grease discharged per meal at various types of Food Service Operations (FSOs). Other data points, such as service hours, flow rate design and design service intervals are also needed. This proposal includes these necessary data points, as well as table 8-3 from ASPE Plumbing Design Manual which was developed in conjunction with the 2011 Brown Grease Supply Study.

Other changes to this section included in this proposal include re-organization of some of the sections, including moving section 1003.3.4 "Grease interceptor and automatic grease removal devices not required" to an exception in listing in section 1003.3.1 "Grease interceptor and automatic grease removal devices required." As well as moving sections 1003.3.8 "Direct connection" and 1003.9 "Venting of interceptors" into sub-sections of 1003.2 "Approval" as these sections should apply to all interceptors as part of an approval.

Please reference the attached file for the Bibliography which includes background on the additions and sizing methodology included in this proposal.

Bibliography: See attached file.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is to provide a prescriptive method for sizing fats, oils, and grease interceptors. Sizing is already required, however, it does not include enough information and provides no direction. The overall effect of this proposal would technically result in lowering the cost of construction, especially for gravity interceptors, as well as the potential to decrease maintenance costs depending of the designed service interval selected.

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IPC: 1003.2, 1003.3.1, 1003.3.5, 1003.9, 1003.10

Proponents: Max Weiss, Plumbing and Drainage Institute, PDI (mweiss@pdionline.org)

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Revise as follows:

1003.2 Approval.
The size, type and location of each interceptor and of each separator shall be designed and installed in accordance with the manufacturer's instructions and the requirements of this section based on the anticipated conditions of use and rate of peak discharge as calculated in accordance with ASME A112.14.3; ASME A112.14.4; CSA B 481.1 or PDI G101. Wastes that do not require treatment or separation shall not be discharged into any interceptor or separator.

1003.3.1 Grease interceptors and automatic grease removal devices required.
A grease interceptor or automatic grease removal device shall be required to receive the drainage from fixtures and equipment with grease-laden waste located in food preparation areas, such as in restaurants, hotel kitchens, hospitals, school kitchens, bars, factory cafeterias and clubs. Fixtures and equipment shall include pot sinks, prerinse sinks; soup kettles or similar devices; wok stations; floor drains or sinks into which kettles are drained; automatic hood wash units and dishwashers without prerinse sinks. Grease interceptors and automatic grease removal devices shall receive waste ~~only~~ from fixtures and equipment that allow fats, oils or grease to be discharged. Where lack of space or other constraints prevent the installation or replacement of a single grease interceptor, one or more grease interceptors shall be permitted to be installed on or ~~above~~ in the floor. ~~and upstream of an existing grease interceptor~~.

1003.3.5 Hydromechanical grease interceptors, fats, oils and greases disposal systems and automatic grease removal devices.
Hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be sized in accordance with ASME A112.14.3, ASME A112.14.4, ASME A112.14.6, CSA B481.3 or PDI G101. Hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be designed and ~~tested~~ certified in accordance with ASME A112.14.3, ASME A112.14.4, CSA B481.1, PDI G101 or PDI G102. Hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be installed in accordance with the manufacturer's instructions. Where manufacturer's instructions are not provided, hydromechanical grease interceptors; fats, oils, and greases disposal systems and automatic grease removal devices shall be installed in compliance with ASME A112.14.3, ASME A112.14.4, ASME A112.14.6, CSA B481.3 or PDI G101.

1003.9 Venting of interceptors and separators.
Interceptors and separators shall be designed so as not to become air bound. Interceptors and separators shall be trapped and vented in accordance with one of the methods in Chapter 9.

1003.10 Access and maintenance of interceptors and separators.
Access shall be provided to each interceptor and separator for service and maintenance. Interceptors and separators shall be maintained by periodic removal of accumulated grease, scum, oil, or other floating substances and solids deposited in the interceptor or separator.
Interceptors shall be serviced prior to: contents reaching a pH of five (5); accumulations greater in depth than twenty-five percent (25%) of the wetted depth of the interceptor or thirty (30) days, whichever condition first occurs.

Reason: Clarification is necessary to ensure empirical hydraulic sizing, service, and application of grease interceptors.

Bibliography: ASSESSMENT OF GREASE INTERCEPTOR PERFORMANCE
Water Environment Research Foundation.
Library of Congress Catalog Card Number: 2008934928
Printed in the United States of America
IWAP ISBN: 978-1-84339-526-3/1-84339-526-6

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed code changes do not add materials; only clarify methodologies.

P144-24

P145-24

IPC: 1003.3.1

Proponents: Eric Thompson, Schier Products, Schier Products

2024 International Plumbing Code

Revise as follows:

1003.3.1 Grease interceptors and automatic grease removal devices required.
A grease interceptor or automatic grease removal device shall be required to receive the drainage from fixtures and equipment with grease-laden waste located in food preparation areas, such as in restaurants, hotel kitchens, hospitals, school kitchens, bars, factory cafeterias and clubs. Fixtures and equipment shall include pot sinks, prerinse sinks; soup kettles or similar devices; wok stations; floor drains or sinks into which kettles are drained; automatic hood wash units and dishwashers ~~without prerinse sinks~~. Grease interceptors and automatic grease removal devices shall receive waste only from fixtures and equipment that allow fats, oils or grease to be discharged. Where lack of space or other constraints prevent the installation or replacement of a grease interceptor, one or more grease interceptors shall be permitted to be installed on or above the floor and upstream of an existing grease interceptor.

Reason: All fixtures and equipment that allow fats, oils or grease should be connected to the interceptor, regardless of the upstream fixtures.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Fixtures that connect do not impact the cost of the change. Dishwashers and pre-rinse sinks, if present, are already a part of the system so there is no additional cost to construction.

P145-24

P146-24

IPC: 1003.3.2

Proponents: Eric Thompson, Schier Products, Schier Products

2024 International Plumbing Code

Revise as follows:

1003.3.2 Food waste disposers restriction.
A food waste disposer shall not discharge to a grease interceptor.

> **Exception:** Food waste disposers shall be permitted to discharge to grease interceptors or solids interceptors that are designed to receive the discharge of food waste.

Reason: Larger grease interceptors have solids capability to allow for additional food waste. Solids interceptors are designed to handle food waste when installed before a grease interceptor and can handle the discharge of food waste disposers.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Grease interceptors are already a part of the project so there would be no additional cost impact in construction. Solids interceptors could be installed additionally which could add cost, however they would not be required per the change.

P146-24

P147-24

IPC: 1003.3.5.1, TABLE 1003.3.5.1

Proponents: Eric Thompson, Schier Products, Schier Products

2024 International Plumbing Code

Revise as follows:

1003.3.5.1 Grease interceptor capacity.

Grease interceptors shall have the minimum grease retention capacity indicated in Table 1003.3.5.1 for the flow-through rates indicated.

TABLE 1003.3.5.1 CAPACITY OF GREASE INTERCEPTORS[a]

TOTAL FLOW-THROUGH RATING (gpm)	GREASE RETENTION CAPACITY (pounds)
4	8
6	12
7	14
9	18
10	20
12	24
14	28
15	30
18	36
20	40
25	50
35	70
50	100
75	150
100	200

For SI: 1 gallon per minute = 3.785 L/m, 1 pound = 0.454 kg.

a. For total flow-through ratings greater than 100 (gpm), double the flow-through rating to determine the grease retention capacity (pounds).

Reason: ASME A112.14.3, one of the standards for grease interceptors, allows for interceptors to be tested beyond the minimum capacity. The table implies that only interceptors certified to that grease capacity would be allowed under the code.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Grease interceptors are tested to ASME A112.14.3 to a minimum grease capacity requirement. This change clarifies that there is a minimum and allows for interceptors that are certified beyond the capacities as shown in the table. There is no impact as interceptors will hold more than the minimum requirement, manufacturers choose to continue the test to maximum capacity at their own expense.

P147-24

P148-24

IPC: 1003.4, 1003.4.2, 1003.4.2.1, 1003.4.2.2, IAPMO Chapter 15 (New)

Proponents: Andrew Heck, Striem, Manufacturer (andrew.heck@striemco.com)

2024 International Plumbing Code

Revise as follows:

1003.4 Oil separators required. ~~At repair garages where floor or trench drains are provided, car washing facilities, factories where oily and flammable liquid wastes are produced and hydraulic elevator pits, oil separators shall be installed into which oil-bearing, grease-bearing or flammable wastes shall be discharged before emptying into the building drainage system or other point of disposal.~~The following facilities shall require an oil separator before discharging into the sanitary sewer system:

1. Automobile service or repair garages.
2. Facilities where automobiles are washed.
3. Vehicle parking areas not intended for storm drainage.
4. Manufacturing, storage, maintenance, repair, or testing process facilities that have oily, flammable, or both types of wastes.
5. Liquid waste that is pumped or drained from hydraulic elevator pits.

~~**Exception:** An oil separator is not required in hydraulic elevator pits where an approved alarm system is installed. Such alarm systems shall not terminate the operation of pumps utilized to maintain emergency operation of the elevator by firefighters.~~

1003.4.2 Oil separator ~~design~~ compliance.
Oil separators shall comply with IAPMO IGC 183 or IAPMO IGC 325 ~~be listed and labeled, or designed in accordance with Sections 1003.4.2.1 and 1003.4.2.2~~.

1003.4.2.1 General design requirements.
The oil separator shall be provided with gastight covers that shall be readily accessible. The vapor compartment in the oil separator shall be independently vented to atmosphere, and the outlet opening shall contain a water seal.
~~Oil separators shall have a depth of not less than 2 feet (610 mm) below the invert of the discharge drain. The outlet opening of the separator shall have not less than an 18-inch (457 mm) water seal.~~

1003.4.2.2 ~~Garages and service stations~~ Oil separator sizing.
The size of an oil separator shall be based on one of the following methods.

1. Where automobiles are serviced, greased, repaired or washed or where gasoline is dispensed, oil separators shall have a capacity of not less than 6 cubic feet (0.168 m^3) for the first 100 square feet (9.3 m^2) of area to be drained, plus 1 cubic foot (0.028 m^3) for each additional 100 square feet (9.3 m^2) of area to be drained into the separator. ~~Parking garages in which servicing, repairing or washing is not conducted, and in which gasoline is not dispensed, shall not require a separator. Areas of commercial garages utilized only for storage of automobiles are not required to be drained through a separator.~~
2. Where not more than three motor vehicles are stored, interceptors shall have a minimum capacity of 6 cubic feet (0.168m^3), and 1 cubic foot (0.028 m^3) of capacity shall be added for each vehicle up to 10 vehicles. For greater than 10 vehicles, an additional 0.15 cu. ft (0.004 m^3) per vehicle shall be added to the interceptor's total capacity.
3. A method approved by the code official.

~~Where automobiles are serviced, greased, repaired or washed or where gasoline is dispensed, oil separators shall have a capacity of not less than 6 cubic feet (0.168 m³) for the first 100 square feet (9.3 m²) of area to be drained, plus 1 cubic foot (0.028 m³) for each additional 100 square feet (9.3 m²) of area to be drained into the separator. Parking garages in which servicing, repairing or washing is not conducted, and in which gasoline is not dispensed, shall not require a separator. Areas of commercial garages utilized only for storage of automobiles are not required to be drained through a separator.~~

Add new standard(s) as follows:

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

IAPMO

IGC 183:2016 Oil/Water Separators and Coalescing Plate Separators

IGC 325:2023 High Efficiency Oil/Water Separators Performance

Staff Analysis: A review of the standard proposed for inclusion in the code, IGC 183:2016 *Oil/Water Separators and Coalescing Plate Separators* and IGC 325:2023 *High Efficiency Oil/Water Separators Performance*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: 10003.4 - Created a numbered list format as it is more legible and comprehensible. Elaborated on existing applications. Added more application types to cover all bases for oil separators. Included parking and storage facilities since they are very popular. Parking garages, and specifically sizing an oil separator for them, is to be discussed in 1003.4.2.2. Removed the exception for hydraulic elevator pits.

Substantiation against an approved alarm system:

1. A standard (and approved) sump pump connected to an oil separator always guarantees a dry elevator pit. One could argue that the introduction of a duplex pump system (or similar) that pumps oil and water separately guarantees a dry pit. However, that introduces more points of potential mechanical failure.

2.The elevator will never be shut down due to accumulated liquid in the pit. This is especially relevant for firefighter emergency operations during an emergency.

3. Any oil that is removed the pit can be pumped to an accessible location for proper maintenance and monitoring. Any oily waste accumulating in an elevator pit poses health, safety, and maintenance risks.

Reason 1003.4.2 - Simplifying this section by providing two standards that are specific to oil separators. IGC 183 is a *design-based* standard and IGC 325 is a *performance-based* standard. Both of these standards are very robust in their requirements, and should supersede the minimal language referenced in the subsequent sections.

Reason 1003.4.2.1 - Removed the language regarding minimum depth below the discharge drain and water seal. This is language that is not typically enforced and doesn't carry any specific logic to be present. Replaced with universally accepted design guidelines for oil separators: sealed and gastight cover, trap on the outlet, independent vent.

Reason 1003.4.2.2 - Changed the section title to better align with the section content: sizing options for oil separators. Broke this section down into (3) bullet point options for simplicity.

The first is the (unedited) square footage sizing methodology for service/maintenance applications.

The second is a sizing methodology for covered parking-only facilities as described in section 1003.4. Again, these are a popular application and are often required by municipalities and local water authorities. Similar to the square footage sizing, provided is a minimum baseline formula. In sum: 1-3 vehicles = 6 cubic feet of capacity required. Then you add (1) additional cu. ft. per vehicles up to 10 vehicles. Above 10 vehicles, add .15 additional cu. ft. per vehicle. The logic behind .15 additional cubic feet is due to the average vehicle holding between 4-6 quarts of oil, which translates to roughly .15 cu. ft.

- Further, unlike the square footage sizing methodology for service/maintenance applications, parking facilities generally produce little to no flow from a constant source. This sizing guide allows the designer/owner to select a unit that is more appropriately sized than it would be otherwise by using square footage sizing. For example: at roughly 180 square feet per stall, a 200 stall covered garage area would require a minimum of 36,000 square feet of drainage area. Using square footage sizing, that would require the oil interceptor to have a minimum gallon capacity of 2,730 gallons. Using the proposed methodology, the minimum would be 310 gallons.

The third method is any method deemed appropriate by the AHJ.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed changes are meant for clarity and simplification. They also do not limit competition for oil separator manufacturers. For example, all oil separator manufacturers have the opportunity to design to the standards outlined in 1003.4.2.

Note: Proposed changes to sections 1003.4 and 1003.4.2.2 would require added scope/cost of an oil separator for covered parking facilities. Currently, the IPC does not require oil separators for parking garages. However, they are still common and regularly enforced. We've addressed mitigating the cost impact by detailing the sizing methodology as outlined in 1003.4.2.2. To summarize: Sizing is more conducive to smaller tanks. Smaller tanks = less install and maintenance cost.

P148-24

P149-24

IPC: 1003.4.2, UL Chapter 15 (New)

Proponents: Jonathan Roberts, UL Solutions, UL Solutions (jonathan.roberts@ul.com)

2024 International Plumbing Code

Revise as follows:

1003.4.2 Oil separator design.
Oil separators shall be listed and labeled in accordance with UL 2215, or designed in accordance with Sections 1003.4.2.1 and 1003.4.2.2.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062-2096

2215-19 Outline of Investigation for Oil/Water Separators

Staff Analysis: A review of the standard proposed for inclusion in the code, UL 2215-9 *Outline of Investigation for Oil/Water Separators*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal identifies UL 2215 as the standard requirements used for third party certification (listed and labeled) oil/water separators. These requirements cover stationary gravity or pump fed aboveground and underground, atmospheric type oil/water separator systems intended to remove oil, having a specific gravity of 0.83 – 0.94 at 15°C (59°F), suspended in water from rainwater runoff or normal washdown of streets, highways, and parking lots at an inlet rate not exceeding the marked maximum influent concentration and flow rate. These requirements cover gravity or pump fed oil/water separator systems having capacities of 60 to 50,000 gallons (227 – 189,270 L) total. There are 17 manufacturers who have products certified in accordance with UL 2215.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is providing clarification as to which standard applies to listed oil/water separators, there is no substantive change as these are already required by the code to be listed.

P149-24

P150-24

IPC: 1102.4 (New)

Proponents: Sidney Lee Cavanaugh, Cavanaugh Consulting, WRT (sidneycavanaugh@yahoo.com)

2024 International Plumbing Code

Add new text as follows:

1102.5 Relining Storm Drainage. The relining and rehabilitation of storm drainage systems using cured-in-place pipe (CIPP) shall be in accordance with ASTM F2599.

Staff Analysis: The proposed standard is in the current edition of the code.

Reason: Storm drainage is certainly a candidate for rehabilitation by CIPP and it should be added to Chapter 11.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The cost allowance is already recognized by fact that the standard is already referenced in the code and technology is currently being used in drainage systems.

P150-24

P151-24

IPC: 1102.6, ASME Chapter 15, ASME Chapter 15 (New)

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Plumbing Code

Revise as follows:

1102.6 Roof drains.
Roof drains shall conform to ASME A112.3.1 or ASME A112.6.4/CSA B79.4. Roof drains, other than siphonic roof drains, shall be tested and rated in accordance with ASME A112.6.4/CSA B79.4 or ASPE/IAPMO Z1034.

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

~~A112.6.4—2003 (R2020)~~ ~~Roof, Deck, and Balcony Drains~~

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

A112.6.4/CSA B79.4 -2022 Roof, Deck, and Balcony Drains

Staff Analysis: A review of the standard proposed for inclusion in the code, ASME A112.6.4/CSA B79.4-2022 *Roof, Deck, and Balcony Drains*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The ASME A112.6.3 was harmonized with CSA B79 standard. The intent of this proposal is to replace the current standard with the new standard.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarification to call out the new harmonized satndard, no addtional requirements.

P151-24

P152-24

IPC: 1106.2, 1106.2.1, TABLE 1106.2, 1106.2.2 (New), 1106.2.3 (New), TABLE 1106.2.3 (New), TABLE 1106.2.3(1) (New), TABLE 1106.2.3(2) (New), TABLE 1106.2.3(3) (New), 1106.2.4 (New), TABLE 1106.2.4 (New)

Proponents: Christopher Winnie PE CPD, SmithGroup, self (chris.winnie@smithgroup.com)

2024 International Plumbing Code

Revise as follows:

1106.2 Size of storm drain piping.
~~Vertical and horizontal *storm drain* piping shall be sized based on the flow rate through the roof drain. The flow rate, as calculated in accordance with Section 1106.2.1, shall be checked against the roof drain manufacturer's published flow rate for the specific roof drain model and size to verify that the selected roof drain will handle the anticipated flow. The flow rate in *storm drain* piping shall not exceed that specified in Table 1106.2.~~ The size of storm drain piping shall be in accordance with Sections 1106.2.1 through 1106.2.4.

1106.2.1 ~~Rainfall rate conversion method~~ Maximum storm water demand.
~~The rainfall rate falling on a roof surface shall be converted to a gallon per minute (L/m) flow rate in accordance with Equation 11-1.~~

$$\cancel{GPM = R \times A \times 0.0104} \qquad \textbf{(Equation 11-1)}$$

~~where:~~
~~*R* = Rainfall intensity in inches (mm) per hour.~~
~~*A* = Roof area in square feet (m^2).~~

The volumetric flow rate of storm drainage shall be the sum of the connected roof drain(s). The total connected load shall be used as the basis for pipe sizing, assuming all roof drains are at full capacity simultaneously.

Delete without substitution:

~~TABLE 1106.2 STORM DRAIN PIPE SIZING~~

PIPE SIZE (inches)	CAPACITY (gpm)				
	VERTICAL DRAIN	SLOPE OF HORIZONTAL DRAIN			
		1/16 inch per foot	1/8 inch per foot	1/4 inch per foot	1/2 inch per foot
2	34	15	22	31	44
3	87	39	55	79	111
4	180	81	115	163	231
5	311	117	165	234	331
6	538	243	344	487	689
8	1,117	505	714	1,010	1,429
10	2,050	927	1,311	1,855	2,623
12	3,272	1,480	2,093	2,960	4,187
15	5,543	2,508	3,546	5,016	7,093

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m.~~

Add new text as follows:

1106.2.2 Sizing. Storm drain pipe sizing shall be sized in accordance with one of the following:

1. Pipe sizing tables or equations in accordance with Section 1106.2.3 and 1106.2.4
2. The sizing tables included in a listed piping system's manufacturer's installation instructions
3. Engineering methods.

1106.2.3 Sizing tables and equations. This section applies to horizontal drainage systems using building gravity. Where the drainage system material is known, Tables 1106.2.3(1), 1106.2.3(2) and 1106.2.3(3) shall be used to size drainage piping.
Where Equation 11-1 is used to determine the expected flow rate seen at a roof drain, or building drain.

Where Equations 11-2, 11-3 and 11-4 are used to size drainage piping based on the drainage pipe material used.

1. The rainfall rate falling on a roof surface shall be converted to a gallon per minute (L/m) flow rate in accordance with Equation 11-1, The Rational Method. $Q = C \times R \times A \times 0.0104$ (Equation 11-1)
   Where: C = Discharge Coefficient, *the roughness of the roof's surface.* Use 1.0 unless permitted by the local authority to factor in roof roughness for primary storm drainage. Secondary drainage shall use 1.0 in all cases.
   Q = Flow rate in gallons per minute (L/m)
   R= Rainfall intensity in inches (mm) per hour.
   A = Projected roof area in square feet (m^2)
2. The flow rates for horizontal sloped drains shall be calculated by use of the Flow Rate Equation and the Manning Equation based on full flow for pipe diameters of a given material, or coefficient of roughness.

   The Flow Rate Equation, Equation 11-2
   $Q = A \times V$ (Equation 11-2)

   Where: Q = Flow rate in gallons per minute (L/m)
   A = Cross-sectional area of the full flow
   V = Velocity of flow, feet per second (L/s)

   The Manning Equation, Equation 11-3
   $V = (k/n) \times R^{2/3} \times S^{1/2}$ (Equation 11-3)
   Where: V = Velocity of flow, feet per second (m/s)
   k = unit conversion factor, 1.486 in English units
   n = roughness (Manning) coefficient
   R = hydraulic radius of pipe, ft (m); for full flow pipe, use radius of the pipe
   S = slope of pressure gradient

   The modified Flow Rate Equation, Equation 11-4
   $Q = A \times (k/n) \times R^{2/3} \times S^{1/2}$ (Equation 11-4)

TABLE 1106.2.3 ROUGHNESS COEFFICIENT, n, FOR USE IN EQUATION 11-4

Surface Material	**Manning's Roughness Coefficient, n**
Cast iron, new	0.012
Cast iron, aged	0.0151
Concrete pipe	0.013
Copper	0.011
PVC	0.010
Vitrified Clay	0.014

TABLE 1106.2.3(1) PVC PIPE

PIPE SIZE (inches)	CAPACITY (gpm)			
	SLOPE OF HORIZONTAL DRAIN			
	1/16 inch per ft	1/8 inch per ft	1/4 inch per ft	1/2 inch per ft
2	12	17	25	35
3	37	50	74	105
4	80	110	160	225
5	145	205	290	410
6	235	330	470	665
8	505	715	1,015	1,435
10	920	1,300	1,845	2,605
12	1,500	2,120	3,000	4,240
15	2,720	3,845	5,440	7,690

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m

TABLE 1106.2.3(2) CAST IRON PIPE, AGED

PIPE SIZE (inches)	CAPACITY (gpm)			
	SLOPE OF HORIZONTAL DRAIN			
	1/16 inch per ft	1/8 inch per ft	1/4 inch per ft	1/2 inch per ft
2	8	11	15	23
3	24	35	49	69
4	53	75	105	150
5	95	135	190	270
6	155	220	310	440
8	335	475	670	950
10	610	860	1,220	1,725
12	990	1,405	1,985	2,810
15	1,800	2,545	3,600	5,095

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m

TABLE 1106.2.3(3) CAST IRON PIPE, NEW

PIPE SIZE (inches)	CAPACITY (gpm)			
	SLOPE OF HORIZONTAL DRAIN			
	1/16 inch per ft	1/8 inch per ft	1/4 inch per ft	1/2 inch per ft
2	10	14	21	29
3	30	40	60	85
4	65	90	130	185
5	120	170	240	340
6	195	275	390	555
8	420	600	845	1,200
10	765	1,085	1,535	2,170
12	1,250	1,765	2,500	3,535

15	2,265	3,205	4,530	6,410

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m

1106.2.4 Vertical sizing table. Vertical storm drain piping shall be sized for the expected flow rate through the roof drain(s). The flow rate, as calculated in accordance with Section 1106.2.2, shall be checked against the roof drain manufacturer's published flow rate for the specific roof drain model and size to verify that the selected roof drain will handle the anticipated flow. The storm drain piping shall not exceed that specified in Table 1106.2.4.

TABLE 1106.2.4 Vertical sizing table

PIPE SIZE (inches)	CAPACITY (gpm)
2	34
3	87
4	180
5	310
6	535
8	1,115
10	2,050
12	3,270
15	5,540

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 gallon per minute = 3.785 L/m

Attached Files

- **Storm Rationale Method_04-Storm Drainage Calc.xls**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4371/
- **Storm Rationale Method_04-Storm Drainage Calc.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4370/
- **Manning's Roughness Coefficients.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4369/
- **Manning Formula_proving code is based on Manning.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4368/
- **Manning Formula_pipe flow_PVC.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4366/
- **Manning Formula_pipe flow_new cast iron.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4365/
- **Manning Formula_pipe flow_aged cast iron.pdf**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4364/
- **Manning Formula_pipe flow and velocities.xlsx**
  https://www.cdpaccess.com/proposal/10328/30804/files/download/4363/
- **Manning Formula_pipe flow_coversheet.pdf**

https://www.cdpaccess.com/proposal/10328/30804/files/download/4362/

Reason: If a building using cast iron storm drain pipe built from the model 2015, 2018, 2021 or 2024 codes were to have roof issues in the future; there is risk to the ICC because of faulty information in sizing storm drains. This proposal aims to fix that so engineers can follow a more complete model code.

As engineers, we have an ethical contract to not impose a hazard onto the occupants of the buildings we design. In its current form, the storm piping code imposes a hazard onto the occupants of the buildings we design. If we follow the current storm drain sizing criteria in 1106 and cast iron pipe is used, then the pipes would undersized between 20-50%, pending the size and slope of the installed pipe. Undersizing roof drain pipes increasing the possibility of the primary drains being overloaded and water ponding on the roof greater than the assumptions made by the structural engineer. The printed Tables in the 2015, 2018, 2021 and 2024 codes are assuming PVC pipe. The printed Tables in the IPC 2012 and earlier editions assumed aged cast iron. We must change this code immediately for the safety of the public and for the engineer's awareness in sizing pipes for a proper working system. This proposed change is a large overhaul from prior storm drainage sections, a code and commentary could be provided, but I didn't submit the context for that here. The layout and wording used was mimicked from the International Fuel Gas Code for gas pipe sizing (section 402), with obvious differences, so that the ICC reads similarly.

Use of roughness coefficients for tall/thick green roofs is viable, which is why mention of the complete Rational Method is shared. It would be fantastic if plumbing engineers use the same formulas as our Civil friends. It is true, storm piping within a building would have gravitational influence to drain faster if there is ponding at the roof drain, but this level of complexity does not appear warranted.

The manipulation of units can be seen/tested in the excels attached. PDFs are also included. I trusted the Manning's Roughness Coefficients from engineering toolbox, and have included them as a reference. The aged cast iron value for "n" was reverse engineered from the legacy storm tables. See documents "Manning Formula_proving code is based on Manning.pdf" and "Storm Rationale Method_04-Storm Drainage Calc.pdf" to see how accurate use of Manning Equation is to the legacy storm tables, so 0.0152 was proposed for the 2027 code to give homage to all storm tables of the last 20 years. PDFs and excel justifying the proposed tables are attached to answer questions about how the numbers were generated, and the excel can be used to see how the proposed Equations can be used should a less common pipe material be used.

Bibliography: For pipe roughness coefficients:

https://www.engineeringtoolbox.com/mannings-roughness-d_799.html

The layout and wording used was mimicked from the International Fuel Gas Code for gas pipe sizing (section 402), with obvious differences

The Rational Method and Manning Equation were sourced from my college fluid dynamics book. But they are readily available formulae that need not be sourced, right? I can provide more information as needed.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$20 / foot of storm pipe.

Estimated Immediate Cost Impact Justification (methodology and variables):

The potential cost increase would only be for cast iron (metal) pipe. The current code edition reflects pipe sizes for PVC/plastic pipe, and those values in the charts remain the same.

The cost was calculated on a cost per linear foot of pipe basis.

I found list prices from a leading cast iron foundry showing costs for 10-foot sections of no hub cast iron pipes. Note that from the reasoning section, PVC pipes can carry ~20% more water when compared to the same size cast iron pipes because of a smoother interior. Here are the costs for convenience on how the number above was guesstimated:

- 2" x 10' pipe --> $174

- 3" x 10' --> $240

- 4" x 10' --> $312
- 5" x 10' --> $449
- 6" x 10' --> $536
- 8" x 10' --> $834
- 10" x 10' --> $1,417
- 12" x 10' --> $2,059
- 15" x 10' --> $3,010

Note that the proposed code change will not require a certain material to be used, but with the differentiation of sizes between PVC and cast iron, more engineers may opt to use PVC pipe as a cost savings measure. To which, this cost impact analysis would be useless as pipe material change adds a certain degree of complexity. If the engineer uses PVC in all storm drain systems, then there would not be a cost impact.

Estimated Life Cycle Cost Impact:

no change

P152-24

P153-24

IPC: 1107.1, ASME Chapter 15, ASME Chapter 15 (New)

Proponents: Justin Cassamassino, ASME, A112 Main Committee (cassamassinoj@asme.org)

2024 International Plumbing Code

Revise as follows:

1107.1 General.
Siphonic roof drains and drainage systems shall be designed in accordance with ASME A112.6.9/CSA B79.9 and ASPE 45.

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

~~A112.6.9 - 2005 (R2024)~~ ~~Siphonic Roof Drains~~

Add new standard(s) as follows:

ASME

American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

A112.6.9/CSA B79.9-2022 Siphonic Roof Drains

Staff Analysis: A review of the standard proposed for inclusion in the code, ASME A112.6.9/CSA B79.9 *Siphonic Roof Drains*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: The ASME A112.6.9 standard was harmonized with B79 standard. The intent of this proposal is to replace the current standard with the new standard.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Clarification to call out the new harmonized standard, no additional requirements

P153-24

P154-24

IPC: 1302.2.1

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

Revise as follows:

1302.2.1 Prohibited sources.
Wastewater containing urine or fecal matter shall not be diverted to on-site nonpotable water reuse systems and shall discharge to the sanitary drainage system of the building or premises in accordance with Chapter 7. ~~Reverse osmosis system reject water,~~ Water ~~water~~ softener discharge water, kitchen sink wastewater, dishwasher wastewater and wastewater discharged from wet-hood scrubbers shall not be collected for reuse in an on-site nonpotable water reuse system.

Reason: Reverse osmosis reject water is a wastewater that has high total dissolved solids (TDS) and other contaminates that were already in the source water. This water can be safely used in graywater systems as such systems will have treatment protocols applied before being used for another purpose. There is no need to eliminate this water from use onsite nonpotable water systems.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The choice to use reverse osmosis reject water is the responsibility of the designer. The code does not mandate the use of reverse osmosis reject water

P154-24

P155-24

IPC: 1302.6.1

Proponents: Kyle Thompson, Technical Director, Plumbing Manufacturers International (kthompson@safeplumbing.org)

2024 International Plumbing Code

Revise as follows:

1302.6.1 Graywater used for fixture flushing.
Graywater used for flushing water closets and urinals shall be disinfected and treated by an on-site water reuse treatment system complying with NSF 350. <u>Water closets supplied by an on-site water reuse treatment system for use in flushing shall also be supplied with an equal-sized potable water line that is dry until in use.</u>

Reason: The objective of this proposal is to safeguard an individual's freedom to choose between a conventional flush toilet and a smart toilet or personal hygiene device (bidet seat) for their home, ensuring that the code upholds this right.

The current code incorporates provisions for providing non-potable water indoors specifically for toilet flushing and other applications. In instances where a building is plumbed with a non-potable water supply line to the toilet, residents opting for a smart toilet or personal hygiene device, whether out of necessity or choice, must connect to the available non-potable water supply or re-pipe with a potable water supply line for proper installation of the smart toilet – often incurring prohibitive expenses. The code restricts the use of non-potable water for activities like bathing, washing with faucets, showerheads, tub spouts, etc. This same consideration should be extended to personal hygiene devices and smart toilets, crucial for many Americans due to medical conditions, or preferred for reasons of cleanliness, health, and environmental awareness.

Making an allowance in the existing code for the inclusion of these products, which adhere to all major plumbing codes and boast a longstanding presence in the market, is important for ensuring public health and safety. The U.S. smart toilet market, valued at $1.8 billion, is anticipated to surpass $3 billion within the next five years. Individuals across the United States incorporate these products into their bathrooms, with some relying on them for maintaining dignity, privacy, and self-reliance, especially those with special needs or limited mobility.

Ensuring ease of cleaning is immediately beneficial and crucial for seniors, significantly impacting their hygiene. Moreover, individuals facing colorectal issues like hemorrhoids, irritable bowel syndrome (IBS), and inflammatory bowel disease (IBD),[1.] along with pregnant women experiencing severe constipation or postpartum recovery,[2.] derive additional hygiene-related advantages from these products. They also contribute to maintaining hand hygiene, a critical factor in preventing the spread of diseases.[3.]

Beyond hygiene, many smart toilets feature health monitoring capabilities that analyze stool or urine to detect health issues such as sugar levels in diabetics. These innovations have proven especially beneficial for stroke rehabilitation[4.]. For certain individuals who cannot use toilet paper due to medical reasons, personal hygiene devices are indispensable. Additionally, these devices have demonstrated a reduction in instances of rashes, hemorrhoids, and urinary tract infections.

In essence, these products are vital for numerous individuals across the United States in preserving their health. However, the existing code could impede the installation of such products in residential bathrooms where the building is plumbed with a non-potable water supply line to the toilet.

This proposal aims to guarantee residents the freedom to choose personal hygiene devices or smart toilets for their homes. It specifies the availability of a potable water supply if builders opt to install non-potable water lines for toilet flushing. To prevent stagnant water conditions, the proposal necessitates keeping the potable water line dry until it is in use. Achieving this could involve installing a water line from the lavatory and incorporating a labeled shutoff valve at the lavatory.

Furthermore, the code already approves using personal hygiene devices that conform to ASME A112.4.2/CSA B45.16. This industry standard requires that a personal hygiene device includes backflow protection through an atmospheric vacuum breaker, air space type vacuum breaker, or air gap fitting.

Non-potable water treated to the level for use in toilet flushing that is compliant with the code, applicable laws, rules, ordinances, and NSF/ANSI 350 or IGC 324 is not equivalent to the level of safety that is dictated by federal law for potable water. Many individuals that use smart toilets and personal hygiene devices do so out of necessity due to disabilities and/or underlying health issues (e.g., arthritis, urinary tract infections, hemorrhoids, anal fissures). The quality level of water that is used with smart toilets and personal hygiene devices must be free of any pathogens, etc., that could cause infection or disease, and therefore, must be treated at a minimum in accordance with regulations for potable water.

Though it is always wise to consult a building official before tackling a new project, the codes do not require a permit to be pulled for every installation in a residential occupancy. For example, the IRC allows for the removal and reinstallation of a toilet without a permit if the installation does not involve or require the replacement or rearrangement of valves, pipes, or fixtures (Section R105.2). A personal hygiene device or smart toilet would meet this exemption as they are installed using the existing plumbing components and piping configuration.

Bibliography: 1. "How to Decide If You Need a Bidet," by Amber J. Tresca, 2019, Verywell Health, https://www.verywellhealth.com/do-i-need-a-bidet-1942839

2. "The Effect of Bidet Use on Severity of Constipation and Quality of Life Among Pregnant Women," by Sultan Alan, Ebru Gozuyesil and Sule Gokyildiz Surucu, August 2020, Yonago Acta Medica (YAM), Journal of Medical Sciences, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7435113/

3. "The Use of Electric Toilet Seats with Water Supply Is Efficacious in Maintaining Hand Hygiene in Experimental Model," by Shigeharu Oie, Hiromi Aoshika, Emiko Arita and Akira Kamiya, 2018, Japanese Journal of Infectious Diseases, https://www.jstage.jst.go.jp/article/yoken/71/4/71_JJID.2017.515/_article/-char/en

4. "Technology-assisted toilets: Improving independence and hygiene in stroke rehabilitation," by David Yachnin, Georges Gharib, Jeffrey Jutai and Hillel Finestone, August 2017, Journal of Rehabilitation and Assistive Technologies Engineering, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6453101/

Cost Impact: Increase

Estimated Immediate Cost Impact:

Increase cost of $175 for rough in of potable water supply line that is dry until in use.

Estimated Immediate Cost Impact Justification (methodology and variables):

a. Rough-in of potable water line that is dry until in use:
i. Parts: shutoff valve ($40), 20 ft copper pipe ($60).
ii. Plumbing Labor: 0.5-hour labor @$150/hr ($75).
iii. Total $175

Estimated Life Cycle Cost Impact:

Savings of $775 for re piping when compared with the cost of rough in of potable supply pipe.

Estimated Life Cycle Cost Impact Justification (methodology and variables):

a. Re-pipe for potable water supply line after construction:
i. Construction
1. Parts: Estimate Drywall $2.50/sq ft., Tile $10/sq ft.
2. Construction Labor: $100/hr.
3. Construction Subtotal: Remove and restore 20sq ft of drywall and tile. 2 hr labor plus parts (Sub Total $450).
ii. Plumbing
1. Parts: Shutoff valve ($40), 20 ft copper pipe ($60).
2. Plumbing Labor: $150/hr.
3. Plumbing Subtotal: Reframe for new plumbing, pipe and fitting installation. 2 hr labor plus parts (Sub Total: $400).
iii. Permit: $100.

iv. Total $950 for re-pipe after construction.

P155-24

P156-24

IPC: 1303.10, IAPMO Chapter 15 (New)

Proponents: Terry Burger, IAPMO Group, IAPMO Group (terry.burger@asse-plumbing.org)

2024 International Plumbing Code

Revise as follows:

1303.10 Storage tanks.
Storage tanks utilized in nonpotable rainwater collection and conveyance systems shall comply with Sections 1301.9 and 1303.10.1 through 1303.10.3~~.~~, or comply with IAPMO Z1002

Add new standard(s) as follows:

IAPMO

IAPMO Group
4755 E. Philadelphia Street
Ontario, CA 91761 USA

Z1002 -2020 Rainwater Harvesting Tanks

Staff Analysis: A review of the standard proposed for inclusion in the code, IAPMO Z1002-2020 Sta*ndard for Rainwater Harvesting Tanks,* with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: There is a standard which cover these products. This change provides reference to an equivalent standard.

Bibliography: IAPMO Z1002 -2020 Rainwater Harvesting Tanks

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

Products already exist in the market which are compliant to the referenced standard.

P156-24

P157-24 Part I

IPC: SECTION 202, SECTION 202 (New), CHAPTER 13, 1301.1, 1301.2, TABLE 1301.2(1) (New), TABLE 1301.2(2) (New), TABLE 1301.2(3) (New), 1301.2.1, 1301.2.2, 1301.3, 1301.4, 1301.5, 1301.6, 1301.7, 1301.8, 1301.9, 1301.9.1, 1301.9.2, 1301.9.3, 1301.9.3.1, 1301.9.3.2, 1301.9.4, 1301.9.5, 1301.9.6, 1301.9.7, 1301.9.8, 1301.9.9, 1301.9.10, 1301.10, 1301.10.1 (New), 1301.10.2 (New), 1301.10.3 (New), 1301.11, 1301.12, 1301.13 (New), SECTION 1302, 1302.1, 1302.2, 1302.2.1, 1302.4 (New), 1302.3, 1302.4, 1302.4.1, 1302.4.2, 1302.4.3, 1302.4.4, 1302.5, 1302.8 (New), 1302.6, 1302.6.1, 1302.7, 1302.7.1, 1302.7.2, 1302.8, 1302.8.1, 1302.8.2, 1302.9, 1302.10, 1302.11, 1302.11.1, 1302.11.2, 1302.11.3, 1302.12, 1302.12.1, 1302.12.2, 1302.12.3, 1302.12.4, 1302.12.5, 1302.12.6, 1302.14.7 (New), 1302.13, 1302.13.1, 1302.13.2, 1302.13.3, 1302.13.4, DOE (New), (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

SECTION 202
GENERAL DEFINITIONS

Add new definition as follows:

BLACKWATER. Wastewater that contains urine or fecal matter.

BLACKWATER CONTRIBUTION (BWC). The fraction equal to the quantity of blackwater divided by the sum of the quantities of raw and treated blackwater plus surface water, groundwater, and water from approved potable water systems.

LOG REDUCTION VALUE (LRV). The measure of the ability of a treatment process to remove or inactivate microorganisms such as bacteria, protozoa and viruses. LRV is the logarithm base 10 of the ratio of the levels of a pathogenic organism or other contaminant before and after treatment.

POTABLE REUSE. The practice of treating wastewater and utilizing it for potable applications.

REUSE WATER. Wastewater or rainwater treated to a level of quality suitable for reuse.

WASTEWATER. The water generated after use of freshwater, raw water, drinking water, or saline water in a deliberate application or process.

WATER REUSE SYSTEM. A system for the treatment, storage, distribution, and reuse of water including, but not limited to, wastewater and captured rainwater.

Revise as follows:

CHAPTER 13 ~~NONPOTABLE~~ WATER REUSE SYSTEMS

1301.1 General.
The provisions of Chapter 13 shall govern the materials, design, construction and installation of systems for the ~~collection~~ treatment, storage, ~~treatment~~ and distribution of ~~nonpotable~~ reuse water. ~~For nonpotable rainwater systems, the~~ The provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution ~~of nonpotable water~~. The application of water reuse systems shall comply with all applicable laws, rules, and ordinances of the jurisdiction. ~~The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction~~.

1301.2 ~~Water~~ Reuse water quality.
~~Nonpotable~~ Reuse water ~~for each end use application~~ quality shall meet the minimum ~~water quality~~ requirements as specified in Tables

1301.2(1), 1301.2(2), 1301.2(3), and as established for the intended application by ~~the~~ all applicable laws, rules and ordinances ~~applicable in~~of the jurisdiction. Where ~~nonpotable~~ water from ~~different~~multiple sources is combined ~~in a system~~, the system shall comply with the most stringent of the requirements of this code that are applicable to such sources.

Add new text as follows:

TABLE 1301.2(1) REQUIRED WATER QUALITY FOR REUSE APPLICATIONS

Use Category	Application	Exposure[a]
Direct Potable Reuse	Direct Potable Reuse	DC
Indirect Potable Reuse (Treatment Follows Reuse Application)	Aquifer Recharge - Direct Injection	IC
	Aquifer Recharge - Surface Application	IC
	Aquifer Storage and Recovery	IC
	Rapid Infiltration Basins	IC
	Infiltration/Percolation Lagoons	IC
	Raw Water Augmentation	IC
	Saltwater Intrusion Barrier	IC
	Surface Water Augmentation to a Supply Source	IC
Irrigation of Food Crops for Human Consumption (Spray/Drip)	Food crop with processing that destroys pathogens (Restricted Access)	LC
	Orchards and Vineyards	AC/LC
	Water contacts edible portion of food crop (Includes Root Crops)	AC
	Water doesn't contact edible portion of food crop (Restricted Access)	IC
Irrigation of Crops Not for Human Consumption (Spray/Drip)	Christmas Tree Farms	AC/LC
	Hemp Crops	AC/LC
	Fiber crops	AC/LC
	Fodder /Feed Crop/ Forage Crops	AC/LC
	Ornamental nursery stock	AC/LC
	Seed Crops	AC/LC
	Silviculture / Tree Farms	AC/LC
	Sod/Turf Crops	AC/LC
	Tobacco	AC/LC
Landscape Irrigation (Spray/Drip)	Athletic Fields	AC/LC
	Cemeteries	AC/LC
	College and University Campuses	AC/LC
	Commercial Campuses	AC/LC
	Golf Courses (Restricted Access)	LC
	Golf Courses (Unrestricted Access)	AC/LC
	Highway/Freeway Medians/ Roadside Vegetation	AC/LC
	Open Access Land Irrigation	AC/LC
	Pasture for Milk Producing Animals (Restricted Access)	LC
	Pasture for Non-Milk Producing Animals (Restricted Access)	LC
	Parks	AC/LC
	Playgrounds	AC/LC
	Residential Irrigation	AC/LC
	Landscape Irrigation (Restricted Access)	LC
	Urban Landscaping	AC/LC
	Schoolyards	AC/LC
Water Features	Decorative Fountains	AC
	Landscape Impoundments (With Fountain(s))	AC
	Landscape Impoundments (Without Fountain(s))	LC
	Ponds and Lagoons	LC
	Recreational Impoundments (Restricted Access)	LC
	Recreational Impoundments (Unrestricted Access)	AC
	Reservoir Augmentation (Recreational)	AC
	Wetland Creation	LC
	Wetland Discharge / Application	LC
Life Safety	Fire Fighting Via Plane	AC
	Fire Hydrant Water Supply	AC
	Fire Protection systems	AC
	Non Structural Fire Fighting	AC
	Structural Fire Fighting	AC
Construction	Concrete and Cement mixing	LC
	Dust Control	LC
	Equipment Operation (Ex. Cooling Power Equipment)	LC
	Material Washing and Sieving	LC

	Soil Compaction and Consolidation	LC
Process Water	Agricultural Cleaning (Animal Washing & Animal Pens)	AC
	Aquaculture	LC
	Boiler Feed	LC
	Building Washing	AC
	Chemical Mixing (Herbicides, Pesticides, Fertilizers)	LC
	Commercial Car Washes	AC
	Commercial Laundries	AC
	Cooling Power Equipment	LC
	Cooling systems with aerosolization	AC
	Cooling systems with no aerosolization	LC
	Dust Control (Roads and Streets)	LC
	Flushing Sanitary Sewers	LC
	Flushing Toilets and Urinals	AC
	Bidets and personal hygiene devices	DC
	Frost Protection	LC
	Gas Pipeline Testing	LC
	Hydro Seeding	AC
	Impoundments at Fish Hatcheries	LC
	Industrial Oil and Gas Operations	LC
Process Water	Industrial Process Water (Possibility of Human Contact or Evaporative)	AC
	Industrial Washwater applications	AC
	Livestock Drinking Water (Milk Producing)	AC
	Livestock Drinking Water (Non-Milk Producing)	AC
	Parts Cleaning	LC
	Pool Water Makeup	AC
	Pressure Washing	AC
	Priming Drainage Traps	LC
	Road Milling	LC
	Ship Ballasting	LC
	Snow Making (Commercial / Recreational Use)	AC
	Snow Making (Storage)	AC
	Stack Scrubbing	LC
	Stream Flow Augmentation	LC
	Street, Sidewalk, Parking Lot Cleaning (Restricted Access)	LC
	Street, Sidewalk, Parking Lot Cleaning (Unrestricted Access)	AC
	Vehicle and equipment Washing	AC
	Wastewater Treatment (Process Uses)	LC
	Window Washing	AC

a. Where two Exposures and two Tiers are cited, the first refers to spray irrigation and the second refers to drip irrigation (or other subsurface irrigation).

b. Where the equipment manufacturer or the jurisdiction requires a level of free residual disinfectant that exceeds the requirement of the quality Tier indicated, such excess shall be provided.

DC (Quality Tier 4) = Direct Public Contact/Consumption Intended

AC (Quality Tier 3) = Aerosolization, or Accidental/Limited

Consumption Possible

IC (Quality Tier 2) = Indirect Public Consumption Intended or Possible

LC (Quality Tier 1) = Limited Contact / No Consumption Intended

TABLE 1301.2(2) WATER QUALITY FOR TIERS OF REUSE

Quality Tier	Minimun Design Water Quality
4	United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards (40 CFR 141), plus 18/15/15 Log Removal of Enteric Viruses, Giardia, and Cryptosporidium
3	Compliant with all applicable laws, rules, ordinances and NSF 350
2	Compliant with all applicable laws, rules, ordinances, and end use fixture / equipment manufacturer requirements

1	Compliant with all applicable laws, rules, ordinances, and end use fixture / equipment manufacturer requirements

TABLE 1301.2(3) LOG REDUCTION (LRV) CREDITS APPLICALBLE TO DPR BASED ON SOURCE WATER

Source Water	Maximum LRV Credits for DPR
Blackwater	0/0/0
Blackwater blended with groundwater [a]	LRV credit [b] = negative log of BWC
Blackwater blended with surface water [a]	LRV credit [b] = negative log of BWC
Blackwater blended with groundwater and surface water [a]	LRV credit [b] = negative log of BWC
Graywater	Case by case basis
Stormwater	Case by case basis
Rainwater	Case by case basis
Industrial Water	Case by case basis
Process Water	Case by case basis

a. Groundwater and surface waters must be either an untreated source of drinking water approved by the jurisdiction or a treated drinking water approved by the jurisdiction.

b. LRV credit for all source waters containing blackwater shall not exceed 2.0.

Delete without substitution:

~~1301.2.1 Residual disinfectants~~.

~~Where chlorine is used for disinfection, the nonpotable water shall contain not more than 4 ppm (4 mg/L) of chloramines or free chlorine when tested in accordance with ASTM D1253. Where ozone is used for disinfection, the nonpotable water shall not contain gas bubbles having elevated levels of ozone at the point of use.~~

> **~~Exception:~~** ~~Reclaimed water sources shall not be required to comply with these requirements.~~

~~1301.2.2 Filtration required~~.

~~Nonpotable water utilized for water closet and urinal flushing applications shall be filtered by a 100-micron (0.1 mm) or finer filter.~~

> **~~Exception:~~** ~~Reclaimed water sources shall not be required to comply with these requirements.~~

Revise as follows:

1301.3 Signage required.

~~Nonpotable~~ Where nonpotable water is supplied to outlets such as hose connections, hydrants, open-ended pipes and faucets, each outlet shall be identified at the point of use ~~for each outlet~~ with signage that reads as follows: "~~Nonpotable water is utilized for [application name].~~ CAUTION: NONPOTABLE WATER – DO NOT DRINK." The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and in colors in contrast to the background on which they are applied. In addition to the required ~~wordage~~ text, the pictograph shown in Figure 1301.3 shall appear on the signage required by this section.

1301.4 Permits.

Permits shall be required for the construction, installation, operation, alteration and repair of ~~nonpotable~~ water reuse systems. Construction documents, engineering calculations, diagrams, operations and maintenence manuals,and other such data pertaining to the ~~nonpotable~~ water reuse systems shall be submitted with each permit application.

1301.5 Potable water connections.

Where a potable system is connected to a nonpotable water system, the potable water supply shall be protected against backflow in accordance with Section 608.

Revise as follows:

1301.6 Components and materials.
Piping, plumbing components and materials used in ~~collection and~~ conveyance and distibution systems shall be of material approved ~~by the manufacturer~~ for the intended application.

1301.7 Insect and vermin control.
The system shall be protected to prevent the entrance of insects and vermin into process tanks and equipment, storage tanks and piping systems. Screen materials shall be compatible with contacting system components and shall not accelerate the corrosion of system components.

1301.8 Freeze protection.
Where ~~sustained~~ freezing temperatures occur, provisions shall be made to keep storage tanks, process tanks and equipment and the related piping from freezing.

1301.9 ~~Nonpotable water storage~~ Water tanks.
~~Nonpotable w~~Water storage and process tanks shall comply with Sections 1301.9.1 through 1301.9.10.

1301.9.1 Location. Any storage tank, process tank and equipment
or portion thereof that is above grade shall be protected from direct exposure to sunlight by one of the following methods:

1. Tank construction using opaque, UV-resistant materials such as heavily tinted plastic, fiberglass, lined metal, concrete, ~~wood,~~ or painted to prevent algae growth.
2. Specially constructed sun barriers.
3. Installation in garages, crawl spaces or sheds.

1301.9.2 Materials.
~~Where collected on-site,~~ Prior to treatment for reuse, water shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion-resistant materials. The ~~storage~~ tank shall be constructed of materials compatible with ~~any~~ all disinfection systems used to treat water upstream of the tank and with ~~any~~all systems used to maintain water quality in the tank. ~~Wooden storage tanks that are not equipped with a makeup water source shall be provided with a flexible liner.~~

1301.9.3 Foundation and supports.
~~Storage~~ All tanks shall be supported on a firm base capable of withstanding the weight of the ~~storage~~ tank when filled to capacity. ~~Storage t~~Tanks shall be supported in accordance with the *International Building Code*.

1301.9.3.1 Ballast.
Where the soil can become saturated, an underground ~~storage~~ tank shall be ballasted, or otherwise secured, to ~~prevent the tank from floating out of the ground~~ resist buoyant forces when empty. The combined weight of the empty tank and hold-down ballast shall ~~meet or~~ exceed the buoyancy force ~~of~~ applied to the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to resist the maximum buoyant forces when the tank is empty, and to support the weight of the ~~storage~~ tank when full, consistent with the bearing capability of adjacent soil.

1301.9.3.2 Structural support.
Where installed below grade, ~~storage~~ tank installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when empty or filled with water.

1301.9.4 Makeup water.

Where an uninterrupted supply is required for the intended application, ~~potable or reclaimed water shall be provided as a~~an additional source of makeup water shall be provided for the storage tank. ~~The~~ All makeup water suppl~~y~~ies shall be protected against backflow in accordance with Section 608. A *full-open valve* located on the makeup water supply lines to the storage tank ~~shall be provided~~. ~~Inlets to~~ Flow into the storage tank shall be controlled by fill valves or other automatic supply valves installed to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. ~~Where makeup water is provided,~~ ~~t~~The water level shall not be permitted to drop below the ~~source water inlet or the~~ intake of any ~~attached~~ pump supplying makeup water.

1301.9.5 Overflow.

~~The storage~~ ~~t~~Tanks shall be equipped with an overflow pipe having a diameter not less than that shown in Table ~~606.5.4~~ 606.5(4). The overflow pipe shall be protected from insects ~~or~~ and vermin and shall discharge in a manner consistent with all applicable laws, rules, and ordinances of the jurisdiction for storm water runoff requirements of the jurisdiction. The overflow pipe shall discharge at a sufficient distance from the tank to avoid damaging the tank foundation or the adjacent property. Drainage from overflow pipes shall be directed to prevent freezing on roof walkways, and on sidewalks, pavement, and other accessways subject to vehicular or pedestrian traffic. The overflow drain shall not be equipped with a shutoff valve. A cleanout shall be provided on each overflow pipe in accordance with Section 708.

1301.9.6 Access. Not less than one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below-grade ~~storage~~ tanks, located outside of the building, shall be provided with ~~a manhole~~ an access opening either not less than 24 inches (610 mm) square or with an inside diameter not less than 24 inches (610 mm). ~~Manholes~~ Access opening shall extend not less than 4 inches (102 mm) above ground ~~or~~ and shall be designed to prevent water infiltration. ~~Finished~~ The finished grade shall be sloped away from the ~~manhole~~ maintenance hole to divert surface water. ~~Manhole~~ Access opening covers shall be secured to prevent unauthorized access. Service ports in ~~manhole~~ access opening covers shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm) above the finished grade level. The service port shall be secured to prevent unauthorized access. Access locations to confined spaces shall be labeled "CONFINED SPACE."

> **Exception:** ~~Treated-water storage~~ ~~t~~Tanks that are less than 800 gallons (3028 L) in volume and installed below grade shall not be required to be equipped with a manhole an access opening provided that the tank has a service port of not less than 8 inches (203 mm) in diameter.

1301.9.7 Venting.

~~Storage t~~Tanks that receive flow by gravity shall be provided with a vent sized in accordance with Chapter 9 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of an *approved* cap or U-bend installed with the opening directed downward. Vent outlets shall extend not less than 4 inches (102 mm) above grade or as necessary to prevent surface water from entering the ~~storage~~ tank. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section 1301.7.

1301.9.8 Draining of tanks.

Tanks shall be provided with a means of emptying the contents for the purpose of service or cleaning. Tanks shall be drained by using a pump or by a drain located at the lowest point in the tank. The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table ~~606.5.7~~ 606.5(7). Not less than one cleanout shall be provided on each drain pipe in accordance with Section 708.

Revise as follows:

1301.9.9 Marking and signage.

Each nonpotable water ~~storage~~ tank shall be labeled with its rated volumetric capacity. The contents of ~~storage~~ tanks shall be identified with the words "CAUTION: NONPOTABLE WATER – DO NOT DRINK." Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, "DANGER – CONFINED SPACE." Markings shall be indelibly printed on the tank or on a tag or sign constructed of corrosion-resistant waterproof material that is mounted on the tank. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied.

1301.9.10 ~~Storage~~ ~~t~~Tank tests.

~~Storage~~ Pressurized tanks shall be be certified in accordance with Section 303.4. Tanks that receive flow by gravity shall tested in accordance with the following:~~Storage t~~Tanks shall be filled with water to the overflow line prior to and during inspection. Seams and joints shall be left exposed and the tank shall remain watertight without leakage for a period of 24 hours.

1. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and that there are no leaks.
2. The tank drain shall be observed for proper operation.
3. The makeup water system shall be observed for proper operation and successful automatic shutoff of the system at the refill threshold shall be verified.

1301.10 System abandonment.

If the owner of an on-site ~~nonpotable~~ water reuse system or ~~rainwater collection and conveyance system~~ components thereof, elects to cease use of, or fails to properly maintain such system, the system shall be abandoned and shall comply with ~~the following:~~ Sections 1301.10.1 through 1301.10.3.

1. ~~All system piping connecting to a utility-provided water system shall be removed or disabled.~~
2. ~~The distribution piping system shall be replaced with an *approved* potable water supply piping system. Where an existing potable pipe system is already in place, the fixtures shall be connected to the existing system.~~
3. ~~The storage tank shall be secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.~~

Add new text as follows:

1301.10.1 Utility-Connected Piping. All system piping connecting to a utility-provided water system shall be removed or disabled.

1301.10.2 Distribution Piping. The distribution piping system shall be removed or replaced with an approved potable water supply piping system. Where an existing potable pipe system is already in place, the fixtures shall be connected to the existing system.

1301.10.3 Tanks. Tanks shall be removed, or secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.

Revise as follows:

1301.11 Trenching requirements for nonpotable water piping.

Nonpotable water ~~collection and~~ distribution ~~piping and reclaimed water~~ piping shall be separated from the *building sewer* and potable water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. Nonpotable water ~~collection and~~ distribution piping shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried nonpotable water piping shall comply with the requirements of Section 306.

Exceptions:

1. The required separation distance shall not apply where the bottom of the nonpotable water pipe within 5 feet (1524 mm) of the *sewer* is not less than 12 inches (305 mm) above the top of the highest point of the *sewer* and the pipe materials conform to Table 702.3.
2. The required separation distance shall not apply where the bottom of the potable water service pipe within 5 feet (1524 mm) of the nonpotable water pipe is not less than 12 inches (305 mm) above the top of the highest point of the nonpotable water pipe and the pipe materials comply with the requirements of Table 605.4.
3. Nonpotable water pipe is permitted to be located in the same trench with a *building sewer*, provided that such *sewer* is constructed of materials that comply with the requirements of Table 702.2.

4. The required separation distance shall not apply where a nonpotable water pipe crosses a *sewer* pipe, provided that the pipe is sleeved to not less than 5 feet (1524 mm) horizontally from the *sewer* pipe centerline on both sides of such crossing, with pipe materials that comply with Table 702.2.
5. The required separation distance shall not apply where a potable water service pipe crosses a nonpotable water pipe, provided that the potable water service pipe is sleeved for a distance of not less than 5 feet (1524 mm) horizontally from the centerline of the nonpotable pipe on both sides of such crossing, with pipe materials that comply with Table 702.2.
6. Irrigation piping located outside of a building and downstream of the backflow preventer is not required to meet the trenching requirements where nonpotable water is used for outdoor applications.

1301.12 Outdoor outlet access.
Sill cocks, hose bibbs, wall hydrants, yard hydrants and other outdoor outlets supplied by nonpotable water shall be located in a locked vault or shall be operable only by means of a removable key <u>and marked in accordance with Section 1301.3</u>.

Add new text as follows:

<u>**1301.13** **Operations and monitoring.** The design, installation, and continued operation of water reuse systems shall be in accordance with an approved operating and monitoring program. The program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code.*</u>

Revise as follows:

SECTION 1302
~~ON-SITE NONPOTABLE~~ WATER REUSE SYSTEMS

1302.1 General.
The provisions of ASTM E2635 and Section 1302 shall govern the construction, installation, alteration and repair of water reuse systems. ~~on-site nonpotable water reuse systems for the collection, storage, treatment and distribution of on-site sources of nonpotable water as permitted by the jurisdiction water reuse systems.~~.

1302.2 **<u>Graywater</u> ~~S~~<u>s</u>ources.** ~~On-site nonpotable water~~ Graywater reuse systems shall collect waste discharge from only the following sources: bathtubs, showers, lavatories, clothes washers ~~and laundry trays .~~<u>, laundry trays, condensate, and other domestic wastewaters that are not expected to contain urine, fecal matter, grease, or food wastes.</u> ~~Where *approved* and as appropriate for the intended application, water from other nonpotable sources shall be collected for reuse by on-site nonpotable water reuse systems.~~.

<u>1302.3</u> ~~1302.2.1~~ ~~Prohibited~~ <u>Blackwater</u> sources.
~~Wastewater containing urine or fecal matter~~ <u>Blackwater</u> shall ~~not~~ be ~~diverted to on-site nonpotable water reuse systems and shall discharge~~ discharged to the sanitary drainage system ~~of the building or premises~~ in accordance with Chapter 7~~. Reverse osmosis system reject water, water softener discharge water, kitchen sink wastewater, dishwasher wastewater and wastewater discharged from wet-hood scrubbers shall not be collected for reuse in an on-site nonpotable water~~<u>or to an approved on-site blackwater reuse system.</u>

Add new text as follows:

<u>**1302.4** **Other sources.**. Other sources including, but not limited to, condensate, reverse osmosis system reject water, water softener discharge water, and wastewater discharged from wet-hood scrubbers shall also be considered for use in a water reuse system.</u>

Revise as follows:

<u>1302.5</u> ~~1302.3~~ Traps.
Traps serving fixtures and devices discharging ~~wastewater to on-site nonpotable~~ <u>water to</u> water reuse systems shall comply with Section 1002.4.

Delete without substitution:

~~**1302.4 Collection pipe**~~**.**

~~On-site nonpotable water reuse systems shall utilize drainage piping *approved* for use in plumbing drainage systems to collect and convey untreated water for reuse. Vent piping *approved* for use in plumbing venting systems shall be utilized for vents in the graywater system. Collection and vent piping materials shall comply with Section 702.~~

~~**1302.4.1 Installation**~~**.**

~~Collection piping conveying untreated water for reuse shall be installed in accordance with Section 704.~~

~~**1302.4.2 Joints**~~**.**

~~Collection piping conveying untreated water for reuse shall utilize joints *approved* for use with the distribution piping and appropriate for the intended applications as specified in Section 705.~~

~~**1302.4.3 Size**~~**.**

~~Collection piping conveying untreated water for reuse shall be sized in accordance with drainage sizing requirements specified in Section 710.~~

Revise as follows:

1302.6 ~~1302.4.4~~ Pipe marking.

Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste and vent piping by Chapter 7.

1302.7 ~~1302.5 Filtration~~ Treatment.

~~Untreated w~~Water collected for reuse shall be ~~filtered as required for the intended end use. Filters shall be provided with *access* for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.~~ treated to meet the quality standards required in Tables 1301.2(1) and 1301.2(2).

Add new text as follows:

1302.8 Treatment systems.. Treatment systems shall be installed to allow access for inspection and maintenance. All treatment equipment shall utilize pressure gauges, level sensors, intensity meters, or other approved methods to indicate when servicing or replacement is required. All treatment equipment shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.

Revise as follows:

1302.9 ~~1302.6 Disinfection and treatment~~ Tanks. ~~Where the intended application for nonpotable water collected on-site for reuse requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use. Nonpotable water collected on-site containing untreated graywater shall be retained in collection reservoirs for not longer than 24 hours.~~ Nopotable tanks utilized in water reuse systems shall comply with Sections 1301.9, 1302.8.1 and 1302.8.2.

Delete without substitution:

~~**1302.6.1 Graywater used for fixture flushing**~~**.**

~~Graywater used for flushing water closets and urinals shall be disinfected and treated by an on-site water reuse treatment system~~

~~complying with NSF 350.~~

~~1302.7 Storage tanks~~.

~~Storage tanks utilized in on-site nonpotable water reuse systems shall comply with Sections 1301.9, 1302.7.1 and 1302.7.2.~~

Revise as follows:

<u>1302.9.1</u> ~~1302.7.1~~ Location.

~~Storage t~~<u>T</u>anks shall be located with a minimum horizontal distance between various elements as indicated in Table ~~1302.7.1~~ <u>1302.7(1)</u>.

<u>1302.9.2</u> ~~1302.7.2~~ Outlets.

Outlets shall be located not less than 4 inches (102 mm) above the bottom of the ~~storage~~ tank and shall not skim water from the surface.

<u>1302.10</u> ~~1302.8~~ Valves.

Valves shall be ~~supplied~~ <u>installed</u> on ~~on-site nonpotable~~ <u>the collection of the</u> water reuse systems in accordance with Sections 1302.~~8~~ <u>9</u>.1 and 1302.~~8~~ <u>9</u>.2.

<u>1302.10.1</u> ~~1302.8.1~~ Bypass valve.

One three-way diverter valve listed and labeled to NSF 50 or other *approved* device shall be installed on collection piping upstream of each storage tank, ~~or drain field,~~ as applicable, to divert untreated on-site reuse sources to the sanitary *sewer* <u>or approved receiving tank</u> to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections. Bypass valves shall be marked to indicate the direction of flow~~, connection and storage tank or drainfield connection~~. Bypass valves shall be provided with *access* that allows for removal. Two shutoff valves shall not be installed to serve as a bypass valve.

<u>1302.10.2</u> ~~1302.8.2~~ Backwater valve.

One or more backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be <u>installed</u> in accordance with Section 714.

<u>1302.11</u> ~~1302.9~~ Pumping and control system.

Mechanical equipment including pumps, valves and ~~filters~~ <u>treatment units</u> shall have *access* ~~and be removable~~ in order to ~~perform~~ to <u>replace,</u> repair, ~~maintenance~~ <u>maintain</u> and clean~~ing~~. The minimum flow rate and flow pressure delivered by the pumping system shall be appropriate for the application and in accordance with Section 604.

<u>1302.12</u> ~~1302.10~~ Water pressure-reducing valve or regulator.

Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the ~~nonpotable~~ water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section 604.8.

<u>1302.13</u> ~~1302.11~~ Distribution piping.

Distribution piping utilized in ~~on-site nonpotable~~ water reuse systems shall comply with Sections ~~1302.11.1~~ <u>1302.12.1</u> through ~~1302.11.3~~ <u>1302.12.3</u>.

Exception: Irrigation piping located outside of the building and downstream of a backflow preventer.

~~1302.11.1~~ <u>1302.13.1</u> Materials, joints and connections.

Distribution piping shall conform to the standards and requirements specified in Section 605.

~~1302.11.2~~ <u>1302.13.2</u> Design.

~~On-site nonpotable w~~<u>W</u>ater reuse distribution piping systems shall be designed and sized in accordance with Section 604 for the intended application.

~~1302.11.3~~ 1302.13.3 Labeling and marking.
~~On-site n~~Nonpotable water distribution piping labeling and marking shall comply with Section 608.9.

1302.14 ~~1302.12~~ Tests and inspections.
Tests and inspections shall be witnessed by the designer and performed in accordance with Sections 1302.12 14.1 through 1302.12 14 .6.

1302.14.1 ~~1302.12.1~~ Collection pipe and vent test.
Drain, waste and vent piping used for on-site water reuse systems shall be tested in accordance with Section 312.

1302.14.2 ~~1302.12.2~~ ~~Storage t~~Tank tests.
~~Storage t~~Tanks shall be tested in accordance with Section 1301.9.10.

1302.14.3 ~~1302.12.3~~ Water supply system test.
The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section 312.6.

1302.14.4 ~~1302.12.4~~ Inspection and testing of backflow prevention assemblies.
The testing of backflow preventers and backwater valves shall be conducted in accordance with Section 312.11.

1302.14.5 ~~1302.12.5~~ Inspection of vermin and insect protection.
Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the ~~storage~~ tank and piping systems in accordance with Section 1301.7.

1302.14.6 ~~1302.12.6~~ Initial ~~W~~water quality test.
The quality of the water for the intended application shall be verified at the point of use in accordance with ~~the requirements~~ all applicable laws, rules, and ordinances of the jurisdiction.

Add new text as follows:

1302.14.7 Operational water quality testing.. The quality of the water for the intended application(s) shall be verified at the point of use in accordance with all applicable laws, rules, ordinances of the jurisdiction, and in accordance with the operation and maintenance manual, and where required, the operating permit.

Revise as follows:

1302.15 ~~1302.13~~ Operation and maintenance manuals. Operation and maintenance materials shall be supplied with nonpotable on-site water reuse systems in accordance with Sections 1302.13.1 through 1302.13.4~~.~~ and the maintenance program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code.*

1302.15.1 ~~1302.13.1~~ Manual.
A detailed operations and maintenance manual shall be supplied in hardcopy form with all systems.

1302.15.2 ~~1302.13.2~~ Schematics.
The manual shall include a detailed system schematic, and the locations and a list of all system components, including manufacturer and model number.

1302.15.3 ~~1302.13.3~~ Maintenance procedures.
The manual shall provide a schedule and procedures for all system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.

1302.15.4 ~~1302.13.4~~ Operations procedures.
The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the

system.

Add new text as follows:

Add new standard(s) as follows:

. 40 CFR 141 United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards

Staff Analysis: A review of the standard proposed for inclusion in the code, DOE 40 CFR 141 *United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

P157-24 Part I

P157-24 Part II

IRC: SECTION R202, SECTION 202 (New), SECTION P2910, P2910.1, P2910.2, P2910.2.1, P2910.2.2, P2910.3, FIGURE P2910.3, P2910.4, P2910.5, P2910.6, P2910.7, P2910.8, P2910.9, P2910.9.1, P2910.9.2, P2910.9.3, P2910.9.4, P2910.9.4.1, P2910.9.4.2, P2910.9.5, P2910.9.5.1, P2910.9.6, TABLE P2910.9.6, P2910.9.7, P2910.9.8, SECTION P2911, P2910.9.9, P2910.10, P2910.11, P2910.12, P2910.13, P2910.14, P2911.1, P2911.2, P2911.2.1, P2911.3, P2911.4, P2911.4.1, P2911.4.2, P2911.4.3, P2911.4.4, P2911.5, P2911.6, P2911.6.1, P2911.7, P2911.7.1, TABLE P2911.7.1, P2911.7.2, P2911.7.3, P2911.8, P2911.8.1, P2911.8.2, P2911.9, P2911.10, P2911.11, P2911.11.1, P2911.11.2, P2911.11.3, P2911.12, P2911.12.1, P2911.12.2, P2911.12.3, P2911.12.4, P2911.12.5, P2911.12.6, P2911.13, P2911.13.1, P2911.13.2, P2911.13.3, P2911.13.4, SECTION P2912, P2912.1, P2912.2, P2912.3, P2912.4, P2912.5, P2912.5.1, P2912.5.2, P2912.6, P2912.7, P2912.7.4, P2912.7.2, P2912.7.3, P2912.7.1, P2912.8, P2912.9, P2912.10, P2912.10.1, TABLE P2912.10.1, P2912.10.2, P2912.10.3, P2912.11, P2912.11.1, P2912.11.2, P2912.12, P2912.13, P2912.14, P2912.14.1, P2912.14.2, P2912.14.3, P2912.15, P2912.15.1, P2912.15.2, P2912.15.3, P2912.15.4, P2912.15.5, P2912.15.6, P2912.15.7, P2912.15.8, P2912.16, P2912.16.1, P2912.16.2, P2912.16.3, P2912.16.4, SECTION P2913, P2913.1, P2913.2, P2913.3, P2913.3.1, P2913.3.1.1, P2913.3.1.2, P2913.3.1.3, P2913.4, P2913.4.1, P2913.4.2, CHAPTER 34 (New), SECTION 3401 (New), P3401.1 (New), P3401.2 (New), TABLE P3401.2(1) (New), TABLE P3401.2(3) (New), TABLE P3401.2.2(2) (New), P3401.3 (New), FIGURE P3401.3 (New), P3401.4 (New), P3401.5 (New), P3401.6 (New), P3401.7 (New), P3401.8 (New), P3401.9 (New), P3401.9.1 (New), P3401.9.2 (New), P3401.9.3 (New), P3401.9.3.1 (New), P3401.9.3.2 (New), P3401.9.4 (New), P3401.9.5 (New), TABLE P3401.9.5 (New), P3401.9.6 (New), P3401.9.7 (New), P3401.9.8 (New), P3401.9.9 (New), P3401.9.10 (New), P3401.10 (New), P3401.10.1 (New), P3401.10.2 (New), P3401.10.3 (New), P3401.11 (New), P3401.12 (New), P3401.13 (New), SECTION P3402 (New), P3402.1 (New), 3402.2 (New), P3402.3 (New), P3402.4 (New), P3402.5 (New), P3402.6 (New), P3402.7 (New), P3402.8 (New), P3402.9 (New), P3402.9.1 (New), TABLE P3402.9.1 (New), P3402.9.2 (New), P3402.10 (New), P3402.10.1 (New), P3402.10.2 (New), P3402.11 (New), P3402.12 (New), P3402.13 (New), P3402.13.1 (New), P3402.13.2 (New), P3402.13.3 (New), P3402.14 (New), P3402.14.1 (New), P3402.14.2 (New), P3402.14.3 (New), P3402.14.4 (New), P3402.14.5 (New), P3402.14.6 (New), P3402.14.7 (New), P3402.15 (New), P3402.15.1 (New), P3402.15.2 (New), P3402.15.3 (New), P3402.15.4 (New), SECTION 3403 (New), P3403.1 (New), P3403.2 (New), P3403.3 (New), P3403.4 (New), P3403.5 (New), P3403.5.1 (New), P3403.5.2 (New), P3403.6 (New), P3403.7 (New), P3403.7.1 (New), P3403.7.2 (New), P3403.7.3 (New), P3403.7.4 (New), P3403.8 (New), P3403.9 (New), P3403.10 (New), P3403.10.1 (New), TABLE P3403.10.1 (New), P3403.10.2 (New), P3403.10.3 (New), P3403.11 (New), P3403.11.1 (New), P3403.11.2 (New), P3403.12 (New), P3403.13 (New), P3403.14 (New), P3403.14.1 (New), P3403.14.2 (New), P3403.14.3 (New), P3403.15 (New), P3403.15.1 (New), P3403.15.2 (New), P3403.15.3 (New), P3403.15.4 (New), P3403.15.5 (New), P3403.15.6 (New), P3403.15.7 (New), P3403.15.8 (New), >P3403.16 (New), P3403.16.1 (New), P3403.16.2 (New), P3403.16.3 (New), P3403.16.4 (New), SECTION P3404 (New), P3404.1 (New), P3404.2 (New), P3404.3 (New), P3404.3.1 (New), P3404.3.1.1 (New), P3404.3.1.2 (New), P3404.3.1.3 (New), P3404.4 (New), P3404.4.1 (New), P3404.4.2 (New), 44 DOE, (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

SECTION R202
DEFINITIONS

Add new definition as follows:

<u>BLACKWATER</u>

. <u>Wastewater that contains urine or fecal matter.</u>

<u>BLACKWATER CONTRIBUTION (BWC)</u>

.

<u>The fraction equal to the quantity of blackwater divided by the sum of the quantities of raw and treated blackwater plus surface water, groundwater, and water from approved potable water systems.</u>

<u>LOG REDUCTION VALUE (LRV)</u>.
<u>The measure of the ability of a treatment process to remove or inactivate microorganisms such as bacteria, protozoa and viruses. LRV is</u>

the logarithm base 10 of the ratio of the levels of a pathogenic organism or other contaminant before and after treatment.

POTABLE REUSE

. The practice of treating *wastewater* and utilizing it for potable applications.

REUSE WATER

. Wastewater or rainwater treated to a level of quality suitable for reuse.

WASTEWATER

.

The water generated after use of freshwater, raw water, drinking water, or saline water in a deliberate application or process.

WATER REUSE SYSTEM

.

A system for the treatment, storage, distribution, and reuse of water including, but not limited to, wastewater and captured rainwater.

Delete without substitution:

~~SECTION P2910~~
~~NONPOTABLE WATER SYSTEMS~~

~~**P2910.1 Scope.** The provisions of this section shall govern the materials, design, construction and installation of systems for the collection, storage, treatment and distribution of nonpotable water. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the *jurisdiction*.~~

~~**P2910.2 Water quality.** Nonpotable water for each end use application shall meet the minimum water quality requirements as established for the intended application by the laws, rules and ordinances applicable in the *jurisdiction*. Where nonpotable water from different sources is combined in a system, the system shall comply with the most stringent requirements of this code applicable to such sources.~~

~~**P2910.2.1 Residual disinfectants.** Where chlorine is used for disinfection, the nonpotable water shall contain not more than 4 ppm (4 mg/L) of chloramines or free chlorine. Where ozone is used for disinfection, the nonpotable water shall not contain gas bubbles having elevated levels of ozone at the point of use.~~

~~**Exception:** Reclaimed water sources shall not be required to comply with the requirements of this section.~~

~~**P2910.2.2 Filtration required.** Nonpotable water utilized for water closet and urinal flushing applications shall be filtered by a 100 micron or finer filter.~~

~~**Exception:** Reclaimed water sources shall not be required to comply with the requirements of this section.~~

~~**P2910.3 Signage required.**~~

~~Nonpotable water outlets such as hose connections, open-ended pipes and faucets shall be identified at the point of use for each outlet with signage that reads, “Nonpotable water is utilized for [application name]. CAUTION: NONPOTABLE WATER. DO NOT DRINK.” The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant, waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inches (12.7 mm) in height and in colors contrasting the background on which they are applied. In addition to the required wordage, the pictograph shown in Figure P2910.3 shall appear on the signage required by this section.~~

~~**FIGURE P2910.3 PICTOGRAPH—DO NOT DRINK**~~

~~**P2910.4 Permits.**~~

~~*Permits* shall be required for the construction, installation, *alteration* and *repair* of nonpotable water systems. *Construction documents*, engineering calculations, diagrams and other such data pertaining to the nonpotable water system shall be submitted with each *permit* application.~~

~~**P2910.5 Potable water connections.**~~

~~Where a potable system is connected to a nonpotable water system, the potable water supply shall be protected against backflow in accordance with Section P2902.~~

~~**P2910.6 Approved components and materials.** Piping, plumbing components and materials used in collection and conveyance systems shall be manufactured of material *approved* for the intended application and compatible with any disinfection and treatment systems used.~~

~~**P2910.7 Insect and vermin control.** The system shall be protected to prevent the entrance of insects and vermin into storage tanks and piping systems. Screen materials shall be compatible with contacting system components and shall not accelerate the corrosion of system components.~~

~~**P2910.8 Freeze protection.** Where sustained freezing temperatures occur, provisions shall be made to keep storage tanks and the related piping from freezing.~~

~~**P2910.9 Nonpotable water storage tanks.**~~

~~Nonpotable water storage tanks shall comply with Sections P2910.9.1 through P2910.9.11.~~

~~**P2910.9.1 Sizing.** The holding capacity of the storage tank shall be sized in accordance with the anticipated demand.~~

~~**P2910.9.2 Location.** Storage tanks shall be installed above or below grade. Above-grade storage tanks shall be protected from direct sunlight and shall be constructed using opaque, UV-resistant materials such as, but not limited to, heavily tinted plastic, lined metal, concrete and wood; or painted to prevent algae growth; or shall have specially constructed sun barriers including, but not limited to, installation in garages, *crawl spaces* or sheds. Storage tanks and their manholes shall not be located directly under any soil piping, waste piping or any source of contamination.~~

~~**P2910.9.3 Materials.** Where collected on site, water shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion-resistant materials. The storage tank shall be constructed of materials compatible with any disinfection systems used to treat water upstream of the tank and with any systems used to maintain water quality within the tank. Wooden storage tanks that are not equipped with a makeup water source shall be provided with a flexible liner.~~

~~**P2910.9.4 Foundation and supports.** Storage tanks shall be supported on a firm base capable of withstanding the weight of the storage tank when filled to capacity. Storage tanks shall be supported in accordance with this code.~~

~~**P2910.9.4.1 Ballast.** Where the soil can become saturated, an underground storage tank shall be ballasted or otherwise secured to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold-down ballast shall meet or exceed the buoyancy force of the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to support the storage tank weight when full, consistent with the bearing capability of adjacent soil.~~

~~**P2910.9.4.2 Structural support.** Where installed below grade, storage tank installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when empty or filled with water.~~

~~**P2910.9.5 Makeup water.**~~

~~Where an uninterrupted nonpotable water supply is required for the intended application, potable or reclaimed water shall be provided as a source of makeup water for the storage tank. The makeup water supply shall be protected against backflow by means of an *air gap* not less than 4 inches (102 mm) above the overflow or an *approved* backflow device in accordance with Section P2902. A *full-open valve* located on the makeup water supply line to the storage tank shall be provided. Inlets to the storage tank shall be controlled by fill valves or other automatic supply valves installed to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. Where makeup water is provided, the water level shall be prohibited from dropping below the source water inlet or the intake of any attached pump.~~

~~**P2910.9.5.1 Inlet control valve alarm.**~~

~~Makeup water systems shall be fitted with a warning mechanism that alerts the user to a failure of the inlet control valve to close correctly. The alarm shall activate before the water within the storage tank begins to discharge into the overflow system.~~

~~**P2910.9.6 Overflow.**~~

~~The storage tank shall be equipped with an overflow pipe having a diameter not less than that shown in Table P2910.9.6. The overflow outlet shall discharge at a point not less than 6 inches (152 mm) above the roof or roof drain; floor or *floor drain*; or over an open water-supplied fixture. The overflow outlet shall be covered with a corrosion-resistant screen of not less than 16 by 20 mesh per inch (630 by 787 mesh per m) and by $^1/_4$-inch (6.4 mm) hardware cloth or shall terminate in a horizontal angle seat check valve. Drainage from overflow pipes shall be directed to prevent freezing on roof walks. The overflow drain shall not be equipped with a shutoff valve. Not less than one cleanout shall be provided on each overflow pipe in accordance with Section P3005.2.~~

~~**TABLE P2910.9.6 SIZE OF DRAIN PIPES FOR WATER TANKS**~~

TANK CAPACITY (gallons)	DRAIN PIPE (inches)
Up to 750	1
751 to 1,500	1$^1/_2$
1,501 to 3,000	2
3,001 to 5,000	2$^1/_2$
5,001 to 7,500	3
Over 7,500	4

~~For SI: 1 gallon = 3.875 liters, 1 inch = 25.4 mm.~~

~~**P2910.9.7 Access.**~~

~~Not less than one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below-grade storage tanks, located outside of the *building*, shall be provided with a manhole either not less than 24 inches (610 mm) square or with an inside diameter not less than 24 inches (610 mm). Manholes shall extend not less than 4 inches (102 mm) above ground or shall be designed to prevent water infiltration. Finished grade shall be sloped away from the manhole to divert surface water. Manhole covers shall be secured to prevent unauthorized access. Service ports in manhole covers shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm)~~

~~above the finished grade level. The service port shall be secured to prevent unauthorized access.~~

> ~~**Exception:** Storage tanks under 800 gallons (3028 L) in volume installed below grade shall not be required to be equipped with a manhole, but shall have a service port not less than 8 inches (203 mm) in diameter.~~

~~P2910.9.8 Venting~~.
~~Storage tanks shall be provided with a vent sized in accordance with Chapter 31 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of an *approved* cap or a U-bend installed with the opening directed downward. Vent outlets shall extend not less than 4 inches (102 mm) above grade, or as necessary to prevent surface water from entering the storage tank. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section P2910.7.~~

~~SECTION P2911~~
~~ON-SITE NONPOTABLE WATER REUSE SYSTEMS~~

~~P2910.9.9 Drain~~.
~~A drain shall be located at the lowest point of the storage tank. The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table P2910.9.6. Not less than one cleanout shall be provided on each drain pipe in accordance with Section P3005.2.~~

~~P2910.10 Marking and signage~~.
~~Each nonpotable water storage tank shall be *labeled* with its rated capacity. The contents of storage tanks shall be identified with the words, "CAUTION: NONPOTABLE WATER. DO NOT DRINK." Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, "DANGER—CONFINED SPACE." Markings shall be indelibly printed on the tank, or on a tag or sign constructed of corrosion-resistant waterproof material that is mounted on the tank. The letters of the words shall be not less than 0.5 inches (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied.~~

~~P2910.11 Storage tank tests~~.
~~Storage tanks shall be tested in accordance with the following:~~

1. ~~Storage tanks shall be filled with water to the overflow line prior to and during inspection. Seams and joints shall be left exposed and the tank shall remain watertight without leakage for a period of 24 hours.~~
2. ~~After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and leaks do not exist.~~
3. ~~Following a successful test of the overflow, the water level in the tank shall be reduced to a level that is 2 inches (51 mm) below the makeup water trigger point by using the tank drain. The tank drain shall be observed for proper operation. The makeup water system shall be observed for proper operation, and successful automatic shutoff of the system at the refill threshold shall be verified. Water shall not be drained from the overflow at any time during the refill test.~~

~~P2910.12 System abandonment.~~ ~~If the *owner* of an on-site nonpotable water reuse system or rainwater collection and conveyance system elects to cease use of or fails to properly maintain such system, the system shall be abandoned and shall comply with the following:~~

1. ~~System piping connecting to a utility-provided water system shall be removed or disabled.~~
2. ~~The distribution piping system shall be replaced with an *approved* potable water supply piping system. Where an existing potable water pipe system is already in place, the fixtures shall be connected to the existing system.~~

3. ~~The storage tank shall be secured from accidental access by sealing or locking tank inlets and access points, or filled with sand or equivalent.~~

~~P2910.13 Separation requirements for nonpotable water piping~~.
~~Nonpotable water collection and distribution piping and reclaimed water piping shall be separated from the *building sewer* and potable water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. Nonpotable water collection and distribution piping shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried nonpotable water piping shall comply with the requirements of Section P2604.~~

~~Exceptions:~~

1. ~~The required separation distance shall not apply where the bottom of the nonpotable water pipe within 5 feet (1524 mm) of the sewer is not less than 12 inches (305 mm) above the top of the highest point of the sewer and the pipe materials conforms to Table P3002.2.~~
2. ~~The required separation distance shall not apply where the bottom of the potable water service pipe within 5 feet (1524 mm) of the nonpotable water pipe is not less than 12 inches (305 mm) above the top of the highest point of the nonpotable water pipe and the pipe materials comply with the requirements of Table P2906.5.~~
3. ~~The required separation distance shall not apply where a nonpotable water pipe is located in the same trench with a *building sewer* that is constructed of materials that comply with the requirements of Table P3002.2.~~
4. ~~The required separation distance shall not apply where a nonpotable water pipe crosses a sewer pipe provided that the nonpotable water pipe is sleeved to not less than 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing, with pipe materials that comply with Table P3002.2.~~
5. ~~The required separation distance shall not apply where a potable water service pipe crosses a nonpotable water pipe, provided that the potable water service pipe is sleeved for a distance of not less than 5 feet (1524 mm) horizontally from the centerline of the nonpotable pipe on both sides of such crossing, with pipe materials that comply with Table P3002.2.~~
6. ~~The required separation distance shall not apply to irrigation piping located outside of a building and downstream of the backflow preventer where nonpotable water is used for outdoor applications.~~

~~P2910.14 Outdoor outlet access~~.
~~Sillcocks, hose bibbs, wall hydrants, yard hydrants and other outdoor outlets supplied by nonpotable water shall be located in a locked vault or shall be operable only by means of a removable key.~~

~~P2911.1 General.~~ ~~The provisions of this section shall govern the construction, installation, *alteration* and *repair* of *on-site nonpotable water reuse systems* for the collection, storage, treatment and distribution of on-site sources of nonpotable water as permitted by the *jurisdiction*.~~

~~P2911.2 Sources~~. ~~*On-site nonpotable water reuse systems* shall collect waste discharge only from the following sources: bathtubs, showers, lavatories, clothes washers and laundry trays. Water from other *approved* nonpotable sources including swimming pool backwash operations, air conditioner condensate, rainwater, foundation drain water, fluid cooler discharge water and fire pump test water shall be permitted to be collected for reuse by *on-site nonpotable water reuse systems*, as *approved* by the *building official* and as appropriate for the intended application.~~

~~P2911.2.1 Prohibited sources.~~ ~~Reverse osmosis system reject water, water softener backwash water, *kitchen* sink wastewater, dishwasher wastewater and wastewater containing urine or fecal matter shall not be collected for reuse within an on-site nonpotable water reuse system.~~

~~P2911.3 Traps~~.
~~Traps serving fixtures and devices discharging wastewater to *on-site nonpotable water reuse systems* shall comply with the Section~~

~~P3201.2.~~

~~P2911.4 Collection pipe.~~

~~*On-site nonpotable water reuse systems* shall utilize drainage piping *approved* for use within plumbing drainage systems to collect and convey untreated water for reuse. Vent piping *approved* for use within plumbing venting systems shall be utilized for vents within the *graywater* system. Collection and vent piping materials shall comply with Section P3002.~~

~~P2911.4.1 Installation.~~

~~Collection piping conveying untreated water for reuse shall be installed in accordance with Section P3005.~~

~~P2911.4.2 Joints.~~

~~Collection piping conveying untreated water for reuse shall utilize joints *approved* for use with the distribution piping and appropriate for the intended applications as specified in Section P3002.~~

~~P2911.4.3 Size.~~

~~Collection piping conveying untreated water for reuse shall be sized in accordance with drainage sizing requirements specified in Section P3005.4.~~

~~P2911.4.4 Marking.~~

~~Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste and vent piping by Chapter 30.~~

~~P2911.5 Filtration.~~ ~~Untreated water collected for reuse shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.~~

~~P2911.6 Disinfection.~~

~~Nonpotable water collected on site for reuse shall be disinfected, treated or both to provide the quality of water needed for the intended end-use application. Where the intended end-use application does not have requirements for the quality of water, disinfection and treatment of water collected on site for reuse shall not be required. Nonpotable water collected on site containing untreated *graywater* shall be retained in collection reservoirs for not more than 24 hours.~~

~~P2911.6.1 Graywater used for fixture flushing.~~

~~*Graywater* used for flushing water closets and urinals shall be disinfected and treated by an on-site water reuse treatment system complying with NSF 350.~~

~~P2911.7 Storage tanks.~~

~~Storage tanks utilized in *on-site nonpotable water reuse systems* shall comply with Section P2910.9 and Sections P2911.7.1 through P2911.7.3.~~

~~P2911.7.1 Location.~~

~~Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P2911.7.1.~~

~~**TABLE P2911.7.1 LOCATION OF NONPOTABLE WATER REUSE STORAGE TANKS**~~

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM STORAGE TANK (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Public water main	10
Seepage pits	5
Septic tanks	5
Streams and lakes	50
Water service	5
Water wells	50

~~For SI: 1 foot = 304.8 mm.~~

~~**P2911.7.2 Inlets.** Storage tank inlets shall be designed to introduce water into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the storage tank.~~

~~**P2911.7.3 Outlets.** Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank, and shall not skim water from the surface.~~

~~**P2911.8 Valves**~~**.**

~~Valves shall be supplied on *on-site nonpotable water reuse systems* in accordance with Sections P2911.8.1 and P2911.8.2.~~

~~**P2911.8.1 Bypass valve**~~**.**

~~One three-way diverter valve certified to NSF 50 or other *approved* device shall be installed on collection piping upstream of each storage tank, or drainfield, as applicable, to divert untreated on-site reuse sources to the sanitary sewer to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections. Bypass valves shall be *labeled* to indicate the direction of flow, connection and storage tank or drainfield connection. Bypass valves shall be installed in accessible locations. Two shutoff valves shall not be installed to serve as a bypass valve.~~

~~**P2911.8.2 Backwater valve**~~**.**

~~Backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be in accordance with Section P3008.~~

~~**P2911.9 Pumping and control system**~~**.**

~~Mechanical equipment including pumps, valves and filters shall be accessible and removable in order to perform *repair*, maintenance and cleaning. The minimum flow rate and *flow pressure* delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.~~

~~**P2911.10 Water pressure-reducing valve or regulator**~~**.**

~~Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the nonpotable water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.~~

~~**P2911.11 Distribution pipe**~~**.**

~~Distribution piping utilized in *on-site nonpotable water reuse systems* shall comply with Sections P2911.11.1 through P2911.11.3.~~

~~**Exception:** Irrigation piping located outside of the *building* and downstream of a backflow preventer.~~

~~P2911.11.1 Materials, joints and connections~~.

~~Distribution piping shall conform to the standards and requirements specified in Section P2906 for nonpotable water.~~

P2911.11.2 Design.

On-site nonpotable water reuse distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

Delete without substitution:

~~P2911.11.3 Marking~~.

~~On-site nonpotable water distribution piping labeling and marking shall comply with Section P2901.2.~~

~~P2911.12 Tests and inspections~~.

~~Tests and inspections shall be performed in accordance with Sections P2911.12.1 through P2911.12.6.~~

~~P2911.12.1 Collection pipe and vent test~~.

~~Drain, waste and vent piping used for on-site water reuse systems shall be tested in accordance with Section P2503.~~

~~P2911.12.2 Storage tank test~~.

~~Storage tanks shall be tested in accordance with Section P2910.11.~~

~~P2911.12.3 Water supply system test~~.

~~The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.~~

~~P2911.12.4 Inspection and testing of backflow prevention assemblies~~.

~~The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.~~

~~P2911.12.5 Inspection of vermin and insect protection~~.

~~Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section P2910.7.~~

~~P2911.12.6 Water quality test~~.

~~The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the *jurisdiction*.~~

~~P2911.13 Operation and maintenance manuals~~.

~~Operation and maintenance materials shall be supplied with nonpotable on-site water reuse systems in accordance with Sections P2911.13.1 through P2911.13.4.~~

~~**P2911.13.1 Manual.** A detailed operations and maintenance manual shall be supplied in hard-copy form for each system.~~

~~**P2911.13.2 Schematics.** The manual shall include a detailed system schematic, the location of system components and a list of system components that includes the manufacturers and model numbers of the components.~~

~~**P2911.13.3 Maintenance procedures.** The manual shall provide a schedule and procedures for system components requiring periodic maintenance. Consumable parts including filters shall be noted along with part numbers.~~

~~**P2911.13.4 Operations procedures.** The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.~~

~~SECTION P2912~~
~~NONPOTABLE RAINWATER COLLECTION AND DISTRIBUTION SYSTEMS~~

~~**P2912.1 General.**~~
~~The provisions of this section shall govern the construction, installation, *alteration* and *repair* of rainwater collection and conveyance systems for the collection, storage, treatment and distribution of rainwater for nonpotable applications. For nonpotable rainwater systems, the provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution of nonpotable water. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the *jurisdiction*.~~

~~**P2912.2 Collection surface.** Rainwater shall be collected only from above-ground impervious roofing surfaces constructed from *approved* materials. Collection of water from vehicular parking or pedestrian walkway surfaces shall be prohibited except where the water is used exclusively for landscape irrigation. Overflow and bleed-off pipes from roof-mounted *appliances* including, but not limited to, evaporative coolers, water heaters and solar water heaters shall not discharge onto rainwater collection surfaces.~~

~~**P2912.3 Debris excluders.** Downspouts and leaders shall be connected to a roof washer and shall be equipped with a debris excluder or equivalent device to prevent the contamination of collected rainwater with leaves, sticks, pine needles and similar material. Debris excluders and equivalent devices shall be self-cleaning.~~

~~**P2912.4 Roof washer.** An amount of rainwater shall be diverted at the beginning of each rain event, and not allowed to enter the storage tank, to wash accumulated debris from the collection surface. The amount of rainfall to be diverted shall be field adjustable as necessary to minimize storage tank water contamination. The roof washer shall not rely on manually operated valves or devices and shall operate automatically. Diverted rainwater shall not be drained to the roof surface and shall be discharged in a manner consistent with the stormwater runoff requirements of the *jurisdiction*. Roof washers shall be accessible for maintenance and service.~~

~~**P2912.5 Roof gutters and downspouts.**~~
~~Gutters and downspouts shall be constructed of materials that are compatible with the collection surface and the rainwater quality for the desired end use. Joints shall be watertight.~~

~~**P2912.5.1 Slope.** Roof gutters, leaders and rainwater collection piping shall slope continuously toward collection inlets and shall be free of leaks. Gutters and downspouts shall have a slope of not less than $^1/_8$ inch per foot (10.4 mm/m) along their entire length. Gutters and downspouts shall be installed so that water does not pool at any point.~~

~~**P2912.5.2 Cleanouts.** Cleanouts shall be provided in the water conveyance system to allow *access to* filters, flushes, pipes and downspouts.~~

~~**P2912.6 Drainage.** Water drained from the roof washer or debris excluder shall not be drained to the sanitary sewer. Such water shall be diverted from the storage tank and shall discharge to a location that will not cause erosion or damage to property. Roof washers and~~

~~debris excluders shall be provided with an automatic means of self-draining between rain events and shall not drain onto roof surfaces.~~

~~P2912.7~~ ~~Collection pipe~~.

~~Rainwater collection and conveyance systems shall utilize drainage piping *approved* for use within plumbing drainage systems to collect and convey captured rainwater. Vent piping *approved* for use within plumbing venting systems shall be utilized for vents within the rainwater system. Collection and vent piping materials shall comply with Section P3002.~~

~~P2912.7.4~~ ~~Marking~~.

~~Additional marking of collection piping conveying captured rainwater for reuse shall not be required beyond that required for sanitary drainage, waste, and vent piping by Chapter 30.~~

~~P2912.7.2~~ ~~Joints~~.

~~Collection piping conveying captured rainwater shall utilize joints *approved* for use with the distribution piping and appropriate for the intended applications as specified in Section P3003.~~

~~P2912.7.3~~ ~~Size~~.

~~Collection piping conveying captured rainwater shall be sized in accordance with drainage sizing requirements specified in Section P3005.4.~~

~~P2912.7.1~~ ~~Installation~~.

~~Collection piping conveying captured rainwater shall be installed in accordance with Section P3005.3.~~

~~P2912.8~~ ~~Filtration.~~ ~~Collected rainwater shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.~~

~~P2912.9~~ ~~Disinfection.~~ ~~Where the intended application for rainwater requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use.~~

~~P2912.10~~ ~~Storage tanks~~.

~~Storage tanks utilized in nonpotable rainwater collection and conveyance systems shall comply with Section P2910.9 and Sections P2912.10.1 through P2912.10.3.~~

~~P2912.10.1~~ ~~Location~~.

~~Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P2912.10.1.~~

~~TABLE P2912.10.1~~ ~~LOCATION OF RAINWATER STORAGE TANKS~~

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM STORAGE TANK (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Seepage pits	5
Septic tanks	5

~~For SI: 1 foot = 304.8 mm~~

~~**P2912.10.2 Inlets**~~**.** ~~Storage tank inlets shall be designed to introduce collected rainwater into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the storage tank.~~

~~**P2912.10.3 Outlets**~~**.** ~~Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank and shall not skim water from the surface.~~

~~**P2912.11 Valves**~~**.**

~~Valves shall be supplied on rainwater collection and conveyance systems in accordance with Sections P2912.11.1 and P2912.11.2.~~

~~**P2912.11.1 Influent diversion**~~**.**

~~A means shall be provided to divert storage tank influent to allow for maintenance and repair of the storage tank system.~~

~~**P2912.11.2 Backwater valve**~~**.**

~~Backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be in accordance with Section P3008.~~

~~**P2912.12 Pumping and control system**~~**.**

~~Mechanical equipment including pumps, valves and filters shall be easily accessible and removable in order to perform repair, maintenance and cleaning. The minimum flow rate and *flow pressure* delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.~~

~~**P2912.13 Water pressure-reducing valve or regulator**~~**.**

~~Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the rainwater distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.~~

~~**P2912.14 Distribution pipe**~~**.**

~~Distribution piping utilized in rainwater collection and conveyance systems shall comply with Sections P2912.14.1 through P2912.14.3.~~

Exception: ~~Irrigation piping located outside of the *building* and downstream of a backflow preventer.~~

~~**P2912.14.1 Materials, joints and connections**~~**.**

~~Distribution piping shall conform to the standards and requirements specified in Section P2906 for nonpotable water.~~

~~**P2912.14.2 Design**~~**.**

~~Distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.~~

~~**P2912.14.3 Labeling and marking**~~**.**

~~Nonpotable rainwater distribution piping labeling and marking shall comply with Section P2901.2.~~

~~**P2912.15 Tests and inspections**~~**.**

~~Tests and inspections shall be performed in accordance with Sections P2912.15.1 through P2912.15.8.~~

~~P2912.15.1 Roof gutter inspection and test.~~
~~Roof gutters shall be inspected to verify that the installation and slope is in accordance with Section P2912.5.1. Gutters shall be tested by pouring not less than 1 gallon of water (3.8 L) into the end of the gutter opposite the collection point. The gutter being tested shall not leak and shall not retain standing water.~~

~~P2912.15.2 Roofwasher test.~~
~~Roofwashers shall be tested by introducing water into the gutters. Proper diversion of the first quantity of water in accordance with the requirements of Section P2912.4 shall be verified.~~

~~P2912.15.3 Collection pipe and vent test.~~
~~Drain, waste and vent piping used for rainwater collection and conveyance systems shall be tested in accordance with Section P2503.~~

~~P2912.15.4 Storage tank test.~~
~~Storage tanks shall be tested in accordance with Section P2910.11.~~

~~P2912.15.5 Water supply system test.~~
~~The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.~~

~~P2912.15.6 Inspection and testing of backflow prevention assemblies.~~
~~The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.~~

~~P2912.15.7 Inspection of vermin and insect protection.~~
~~Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section P2910.7.~~

~~P2912.15.8 Water quality test.~~
~~The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the *jurisdiction*.~~

~~P2912.16 Operation and maintenance manuals.~~
~~Operation and maintenance manuals shall be supplied with rainwater collection and conveyance systems in accordance with Sections P2912.16.1 through P2912.16.4.~~

~~P2912.16.1 Manual.~~ ~~A detailed operations and maintenance manual shall be supplied in hard-copy form for each system.~~

~~P2912.16.2 Schematics.~~ ~~The manual shall include a detailed system schematic, the location of system components and a list of system components that includes the manufacturers and model numbers of the components.~~

~~P2912.16.3 Maintenance procedures.~~ ~~The manual shall provide a maintenance schedule and procedures for system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.~~

~~**P2912.16.4 Operations procedures**~~**.**

~~The manual shall include system startup and shutdown procedures, and detailed operating procedures.~~

~~SECTION P2913~~
~~RECLAIMED WATER SYSTEMS~~

~~**P2913.1 General**~~**.**

~~The provisions of this section shall govern the construction, installation, *alteration* and *repair* of systems supplying nonpotable reclaimed water.~~

~~**P2913.2 Water pressure-reducing valve or regulator**~~**.**

~~Where the reclaimed water pressure supplied to the *building* exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the reclaimed water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2~~

~~**P2913.3 Reclaimed water systems**~~**.**

~~The design of the reclaimed water systems shall conform to accepted engineering practice.~~

~~**P2913.3.1 Distribution pipe**~~**.**

~~Distribution piping shall comply with Sections P2913.3.1.1 through P2913.3.1.3.~~

> ~~**Exception:** Irrigation piping located outside of the *building* and downstream of a backflow preventer.~~

~~**P2913.3.1.1 Materials, joints and connections**~~**.**

~~Distribution piping conveying reclaimed water shall conform to standards and requirements specified in Section P2906 for nonpotable water.~~

~~**P2913.3.1.2 Design**~~**.**

~~Distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.~~

~~**P2913.3.1.3 Labeling and marking**~~**.**

~~Nonpotable rainwater distribution piping labeling and marking shall comply with Section P2901.2.~~

~~**P2913.4 Tests and inspections**~~**.**

~~Tests and inspections shall be performed in accordance with Sections P2913.4.1 and P2913.4.2.~~

~~**P2913.4.1 Water supply system test.**~~

~~The testing of makeup water supply piping and reclaimed water distribution piping shall be conducted in accordance with Section P2503.7.~~

~~**P2913.4.2 Inspection and testing of backflow prevention assemblies**~~**.**

~~The testing of backflow preventers shall be conducted in accordance with Section P2503.8.~~

Add new text as follows:

CHAPTER 34 WATER REUSE SYSTEMS

SECTION 3401 GENERAL

P3401.1 General. The provisions of this chapter shall govern the materials, design, construction, and installation of systems for the treatment, storage, and distribution of *reuse water*. The provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment, and distribution. The application of water reuse systems shall comply with all applicable laws, rules, and ordinances of the jurisdiction.

P3401.2 Reuse water quality. Reuse water quality shall meet the minimum requirements as specified in Tables P3401.2(1), P3401.2(2), P3401.2(3), and as established for the intended application by all applicable laws, rules, and ordinances of the jurisdiction. Where water from multiple sources is combined, the system shall comply with the most stringent of the requirements of this code that are applicable to such sources.

TABLE P3401.2(1) REQUIRED WATER QUALITY FOR REUSE APPLICATIONS

Use Category	Application	Exposure[a]	Quality Tier[b]
Direct Potable Reuse	Direct Potable Reuse	DC	4
Indirect Potable Reuse (Treatment Follows Reuse Application)	Aquifer Recharge - Direct Injection	IC	2
	Aquifer Recharge - Surface Application	IC	2
	Aquifer Storage and Recovery	IC	2
	Rapid Infiltration Basins	IC	2
	Infiltration/Percolation Lagoons	IC	2
	Raw Water Augmentation	IC	2
	Saltwater Intrusion Barrier	IC	2
	Surface Water Augmentation to a Supply Source	IC	2
Irrigation of Food Crops for Human Consumption (Spray/Drip)	Food crop w/ processing that destroys pathogens (Restricted Access)	LC	1
	Orchards and Vineyards	AC/LC	4/1
	Water contacts edible portion of food crop (Includes Root Crops)	AC	4
	Water doesn't contact edible portion of food crop (Restricted Access)	IC	2
Irrigation of Crops Not for Human Consumption (Spray/Drip)	Christmas Tree Farms	AC/LC	3/1
	Hemp Crops	AC/LC	3/1
	Fiber crops	AC/LC	3/1
	Fodder /Feed Crop/ Forage Crops	AC/LC	3/1
	Ornamental nursery stock	AC/LC	3/1
	Silviculture / Tree Farms	AC/LC	3/1
	Sod/Turf Crops	AC/LC	3/1
	Tobacco	AC/LC	3/1
Landscape Irrigation (Spray/Drip)	Athletic Fields	AC/LC	3/1
	Cemeteries	AC/LC	3/1
	College and University Campuses	AC/LC	3/1
	Commercial Campuses	AC/LC	3/1
	Golf Courses (Restricted Access)	LC	1
	Golf Courses (Unrestricted Access)	AC/LC	3/1
	Highway/Freeway Medians/ Roadside Vegetation	AC/LC	3/1
	Open Access Land Irrigation	AC/LC	3/1
	Pasture for Milk Producing Animals (Restricted Access)	LC	1
	Pasture for Non-Milk Producing Animals (Restricted Access)	LC	1
	Parks	AC/LC	3/1
	Playgrounds	AC/LC	3/1

	Residential Irrigation	AC/LC	3/1
	Landscape Irrigation (Restricted Access)	LC	1
	Urban Landscaping	AC/LC	3/1
	Schoolyards	AC/LC	3/1
Water Features	Decorative Fountains	AC	3
	Landscape Impoundments (With Fountain(s))	AC	3
	Landscape Impoundments (Without Fountain(s))	LC	1
	Ponds and Lagoons	LC	1
	Recreational Impoundments (Restricted Access)	LC	1
	Recreational Impoundments (Unrestricted Access)	AC	3
	Reservoir Augmentation (Recreational)	AC	3
	Wetland Creation	LC	1
	Wetland Discharge / Application	LC	1
Life Safety	Fire Fighting Via Plane	AC	3
	Fire Hydrant Water Supply	AC	3
	Fire Protection systems	AC	3
	Non Structural Fire Fighting	AC	3
	Structural Fire Fighting	AC	3
Construction	Concrete and Cement mixing	LC	1
	Dust Control	LC	1
	Equipment Operation (Ex. Cooling Power Equipment)	LC	1
	Material Washing and Sieving	LC	1
	Soil Compaction and Consolidation	LC	1
Process Water	Agricultural Cleaning (Animal Washing & Animal Pens)	AC	3
	Aquaculture	LC	1
	Boiler Feed	LC	1
	Building Washing	AC	3
	Chemical Mixing (Herbicides, Pesticides, Fertilizers)	LC	1
	Commercial Car Washes	AC	3
	Commercial Laundries	AC	3
	Cooling Power Equipment	LC	1
	Cooling systems with aerosolization	AC	3
	Cooling systems with no aerosolization	LC	1
	Dust Control (Roads and Streets)	LC	1
	Flushing Sanitary Sewers	LC	1
	Flushing Toilets and Urinals	AC	3
	Bidets and personal hygiene devices	DC	4
	Frost Protection	LC	1
	Gas Pipeline Testing	LC	1
	Hydro Seeding	AC	3
	Impoundments at Fish Hatcheries	LC	1
	Industrial Oil and Gas Operations	LC	1
	Industrial Process Water (No Possibility of Human Contact)	LC	1
Process Water	Industrial Process Water (Possibility of Human Contact or Evaporative)	AC	3
	Industrial Washwater applications	AC	3
	Livestock Drinking Water (Milk Producing)	AC	3
	Livestock Drinking Water (Non-Milk Producing)	AC	3
	Parts Cleaning	LC	1
	Pool Water Makeup	AC	3
	Pressure Washing	AC	3
	Priming Drainage Traps	LC	1
	Road Milling	LC	1
	Ship Ballasting	LC	1
	Snow Making (Commercial / Recreational Use)	AC	3
	Snow Making (Storage)	AC	3
	Stack Scrubbing	AC	3
	Stream Flow Augmentation	LC	1
	Street, Sidewalk, Parking Lot Cleaning (Restricted Access)	LC	1
	Street, Sidewalk, Parking Lot Cleaning (Unrestricted Access)	AC	3
	Vehicle and equipment Washing	AC	3
	Wastewater Treatment (Process Uses)	LC	1
	Window Washing	AC	3

TABLE P3401.2(3) LOG REDUCTION (LRV) CREDITS APPLICABLE TO DPR BASED ON SOURCE WATER

Source Water	Maximum LRV Credits for DPR
Blackwater	0/0/0

Blackwater blended with ground water [a]	*LRV* credit [b] = negative log of *BWC*
Blackwater blended with surface water [a]	LRV credit [b] = negative log of BWC
Blackwater blended with groundwater and surface water [a]	*LRV* credit [b] = negative log of *BWC*
Graywater	Case by case basis
Stormwater	Case by case basis
Rainwater	Case by case basis
Industrial Water	Case by case basis
Process water	Case by case basis

a. Groundwater and surface waters must be either an untreated source of drinking water approved by the jurisdiction or a treated drinking water approved by the jurisdiction.

b. LRV credit for all source waters containing blackwater shall not exceed 2.0.

TABLE P3401.2.2(2) WATER QUALITY FOR TIERS OF REUSE

Quality Tier	Minimum Design Water Quality
4	United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards (40 CFR 141), plus 18/15/15 Log Removal of Enteric Viruses, Giardia, and Cryptosporidium
3	Compliant with all applicable laws, rules, ordinances, and NSF/ANSI 350
2	Compliant with all applicable laws, rules, ordinances, and end use fixture / equipment manufacturer requirements
1	Compliant with all applicable laws, rules, ordinances, and end use fixture / equipment manufacturer requirements

P3401.3 Signage required. Where nonpotable water is supplied to outlets such as hose connections, hydrants, open-ended pipes and faucets each outlet shall be identified at the point of use with signage that reads as follows: “CAUTION: NONPOTABLE WATER – DO NOT DRINK.” The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and in colors in contrast to the background on which they are applied. In addition to the required text, the pictograph shown in Figure P3401.3 shall appear on the signage required by this section.

FIGURE P3401.3 PICTOGRAPH—DO NOT DRINK

P3401.4 Permits. Permits shall be required for the construction, installation, operation, alteration and repair of water reuse systems. Construction documents, engineering calculations, diagrams, operation and maintenance manuals, and other such data pertaining to the water reuse system shall be submitted with each permit application.

P3401.5 Potable water connections. Where a potable system is connected to a nonpotable water system, the potable water supply shall be protected against backflow in accordance with Section P2902.

P3401.6 Components and materials. Piping, plumbing components, and materials used in conveyance and distribution systems shall be of material *approved* for the intended application.

P3401.7 Insect and vermin control. The system shall be protected to prevent the entrance of insects and vermin into process tanks and equipment, storage tanks and piping systems. Screen materials shall be compatible with contacting system components and shall not accelerate the corrosion of system components.

P3401.8 Freeze protection. Where freezing temperatures occur, provisions shall be made to keep storage tanks, process tanks and equipment, and the related piping from freezing.

P3401.9 Water tanks. Water storage and process tanks shall comply with Sections P3401.9.1 through P3401.9.10.

P3401.9.1 Location. Any storage tank, process tank and equipment, or portion thereof that is above grade shall be protected from direct exposure to sunlight by one of the following methods:

1. Tank construction using opaque, UV-resistant materials such as heavily tinted plastic, fiberglass, lined metal, concrete, or painted to prevent algae growth.
2. Specially constructed sun barriers.
3. Installation in garages, crawl spaces or sheds.

P3401.9.2 Materials. Prior to treatment for reuse, water shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion-resistant materials. The tank shall be constructed of materials compatible with all disinfection systems used to treat water upstream of the tank and with all systems used to maintain water quality in the tank.

P3401.9.3 Foundation and supports.. All tanks shall be supported on a firm base capable of withstanding the weight of the tank when filled to capacity. Tanks shall be supported in accordance with the *International Building Code*.

P3401.9.3.1 Ballast. Where the soil can become saturated, an underground tank shall be ballasted, or otherwise secured, to resist buoyant forces when empty. The combined weight of the empty tank and hold-down ballast shall exceed the buoyancy force applied to the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to resist the maximum buoyant forces when the tank is empty, and to support the weight of the tank when full, consistent with the bearing capability of adjacent soil.

P3401.9.3.2 Structural support. Where installed below grade, tank installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when empty or filled with water.

P3401.9.4 Makeup water. Where an uninterrupted supply is required for the intended application, an additional source of makeup water shall be provided for the storage tank. All makeup water supplies shall be protected against backflow in accordance with Section P2902. A *full-open valve* located on the makeup water supply lines to the storage tank shall be provided. Flow into the storage tank shall be controlled by fill valves or other automatic supply valves installed to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. The water level shall not be permitted to drop below the intake of any pump supplying makeup water.

P3401.9.5 Overflow. Tanks shall be equipped with an overflow pipe having a diameter not less than that shown in Table P3401.9.5. The overflow pipe shall be protected from insects and vermin and shall discharge in a manner consistent with all applicable laws, rules, and ordinances of the jurisdiction for storm water runoff requirements. The overflow pipe shall discharge at a sufficient distance from the tank to avoid damaging the tank foundation or the adjacent property. Drainage from overflow pipes shall be directed to prevent freezing on roof walkways, and on sidewalks, pavement, and other accessways subject to vehicular or pedestrian traffic. The overflow drain shall not be equipped with a shutoff valve. A cleanout shall be provided on each overflow pipe in accordance with Section P3005.2.

TABLE P3401.9.5 SIZE OF DRAIN PIPES FOR WATER TANKS

TANK CAPACITY (gallons)	DRAIN PIPE (inches)
Up to 750	1
751 to 1,500	1 1/2
1,501 to 3,000	2
3,001 to 3,000	2 1/2
5,001 to 7,500	3
Over 7,500	4

For SI: 1 gallon = 3.875 liters, 1 inch = 25.4 mm.

P3401.9.6 Access. Not less than one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below-grade tanks, located outside of the building, shall be provided with an access opening either not less than 24 inches (610 mm) square or with an inside diameter not less than 24 inches (610 mm). An access opening shall extend not less than 4 inches (102 mm) above ground and shall be designed to prevent water infiltration. The finished grade shall be sloped away from the maintenance hole to divert surface water. Access opening covers shall be secured to prevent unauthorized access. Service ports in an access opening shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm) above the finished grade level. The service port shall be secured to prevent unauthorized access. Access locations to confined spaces shall be labeled “CONFINED SPACE.”

Exception: Tanks that are less than 800 gallons (3028 L) in volume and installed below grade shall not be required to be equipped with an access opening provided that the tank has a service port of not less than 8 inches (203mm) in diameter.

P3401.9.7 Venting. Tanks that receive flow by gravity shall be provided with a vent sized in accordance with Chapter 31 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of an approved cap or U-bend installed with the opening directed downward. Vent outlets shall extend not less than 4 inches (102 mm) above grade or as necessary to prevent surface water from entering the tank. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section P3401.7.

P3401.9.8 Draining of tanks. Tanks shall be provided with a means of emptying the contents for the purpose of service or cleaning. Tanks shall be drained by using a pump or by a drain located at the lowest point in the tank. The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table P3401.9.5.Not less than one cleanout shall be provided on each drain pipe in accordance with Section P3005.2.

P3401.9.9 Marking and signage. Each nonpotable water tank shall be labeled with its rated volumetric capacity. The contents of tanks shall be identified with the words “CAUTION: NONPOTABLE WATER – DO NOT DRINK.” Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, “DANGER – CONFINED SPACE.” Markings shall be indelibly printed on the tank or on a tag or sign constructed of corrosion-resistant waterproof material that is mounted on the tank. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied

P3401.9.10 Tank tests. Pressurized tanks shall be certified in accordance with Section P2609.4. Tanks that receive flow by gravity shall be tested in accordance with the following:

Tanks shall be filled with water to the overflow line prior to and during inspection. Seams and joints shall be left exposed and the tank shall remain watertight without leakage for a period of 24 hours.

1. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and that there are no leaks.
2. The tank drain shall be observed for proper operation.
3. The makeup water system shall be observed for proper operation, and successful automatic shutoff of the system at the refill threshold shall be verified.

P3401.10 System abandonment. If the owner of an on-site *water reuse system* or components thereof elects to cease use of, or fails to properly maintain such system, the system shall be abandoned and shall comply with Sections P3401.10.1 through P3401.10.3.

P3401.10.1 Utility-connected piping. All system piping connecting to a utility-provided water system shall be removed or disabled.

P3401.10.2 Distribution piping. The distribution piping system shall be removed or replaced with an approved potable water supply piping system. Where an existing potable pipe system is already in place, the fixtures shall be connected to the existing system.

P3401.10.3 Tanks. Tank(s) shall be removed, or secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.

P3401.11 Trenching requirements for nonpotable water piping. Nonpotable water distribution piping shall be separated from the *building sewer* and potable water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. Nonpotable water distribution piping shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried nonpotable water piping shall comply with the requirements of Section P2604.

Exceptions:

1. The required separation distance shall not apply where the bottom of the nonpotable water pipe within 5 feet (1524 mm) of the sewer is not less than 12 inches (305 mm) above the top of the highest point of the *sewer* and the pipe materials conform to Table P3002.2.
2. The required separation distance shall not apply where the bottom of the potable water service pipe within 5 feet (1524 mm) of the nonpotable water pipe is not less than 12 inches (305 mm) above the top of the highest point of the nonpotable water pipe and the pipe materials comply with the requirements of Table P2906.5
3. Nonpotable water pipe is permitted to be located in the same trench as a *building sewer*, provided that such sewer is constructed of materials that comply with the requirements of Table P3002.1(2).
4. The required separation distance shall not apply where a nonpotable water pipe crosses a sewer pipe, provided that the pipe is sleeved to not less than 5 feet (1524 mm) horizontally from the sewer pipe centerline on both sides of such crossing, with pipe materials that comply with Table P3002.1(2).
5. The required separation distance shall not apply where a potable water service pipe crosses a nonpotable water pipe, provided that the potable water service pipe is sleeved for a distance of not less than 5 feet (1524 mm) horizontally from the centerline of the nonpotable pipe on both sides of such crossing, with pipe materials that comply with Table P3002.1(2).
6. Irrigation piping located outside of a building and downstream of the backflow preventer is not required to meet the trenching requirements where nonpotable water is used for outdoor applications.

P3401.12 Outdoor outlet access. Sillcocks, hose bibbs, wall hydrants, yard hydrants and other outdoor outlets supplied by nonpotable water shall be located in a locked vault or shall be operable only by means of a removable key and marked in accordance with Section P3401.3.

P3401.13 Operation and Monitoring. The design, installation and continued operation of water reuse systems shall be in accordance with an approved operating and monitoring program. The program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code*.

SECTION P3402
GRAYWATER AND BLACKWATER REUSE

P3402.1 General. The provisions of ASTM E2635 and Section P3402 shall govern the construction, installation, alteration and repair of water reuse systems.

3402.2 Graywater sources. Graywater reuse systems shall collect waste discharge from only the following sources: bathtubs, showers, lavatories, clothes washers, laundry trays, condensate and other domestic wastewaters that are not expected to contain urine, fecal matter, grease or food wastes.

P3402.3 Blackwater sources. Blackwater shall be discharged to the sanitary drainage system in accordance with Chapter 30 or to an approved on-site blackwater reuse system.

P3402.4 Other sources. Other sources including, but not limited to, condensate, reverse osmosis system reject water and water softener discharge water shall also be considered for use in a water reuse system.

P3402.5 Traps. Traps serving fixtures and devices discharging water to water reuse systems shall comply with Section P3201.2.

P3402.6 Pipe marking. Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste and vent piping by Chapter 30.

P3402.7 Treatment. Water collected for reuse shall be treated to meet the quality standards required in Tables P3401.2(1) and P3401.2(2).

P3402.8 Treatment systems. Treatment systems shall be installed to allowaccess for inspection and maintenance. All treatment equipment shall utilize pressure gauges, level sensors, intensity meters or other approved methods to indicate when servicing or replacement is required. All treatment equipment shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.

P3402.9 Tanks. Nonpotabletanksutilized in water reuse systems shall comply with Sections P3401.9, P3402.9.1 and P3402.9.2.

P3402.9.1 Location. Tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P3402.9.1.

TABLE P3402.9.1 LOCATION OF NONPOTABLE WATER REUSE TANKS

ELEMENT	MINIMUM HORIZONTAL DISTANCE FROM TANK (feet)
Critical root zone (CRZ) of protected trees	2
Lot line adjoining private lots	5
Public water main	10
Seepage pits	5
Septic tanks	5
Streams and lakes	50
Water service	5
Water wells	50

1 foot = 304.8 mm.

P3402.9.2 Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the tank and shall not skim water from the surface.

P3402.10 Valves. Valves shall be installed on the collection piping of the *water reuse system*s in accordance with Sections P3402.10.1 and P3402.10.2.

P3402.10.1 Bypass valve. One three-way diverter valve listed and labeled to NSF 50 or other *approved* device shall be installed on collection piping upstream of each storage tank, as applicable, to divert untreated on-site reuse sources to the sanitary sewer or approved receiving tank to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections. Bypass valves shall be marked to indicate the direction of flow. Bypass valves shall be provided with access that allows for removal. Two shutoff valves shall not be installed to serve as a bypass valve.

P3402.10.2 Backwater valve. One or more backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be installed in accordance with Section P3008.

P3402.11 Pumping and control system. Mechanical equipment including pumps, valves, and treatment units shall have *access* in order to replace, repair, maintain and clean. The minimum flow rate and flow pressure delivered by the pumping system shall be appropriate for the application and in accordance with Section P2903.

P3402.12 Water pressure-reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P3402.13 Distribution piping. Distribution piping utilized in water reuse systems shall comply with Sections P3402.13.1 through P3402.13.3.

Exception: Irrigation piping located outside of the building and downstream of a backflow preventer.

P3402.13.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirements specified in Section P2906.

P3402.13.2 Design. Water reuse distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

P3402.13.3 Labeling and marking. Nonpotable water distribution piping labeling and marking shall comply with Section P2901.2.

P3402.14 Tests and Inspections. Tests and inspections shall be witnessed by the designer and performed in accordance with Sections P3402.14.1 through P3402.14.7.

P3402.14.1 Collection pipe and vent test. Drain, waste and vent piping used for on-site water reuse systems shall be tested in accordance with Section P2503.5.

P3402.14.2 Tank test. Tanks shall be tested in accordance with Section P3401.9.10.

P3402.14.3 Water supply system test. The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.

P3402.14.4 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.

P3402.14.5 Inspection of vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the tank and piping systems in accordance with Section P3401.7.

P3402.14.6 Initial water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with all applicable laws, rules and ordinances of the jurisdiction.

P3402.14.7 Operational water quality testing. The quality of the water for the intended application(s) shall be verified at the point of use in accordance with all applicable laws, rules, ordinances of the jurisdiction, and in accordance with the operation and maintenance manual, and where required, the operating permit.

P3402.15 Operation and maintenance manuals. Operation and maintenance materials shall be supplied with ~~nonpotable on-site~~*water reuse system*s in accordance with Sections P3402.15.1 through P3402.15.4 and the maintenance program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code*.

P3402.15.1 Manual. A detailed operations and maintenance manual shall be supplied in hardcopy form with all systems.

P3402.15.2 Schematics. The manual shall include a detailed system schematic, and the locations and a list of all system components, including manufacturer and model number.

P3402.15.3 Maintenance procedures. The manual shall provide a schedule and procedures for all system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.

P3402.15.4 Operations procedures. The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.

SECTION 3403
NONPOTABLE RAINWATER COLLECTION SYSTEMS

P3403.1 General. The provisions of this section shall govern the construction, installation, alteration and repair of rainwater collection and conveyance systems for the collection, storage, treatment and distribution of rainwater for nonpotable applications. For nonpotable rainwater systems, the provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution of nonpotable water. The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction.

P3403.2 Collection surface. Rainwater shall be collected only from above-ground impervious roofing surfaces constructed from approved materials. Collection of water from vehicular parking or pedestrian walkway surfaces shall be prohibited except where the water is used exclusively for landscape irrigation. Overflow and bleed-off pipes from roof-mounted appliances including, but not limited to, evaporative coolers, water heaters and solar water heaters shall not discharge onto rainwater collection surfaces.

P3403.3 Debris excluders. Downspouts and leaders shall be connected to a roof washer and shall be equipped with a debris excluder or equivalent device to prevent the contamination of collected rainwater with leaves, sticks, pine needles and similar material. Debris excluders and equivalent devices shall be self-cleaning.

P3403.4 Roof washer. An amount of rainwater shall be diverted at the beginning of each rain event, and not allowed to enter the storage tank, to wash accumulated debris from the collection surface. The amount of rainfall to be diverted shall be field adjustable as necessary to minimize storage tank water contamination. The roof washer shall not rely on manually operated valves or devices, and shall operate automatically. Diverted rainwater shall not be drained to the roof surface, and shall be discharged in a manner consistent with the stormwater runoff requirements of the jurisdiction. Roof washers shall be accessible for maintenance and service.

P3403.5 Roof gutters and downspouts . Gutters and downspouts shall be constructed of materials that are compatible with the collection surface and the rainwater quality for the desired end use. Joints shall be watertight.

P3403.5.1 Slope. Roof gutters, leaders and rainwater collection piping shall slope continuously toward collection inlets and shall be free of leaks. Gutters and downspouts shall have a slope of not less than $^1/_8$ inch per foot (10.4 mm/m) along their entire length. Gutters and downspouts shall be installed so that water does not pool at any point.

P3403.5.2 Cleanouts. Cleanouts shall be provided in the water conveyance system to allow access to filters, flushes, pipes and downspout

P3403.6 Drainage. Water drained from the roof washer or debris excluder shall not be drained to the sanitary sewer. Such water shall be diverted from the storage tank and shall discharge to a location that will not cause erosion or damage to property. Roof washers and debris excluders shall be provided with an automatic means of self-draining between rain events and shall not drain onto roof surfaces.

P3403.7 Collection pipe. Rainwater collection and conveyance systems shall utilize drainage piping approved for use within plumbing drainage systems to collect and convey captured rainwater. Vent piping approved for use within plumbing venting systems shall be utilized for vents within the rainwater system. Collection and vent piping materials shall comply with Section P3002.

P3403.7.1 Installation. Collection piping conveying captured rainwater shall be installed in accordance with Section P3005.3.

P3403.7.2 Joints. Collection piping conveying captured rainwater shall utilize joints approved for use with the distribution piping and appropriate for the intended applications as specified in Section P3003.

P3403.7.3 Size. Collection piping conveying captured rainwater shall be sized in accordance with drainage-sizing requirements specified in Section P3005.4

P3403.7.4 Marking. Additional marking of collection piping conveying captured rainwater for reuse shall not be required beyond that required for sanitary drainage, waste, and vent piping by Chapter 30.

P3403.8 Filtration. Collected rainwater shall be filtered as required for the intended end use. Filters shall be accessible for inspection and maintenance. Filters shall utilize a pressure gauge or other approved method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves installed immediately upstream and downstream to allow for isolation during maintenance.

P3403.9 Disinfection. Where the intended application for rainwater requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use.

P3403.10 Storage tanks. Storage tanks utilized in nonpotable rainwater collection and conveyance systems shall comply with Section P3401.9 and Sections P3403.10.1 through P3403.10.3.

P3403.10.1 Location. Storage tanks shall be located with a minimum horizontal distance between various elements as indicated in Table P3403.10.1.

TABLE P3403.10.1 LOCATION OF RAINWATER STORAGE TANKS

ELEMENT	MINIMUM HORIZONTAL DISTANCE (feet)
Critical root zone	2
Lot line adjoining private lots	5
Seepage pits	5
Septic tanks	5

For SI: 1 foot = 304.8 mm

P3403.10.2 Inlets. Storage tank inlets shall be designed to introduce collected rainwater into the tank with minimum turbulence, and shall be located and designed to avoid agitating the contents of the storage tank.

P3403.10.3 Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the storage tank and shall not skim water from the surface.

P3403.11 Valves. Valves shall be supplied on rainwater collection and conveyance systems in accordance with Sections P3403.11.1 and P3403.11.2.

P3403.11.1 Influent diversion. A means shall be provided to divert storage tank influent to allow for maintenance and repair of the storage tank system.

P3403.11.2 Backwater valve. Backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be in accordance with Section P3008.

P3403.12 Pumping and control system.. Mechanical equipment including pumps, valves and filters shall be easily accessible and removable in order to perform repair, maintenance and cleaning. The minimum flow rate and flow pressure delivered by the pumping system shall appropriate for the application and in accordance with Section P2903.

P3403.13 Water pressure-reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the rainwater distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P3403.14 Distribution pipe. Distribution piping utilized in rainwater collection and conveyance systems shall comply with Sections P3403.14.1 through P3403.14.3.

> **Exception:** Irrigation piping located outside of the building and downstream of a backflow preventerrigation piping located outside of the building and downstream of a backflow preventer.

-

P3403.14.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirementsspecified in Section P2906 for nonpotable water.

P3403.14.2 Design. Distribution piping systems shall be designed and sized in accordance with the Section P2903 for the intended application.

P3403.14.3 Labeling and marking. Nonpotable rainwater distribution piping labeling and marking shall comply with Section P2901.2.

P3403.15 Tests and inspections. Tests and inspections shall be performed in accordance with Sections P3403.15.1 through P3403.15.8.

P3403.15.1 Roof gutter inspection and test. Roof gutters shall be inspected to verify that the installation and slope is in accordance with Section P3403.5.1. Gutters shall be tested by pouring not less than 1 gallon of water (3.8 L) into the end of the gutter opposite the collection point. The gutter being tested shall not leak and shall not retain standing water.

P3403.15.2 Roofwasher test.. Roofwashers shall be tested by introducing water into the gutters. Proper diversion of the first quantity of water in accordance with the requirements of Section P3403.4 shall be verified.

P3403.15.3 Collection pipe and vent test. Drain, waste and vent piping used for rainwater collection and conveyance systems shall be tested in accordance with Section P2503.5.

P3403.15.4 Storage tank test . Storage tanks shall be tested in accordance with the Section P3401.9.10.

P3403.15.5 Water supply system test. The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section P2503.7.

P3403.15.6 Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and backwater valves shall be conducted in accordance with Section P2503.8.

P3403.15.7 Inspection of vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the storage tank and piping systems in accordance with Section P3401.7.

P3403.15.8 **Water quality test.** The quality of the water for the intended application shall be verified at the point of use in accordance with the requirements of the jurisdiction.

>P3403.16 **Operation and maintenance manuals..** Operation and maintenance manuals shall be supplied with rainwater collection and conveyance systems in accordance with Sections P3403.16.1 through P3403.16.4.

P3403.16.1 **Manual..** A detailed operations and maintenance manual shall be supplied in hard-copy form for each system.

P3403.16.2 **Schematics.** The manual shall include a detailed system schematic, the location of system components and a list of system components that includes the manufacturers and model numbers of the components.

P3403.16.3 **Maintenance procedures.** The manual shall provide a maintenance schedule and procedures for system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.

P3403.16.4 **Operations procedures.** The manual shall include system startup and shutdown procedures, and detailed operating procedures.

SECTION P3404
RECLAIMED WATER SYSTEMS

P3404.1 **General.** The provisions of this section shall govern the construction, installation, alteration and repair of systems supplying nonpotable reclaimed water.

P3404.2 **Water pressure-reducing valve or regulator.** Where the reclaimed water pressure supplied to the building exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the reclaimed water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section P2903.3.2.

P3404.3 **Reclaimed water systems.** The design of the reclaimed water systems shall conform to accepted engineering practice.

P3404.3.1 **Distribution pipe.** Distribution piping shall comply with Sections P3404.3.1.1 through P3404.3.1.3.

Exception: Irrigation piping located outside of the building and downstream of a backflow preventer.

P3404.3.1.1 **Materials, joints and connections. .** Distribution piping conveying reclaimed water shall conform to standards and requirements specified in Section P2906 for nonpotable water.

P3404.3.1.2 **Design.** Distribution piping systems shall be designed and sized in accordance with Section P2903 for the intended application.

P3404.3.1.3 **Labeling and marking.** Nonpotable rainwater distribution piping labeling and marking shall comply with Section P3401.3.

P3404.4 **Tests and inspections..** Tests and inspections shall be performed in accordance with Sections P3404.4.1 and P3404.4.2.

P3404.4.1 **Water supply system test.** The testing of makeup water supply piping and reclaimed water distribution piping shall be conducted in accordance with Section P2503.7.

P3404.4.2 **Inspection and testing of backflow prevention assemblies. .** The testing of backflow preventers shall be conducted in accor dance with Section P2503.8.

Add new standard(s) as follows:

. 40 CFR 141 United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards

Staff Analysis: A review of the standard proposed for inclusion in the code, DOE 40 CFR 141 *United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: A version of this proposal was presented in 2020 and rejected. Feedback from the PMGCAC has been considered and addressed herein as follows:

The definitions of graywater, wastewater, and blackwater are unclear.

It is unclear how a code official would enforce odor controls.

Odors are addressed in this proposal by reference to 40 CFR 141, NSF 350, and required compliance with all applicable laws, rules, and ordinances. Furthermore, The designer is required to address odor control in the operation and monitoring program, if the code official has any concerns.

Wastewater reuse should be governed locally, not in ICC code.

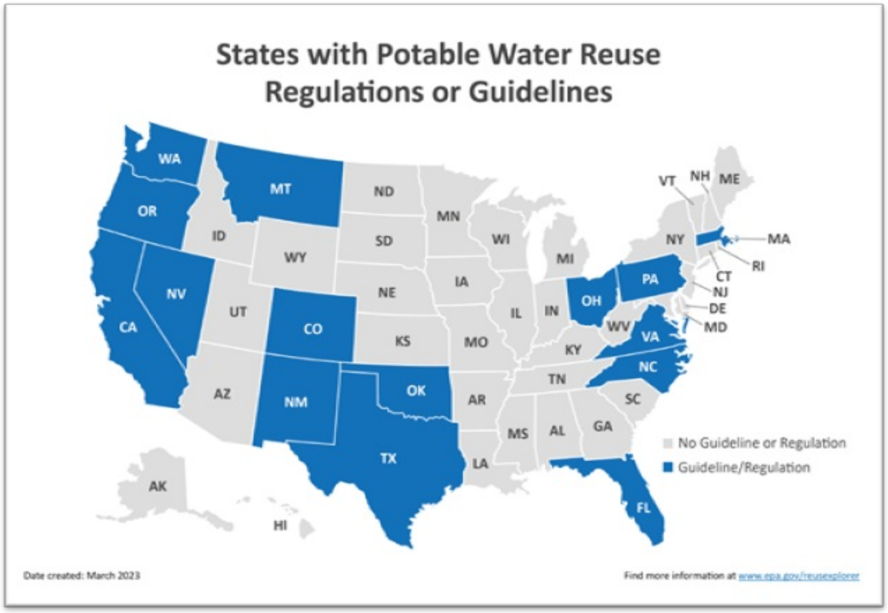
More detail is needed on blackwater reuse and related quality.

This proposal includes rigorous quality standards based on current science and focused on public safety.

Water reuse options should be expanded in the plumbing code not only because of the moral imperative to improve water efficiency and reduce consumption of valuable potable water for nonpotable purposes, but also because current technologies safely enable such practices. For example, by treating and reusing its own wastewater, a commercial office building can offset 100% of its toilet and urinal flushing demand, which can represent up to 70% of its total indoor potable water demands. In San Francisco, the San Francisco Public Utilities Commission headquarters building treats wastewater onsite for toilet and urinal flushing, reducing the use of potable water within the building by approximately 50%. In Sydney, Australia at 1 Bligh Street, a commercial high rise tower is offsetting 100% of the building's nonpotable water demands by reusing wastewater. In Portland, Oregon the Hassalo on Eighth eco-district, a cluster of residential, commercial, and mixed-use buildings is collecting its wastewater and reusing it for toilet flushing and irrigation. This system saves up to 7 million gallons of potable water per year. In New York City, the Solaire Building has successfully operated an onsite blackwater reuse system for two decades to meet the building's toilet flushing, cooling tower makeup, and irrigation demands. Similar to San Francisco, New York City has several buildings treating blackwater onsite for non-potable end uses. These are just a few examples of successfully operating nonpotable reuse systems with long histories.

Today, focus has shifted to Indirect Potable Reuse (IPR) and Direct Potable Reuse (DPR). IPR is when treated wastewater is supplied to a raw drinking water source such as an aquifer or reservoir. The naturally blended water is then withdrawn for treatment in a drinking water treatment facility prior to public consumption. DPR eliminates the environmental buffer and provides treated wastewater directly for public consumption.

According to the EPA, treated wastewater can be used for potable consumption in California, Colorado, Connecticut, Delaware, Florida, Massachusetts, Montana, Nevada, New Mexico, North Carolina, Oklahoma, Oregon, Pennsylvania, Texas, Virginia, and Washington. Some of these states also permit DPR. Still other states are in the process of developing DPR regulations, including Arizona where the practice is currently labeled “Advanced Water Purification” (AWP) instead of DPR.



ADEQ
Arizona Department
of Environmental Quality

azdeq.gov

FACT SHEET

Publication Number: FS-23-03

What Is Advanced Water Purification?

Advanced Water Purification (AWP) is an innovative set of water treatment processes that purifies recycled water into safe drinking without the need for an environmental buffer, such as a river or lake. The purified water is then blended with other sources of water, such as groundwater or surface water, and distributed as drinking water to consumers. AWP can help increase the availability of water in areas with water scarcity and reduce the dependence on limited sources of water.

Key Facts About AWP

- AWP involves using proven technologies such as UltraViolet (UV) light, Reverse Osmosis (RO), ozone and biofiltration to purify water to meet or exceed state and federal drinking water standards.
- The treatment process effectively targets pathogens and harmful chemical contaminants.
- AWP is safe and effective in providing high-quality drinking water. Studies have shown that the purified water is of comparable or better quality than conventional drinking water sources.

What Is ADEQ Doing And Why?

Just like water conservation, water recycling and other sustainable water management practices, AWP is a part of Arizona's long-term strategy to ensure a safe and adequate drinking water supply sufficient to support Arizona's existing and future population.

ADEQ is working on a rule to establish a permitting process for collecting and treating wastewater to meet protective standards so that it may be used as a drinking water source.

What Are The Benefits Of AWP?

AWP is a valuable strategy for managing water resources, offering numerous benefits:

- Increased Water Quality
- Drought Resilience & Water Security
- Improved Public Health
- Reduced Environmental Impact
- Energy Efficiency
- Sustainability

Learn more about what ADEQ is doing to help utilities provide AWP as a viable drinking water source for Arizona communities and how you can get involved:

azdeq.gov/AWP

For translations or other communications aids, please email the Title VI Coordinator, Leonard Drago, at Drago.Leonard@azdeq.gov or call 602-771-2288.

Para traducciones u otras ayudas de comunicación, envíe un correo electrónico al Coordinador del Título VI, Leonard Drago, a Drago.Leonard@azdeq.gov o llame al 602-771-2288.

Health & Safety. Standards such as NSF 350 exist to guide the implementation of onsite treatment and reuse systems. Water quality standards are also evolving as public health regulators and utilities from across the country are adopting a health risk-based approach that applies to water sources including blackwater, graywater, and rainwater. This health risk- framework focuses on the removal of pathogens and ongoing monitoring to ensure water is treated appropriately based on the end use. Public health and safety is paramount. States including California and Washington are proceeding with establishing health risk-based frameworks for the treatment of onsite blackwater.

The quality defined for the sole Tier 4 application (DPR) is by necessity not only based on common drinking water quality standards (USEPA), but also on the recognition that additional biological barriers are appropriate, given the source water's origin. Extensive studies have been conducted in the past few decades to determine the level of treatment required to ensure public health and safety.

Log removals of Enteric Viruses, Giardia, and Cryptosporidium (18/15/15, respectively) are based on the National Water Research Institute's "DPR Criteria Expert Panel: Preliminary Findings and Recommendations", Fountain Valley, California, June 23, 2023

These log reductions, mean that enteric viruses are reduced by 99.9999999999999999% (18 nines), that giardia and cryptosporidium oocysts are each reduced by 99.9999999999999% (15 nines)

Engineering process design is expected to be based on treatment technique log removal values (LRVs), as published by generally accepted industry leaders and institutions (e.g., United States Environmental Protection Agency, Water Environment & Research Foundation, World Health Organization, etc.). Treatment verification is expected to be demonstrated by periodic challenge tests, as described by generally accepted industry leaders and institutions (see above). Due to the rapid evolution and variety of treatment techniques and challenge test protocols, neither are further specified herein although they may be in the future. Additionally, periodic challenge testing may not be required where treatment process surrogates are monitored to ensure ongoing performance within a credited window. At this time, flexibility is needed to promote water conservation and to empower decision makers.

This proposal does not seek to specifically define water quality requirements for Tier 1 and 2 applications. It is recognized that such standards may be highly dependent on source water quality,and should remain flexible to empower decision makers.

Public health and safety are further assured by requiring competent management of all water reuse systems. Section 1302.14 specifies Management Model 4 or Management Model 5 of USEPA's Management Guidelines for Decentralized Wastewater Management (EPA 832-B-03-001, March 2003)

The Five Management Models

- **Management Model 1 - "Homeowner Awareness"** specifies appropriate program elements and activities where treatment systems are owned and operated by individual property owners in areas of low environmental sensitivity. This program is adequate where treatment technologies are limited to conventional systems that require little owner attention. To help ensure that timely maintenance is performed, the regulatory authority mails maintenance reminders to owners at appropriate intervals.
- **Management Model 2 - "Maintenance Contracts"** specifies program elements and activities where more complex designs are employed to enhance the capacity of conventional systems to accept and treat wastewater. Because of treatment complexity, contracts with qualified technicians are needed to ensure proper and timely maintenance.
- **Management Model 3 - "Operating Permits"** specifies program elements and activities where sustained performance of treatment systems is critical to protect public health and water quality. Limited-term operating permits are issued to the owner and are renewable for another term if the owner demonstrates that the system is in compliance with the terms and conditions of the permit. Performance-based designs may be incorporated into programs with management controls at this level.
- **Management Model 4 - "Responsible Management Entity (RME) Operation and Maintenance"** specifies program elements and activities where frequent and highly reliable operation and maintenance of decentralized systems is required to ensure water resource protection in sensitive environments. Under this model, the operating permit is issued to an RME instead of the property owner to provide the needed assurance that the appropriate maintenance is performed.
- **Management Model 5 - "RME Ownership"** specifies that program elements and activities for treatment systems are owned, operated, and maintained by the RME, which removes the property owner from responsibility for the system. This program is analogous to central sewerage and provides the greatest assurance of system performance in the most sensitive of environments.

SAMPLE LRV CREDIT CALCULATION REGARDING IPC TABLE 1301.2(3) and IRC Table P3401.2(3):

10,000 gpd of Blackwater

70,000 gpd of groundwater

20,000 gpd of surface water

BWC = 10,000 / (10,000 + 70,000 + 20,000)

BWC = 0.10

LRV Credit = -log (BWC)

LRV Credit = -log (0.10)

LRV Credit = 1.0

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC) PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Bibliography: Alsup, Kayla and Alsup, Kayla E., "Sustainable Water Treatment Systems: A Direct Potable Proposal" (2021). Murray State University Honors College Theses. 89.

Case Studies of Innovative Water Reuse and Resource Recovery Projects, San Francisco Public Utilities Commission (SFPUC), https://sfpuc.org/documents/case-studies-innovative-water-reuse-and-resource-recovery-projects, accessed July 27, 2023.

Derivation of Log Removal Values for the Addendum to A Framework for Regulating Direct Potable Reuse, presenting an early draft of the anticipated criteria for DPR

, California State Water Board Division of Drinking Water, June 15, 2021.

Drinking Water Quality Standards, United States Environmental Protection Agency, Code of Federal Regulation https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-141.

Ghernaout, D. , Elboughdiri, N. and Alghamdi, A. (2019) Direct Potable Reuse: The Singapore NEWater Project as a Role Model. Open Access Library Journal, 6, 1-10. doi: 10.4236/oalib.1105980.

Kehoe P. & Nokhoudian T. 2022 "Onsite Water Recycling: an Innovative Approach to Solving an Old Problem". San Francisco, CA.

Leslie, Jacques., "Where Water is Scarce, Communities Turn to Reusing Wastewater," Yale Environment 360, May 1, 2018.

National Water Research Institute. "DPR Criteria Expert Panel: Preliminary Findings and Recommendations", Fountain Valley, California, June 23, 2023.

"Onsite Water Reuse Program Guidebook (2022)", San Francisco Public Utilities Commission (SFPUC), accessed July 27, 2023.

"Potable reuse: Guidance for producing safe drinking-water." Geneva: World Health Organization; 2017. License: CC BY-NC-SA 3.0 IGO.

Rich, D., Andiroglu, E., Gallo, K., & Ramanathan, S. (2023). A Review of Water Reuse Applications and Effluent Standards in Response to Water Scarcity. *Water Security*. Accepted through Peer Review July 2023.

Sharvelle, S.; Ashbolt, N.; Clerico, E.; Hultquist, R.; Leverenz, H.; and A. Olivieri. (2017). "Risk-Based Framework for the Development of Public Health Guidance for Decentralized Nonpotable Water Systems." Prepared by the National Water Research Institute for the Water Environment & Reuse Foundation. Alexandria, VA. WE&RF Project No. SIWM10C15.

Tchobanoglous, George, Franklin L. Burton, H. David Stensel, Metcalf & Eddy., Wastewater engineering : treatment and reuse. (4th ed.). Boston: McGraw-Hill. 2003. ISBN 0-07-041878-0. OCLC 48053912.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal to expand implementation of onsite wastewater reuse will not increase the cost of construction. The proposal is allowing for onsite wastewater reuse systems as an option, but not mandating installation. Buildings that choose to install a system would experience increased construction costs to install tanks, treatment, and distribution piping. However, buildings can also realize cost savings on water and sewer bills by reusing wastewater onsite. As a result, the building would consume less potable water and send less wastewater to the sewer.

An analysis was conducted to evaluate the amount of wastewater that could be treated and reused onsite in proposed mixed-use development in San Francisco. Using the water utility's rate schedule to estimate the financial savings, the analysis showed installing an onsite wastewater reuse system could result in savings of about $50,000 annually based on reduced potable consumption alone. As the cost of potable water increases, so would such savings.

P157-24 Part II

P158-24

IPC: TABLE 1403.2, 1403.2

Proponents: Michael Cudahy, PPFA Plastic Pipe and Fittings Association, PPFA Plastic Pipe and Fittings Association (mikec@cmservices.com)

2024 International Plumbing Code

Revise as follows:

TABLE 1403.2 DISTRIBUTION PIPE

MATERIAL	STANDARD
Polyethylene (PE) plastic pipe	ASTM F405
Polyvinyl chloride (PVC) plastic pipe	ASTM D2729; CSA B182.1
Polyvinyl chloride (PVC) plastic pipe with a 3.5-inch O.D. and solid cellular core or composite wall	ASTM F1488

For SI: 1 inch = 25.4 mm.

1403.2 Distribution piping.
Distribution piping shall be not less than 3 inches (76 mm) in diameter. Materials shall comply with Table 1403.2. The top of the distribution pipe shall be not less than 8 inches (203 mm) below the original surface. The slope of the distribution pipes shall be not less than 2 inches (51 mm) and not greater than 4 inches (102 mm) per 100 feet (30 480 mm).

Reason: Standard CSA B182.1, which is already in the IPC, contains section 5.1.2 for perforated pipe.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Adding CSA B182.1 as an optional type of perforated pipe would not alter the costs of construction, but could offer slightly less expense on a project, depending on the local pipe market costs ($0-$100).

Estimated Immediate Cost Impact Justification (methodology and variables):

Adding CSA B182.1 as an optional type of perforated pipe would not alter the costs of construction, but could offer slightly less expense on a project, depending on the local pipe market costs ($0-$100) compared with current options.

Estimated Life Cycle Cost Impact:

None expected over the life of the project ($0).

Estimated Life Cycle Cost Impact Justification (methodology and variables):

None expected over the life of the project ($0).

P158-24

P159-24 Part I

IPC: APPENDIX A, A101, A101.1, TABLE A101.1

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE MECHANICAL CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

Delete without substitution:

~~APPENDIX A PLUMBING PERMIT FEE SCHEDULE~~

~~A101~~
~~PLUMBING PERMIT FEE SCHEDULE~~

~~**A101.1 General.**~~
~~See Table A101.1 for an example plumbing permit fee schedule.~~

~~**TABLE A101.1 EXAMPLE OF PERMIT FEE SCHEDULE**~~

Permit Issuance		
1.	For issuing each permit	$ ______
2.	For issuing each supplemental permit	______
Unit Fee Schedule		
1.	For each plumbing fixture or trap or set of fixtures on one trap (including water, drainage piping and backflow protection thereof)	______
2.	For each building sewer and each trailer park sewer	______
3.	Rainwater systems—per drain (inside building)	______
4.	For each cesspool (where permitted)	______
5.	For each private sewage disposal system	______
6.	For each water heater and/or vent	______
7.	For each industrial waste pretreatment interceptor including its trap and vent, excepting kitchen-type grease interceptors functioning as fixture traps	______
8.	For installation, alteration or repair of water-piping and/or water-treating equipment, each	______
9.	For repair or alteration of drainage or vent piping, each fixture	______
10.	For each lawn sprinkler system on any one meter including backflow protection devices therefor	______
11.	For atmospheric-type vacuum breakers not included in Item 2:	
	1 to 5	______
	over 5, each	______
12.	For each backflow protective device other than atmospheric-type vacuum breakers:	
	2 inches (51 mm) and smaller	______
	Over 2 inches (51 mm)	______
Other Inspections and Fees		
1.	Inspections outside of normal business hours (minimum charge 2 hours)	_____ per hour
2.	Reinspection fee assessed under provisions of Section 111.4.3	_____ each
3.	Inspections for which no fee is specifically indicated (minimum charge one-half hour)	_____ per hour
4.	Additional plan review required by changes, additions or revisions to approved plans (minimum charge one-half hour)	_____ per hour

P159-24 Part II

IMC®: APPENDIX B, SECTION B101, B101.1, B101.2, B101.2.1, B101.2.3, B101.2.2, B102.1, B103.1, B104.1, SECTION B104, SECTION B103, SECTION B102

Proponents: Jeff Grove, Chair, Building Code Action Committee (BCAC) (bcac@iccsafe.org); Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Mechanical Code

Delete without substitution:

~~APPENDIX B RECOMMENDED PERMIT FEE SCHEDULE~~

~~SECTION B101~~
~~MECHANICAL WORK, OTHER THAN GAS PIPING SYSTEMS~~

~~**B101.1 Initial fee.** For issuing each permit $___.~~

~~**B101.2 Additional fees.** Where applicable, additional fees shall be in accordance with Sections B101.2.1 through B101.2.3.~~

~~**B101.2.1 Mechanical systems.** Fee for inspecting heating, ventilating, ductwork, air-conditioning, exhaust, venting, *combustion air*, pressure vessel, solar, fuel oil and *refrigeration systems* and *appliance* installations shall be $___ for the first $1,000.00, or fraction thereof, of valuation of the installation plus $___ for each additional $1,000.00 or fraction thereof.~~

~~**B101.2.3 Boilers.** Fee for inspecting boilers (based upon Btu input):~~

~~**B101.2.2 Repairs, alterations and additions.** Fee for inspecting repairs, *alterations* and additions to an existing system shall be $___ plus $___ for each $1,000.00 or fraction thereof.~~

~~**B102.1 General.** If it becomes necessary to make a reinspection of a heating, ventilation, air-conditioning or *refrigeration system*, or boiler installation, the installer of such *equipment* shall pay a reinspection fee of $___.~~

~~**B103.1 General.** When preliminary inspection is requested for purposes of permitting temporary operation of a heating, ventilating, refrigeration, or air-conditioning system, or portion thereof, a fee of $___ shall be paid by the contractor requesting such preliminary inspection. If the system is not *approved* for temporary operation on the first preliminary inspection, the usual reinspection fee shall be charged for each subsequent preliminary inspection for such purpose.~~

~~**B104.1 General.**~~
~~In all *buildings*, except one- and two-family *dwellings*, where self-contained air-conditioning units of less than 2 tons (7.034 kW) are to be installed, the fee charged shall be that for the total cost of all units combined (see Section B101.2.1 for rate).~~

~~SECTION B104~~
~~SELF-CONTAINED UNITS LESS THAN 2 TONS~~

~~SECTION B103~~
~~TEMPORARY OPERATION INSPECTION FEE~~

~~SECTION B102~~

~~FEE FOR REINSPECTION~~

Reason: There were two different proposals to address consistency in the Fees section (ADM 27-19 and ADM 33-19) – the end result was coordination between the 2021 codes for – IBC, IFC, IEBC, IMC, IPC, IPMC, IFGC, ISPSC, IWUIC and IZC. ADM 27-19 removed fees schedules from being inserted at the time of adoption into the IMC, IPC, IPMC, IFGC and ISPSC. If the jurisdiction is on a code for 3 to 6 years, this would prohibit them from adjusting their fees. Adoption of an appendix with fees (IRC) or to be filled in by the jurisdiction (IMC and IPC) would have the same effect. These appendices should be deleted.The BCAC will be submitting a proposal in Group B for IRC Appendix AB (Previously AL) Permit Fees.

This proposal is submitted by the ICC Building Code Action Committee (BCAC) and the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC).

BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This proposal is essentially editorial because the intent of ADM27-19 was to remove the fee schedules in the codes that had such schedules.

P159-24 Part II

P160-24 Part I

IPC: APPENDIX E, TABLE E103.3(3)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

APPENDIX E SIZING OF WATER PIPING SYSTEM

Revise as follows:

TABLE E103.3(3) TABLE FOR ESTIMATING DEMAND

SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSH TANKS			SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSHOMETER VALVES		
Load	Demand		Load	Demand	
(Water supply fixture units)	(Gallons per minute)	(Cubic feet per minute)	(Water supply fixture units)	(Gallons per minute)	(Cubic feet per minute)
1	3.0	~~0.04104~~ 0.4104	—	—	—
2	5.0	~~0.0684~~ 0.6684	—	—	—
3	6.5	0.86892	—	—	—
4	8.0	1.06944	—	—	—
5	9.4	1.256592	5	15.0	2.0052
6	10.7	1.430376	6	17.4	2.326032
7	11.8	1.577424	7	19.8	2.646364
8	12.8	1.711104	8	22.2	2.967696
9	13.7	1.831416	9	24.6	3.288528
10	14.6	1.951728	10	27.0	3.60936
11	15.4	2.058672	11	27.8	3.716304
12	16.0	2.13888	12	28.6	3.823248
13	16.5	2.20572	13	29.4	3.930192
14	17.0	2.27256	14	30.2	4.037136
15	17.5	2.3394	15	31.0	4.14408
16	18.0	2.90624	16	31.8	4.241024
17	18.4	2.459712	17	32.6	4.357968
18	18.8	2.513184	18	33.4	4.464912
19	19.2	2.566656	19	34.2	4.571856
20	19.6	2.620128	20	35.0	4.6788
25	21.5	2.87412	25	38.0	5.07984
30	23.3	3.114744	30	42.0	5.61356
35	24.9	3.328632	35	44.0	5.88192
40	26.3	3.515784	40	46.0	6.14928
45	27.7	3.702936	45	48.0	6.41664
50	29.1	3.890088	50	50.0	6.684
60	32.0	4.27776	60	54.0	7.21872
70	35.0	4.6788	70	58.0	7.75344
80	38.0	5.07984	80	61.2	8.181216
90	41.0	5.48088	90	64.3	8.595624
100	43.5	5.81508	100	67.5	9.0234
120	48.0	6.41664	120	73.0	9.75864
140	52.5	7.0182	140	77.0	10.29336
160	57.0	7.61976	160	81.0	10.82808
180	61.0	8.15448	180	85.5	11.42964
200	65.0	8.6892	200	90.0	12.0312
225	70.0	9.3576	225	95.5	12.76644
250	75.0	10.026	250	101.0	13.50168
275	80.0	10.6944	275	104.5	13.96956
300	85.0	11.3628	300	108.0	14.43744
400	105.0	14.0364	400	127.0	16.97736
500	124.0	16.57632	500	143.0	19.11624
750	170.0	22.7256	750	177.0	23.66136
1,000	208.0	27.80544	1,000	208.0	27.80544
1,250	239.0	31.94952	1,250	239.0	31.94952
1,500	269.0	35.95992	1,500	269.0	35.95992
1,750	297.0	39.70296	1,750	297.0	39.70296
2,000	325.0	43.446	2,000	325.0	43.446
2,500	380.0	50.7984	2,500	380.0	50.7984
3,000	433.0	57.88344	3,000	433.0	57.88344
4,000	525.0	70.182	4,000	525.0	70.182
5,000	593.0	79.27224	5,000	593.0	79.27224

For SI: 1 inch = 25.4 mm, 1 gallon per minute = 3.785 L/m, 1 cubic foot per minute = 0.28 m^3 per minute.

Reason: This is an editorial change. The conversion from gallons per minute to cubic feet per minute for these two rows has been incorrect for many editions of the code. Most users of this table utilize the “gallon per minute” values, it is best to avoid confusion by having the conversion displayed correctly.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a simple cleanup of incorrect values in table.

P160-24 Part I

P160-24 Part II

IRC: APPENDIX CF, TABLE CF103.3(3)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

APPENDIX CF SIZING OF WATER PIPING SYSTEM

Revise as follows:

TABLE CF103.3(3) TABLE FOR ESTIMATING DEMAND

SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSH TANKS			SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSHOMETERS		
Load	Demand		Load	Demand	
(w.s.f.u.)	(gpm)	(cfm)	(w.s.f.u.)	(gpm)	(cfm)
1	3.0	~~0.04104~~ 0.4104	—	—	—
2	5.0	~~0.0684~~ 0.6684	—	—	—
3	6.5	0.86892	—	—	—
4	8.0	1.06944	—	—	—
5	9.4	1.256592	5	15.0	2.0052
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13	16.5	2.20572	13	29.4	3.930192
14	17.0	2.27256	14	30.2	4.037136
15	17.5	2.3394	15	31.0	4.14408
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17	18.4	2.459712	17	32.6	4.357968
18	18.8	2.513184	18	33.4	4.464912
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100	43.5	5.81508	100	67.5	9.0234
120	48.0	6.41664	120	73.0	9.75864
140	52.5	7.0182	140	77.0	10.29336
160	57.0	7.61976	160	81.0	10.82808
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500	124.0	16.57632	500	143.0	19.11624
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1,750	297.0	39.70296	1,750	297.0	39.70296
2,000	325.0	43.446	2,000	325.0	43.446
2,500	380.0	50.7984	2,500	380.0	50.7984
3,000	433.0	57.88344	3,000	433.0	57.88344

SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSH TANKS			SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSHOMETERS		
Load	Demand		Load	Demand	
(w.s.f.u.)	(gpm)	(cfm)	(w.s.f.u.)	(gpm)	(cfm)
4,000	535.0	70.182	4,000	525.0	70.182
5,000	593.0	79.27224	5,000	593.0	79.27224

For SI: 1 gallon per minute = 3.785 L/m, 1 cubic foot per minute = 0.000471 m^3/s.

Reason: This is an editorial change. The conversion from gallons per minute to cubic feet per minute for these two rows has been incorrect for many editions of the code. Most users of this table utilize the “gallon per minute” values, it is best to avoid confusion by having the conversion displayed correctly.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

This is a simple cleanup of incorrect values in table.

P160-24 Part II

P161-24

IPC: APPENDIX G (New), SECTION G101 (New), G101.1 (New), G101.2 (New), G101.3 (New), G101.4 (New), G101.5 (New), G101.6 (New), G102 (New), G102.1 (New), SECTION 202 (New), SECTION G103 (New), G103.1 (New), G103.2 (New), G103.3 (New), SECTION G104 (New), G104.1 (New), G104.2 (New), G104.3 (New), G104.4 (New), G104.5 (New), G104.6 (New), G104.7 (New), SECTION G105 (New), G105.1 (New), G105.2 (New), G105.2.1 (New), G105.3 (New), G105.4 (New), G105.5 (New), G105.6 (New), G105.7 (New), G105.8 (New), G105.9 (New), G105.10 (New), G105.11 (New), G105.12 (New), SECTION G106 (New), G106.1 (New), G106.2 (New)

Proponents: Mathew Lippincott, University of Michigan, self (mlippin@umich.edu); Martin Hammer, Martin Hammer - Architect (mfhammer@pacbell.net); Pat Lando, Recode, Recode (pat@recodenow.org); Ashton Merck, North Carolina State University / STEPS Center, self; Nancy Love, University of Michigan, self (nglove@umich.edu); John Lansing, PAE Consulting Engineers (john.lansing@pae-engineers.com); Abraham Noe-Hays, Rich Earth Institute (abe@richearthinstitute.org); Miriam Hacker, Myself; Mark Buehrer, 2020 ENGINEERING, Inc., 2020 ENGINEERING, Inc. (mark@2020engineering.com); Lucas Crane, Arizona State University, self (lccrane1@asu.edu); Hayley Joyell Smith, PHLUSH (Public Hygiene Lets Us Stay Human), PHLUSH, Board Director (hayley@phlush.org); Kim Nace, Brightwater Tools (kim@brightwatertools.com); A P Robertson, self, self (sandyrob51@gmail.com); Treavor Boyer, Arizona State University / STEPS, self (thboyer@asu.edu)

2024 International Plumbing Code

Add new text as follows:

APPENDIX G URINE DIVERSION SYSTEMS

SECTION G101
GENERAL

G101.1 Scope. This appendix shall govern the materials, design, installation, maintenance and inspection of urine diversion systems, and shall govern the disposal or treatment of *diverted urine* and the output of *urine derived products*.

G101.2 Urine diversion fixture units. Each urine diversion fixture shall be rated as one drainage fixture unit.

G101.3 Tests. The *urine diversion* system shall be tested in accordance with Section 312.

G101.4 Maintenance responsibility. The required maintenance and inspection of *urine diversion* systems shall be the responsibility of the property owner, unless otherwise required by the *code official*.

G101.5 Operation. *Urine diversion* systems shall be operated and maintained in a safe and sanitary condition in accordance with the Section G101.6.

G101.6 Operation and maintenance manual. An operation and maintenance manual shall be provided in hardcopy form and shall be transferred to the new owner or tenant upon transfer of property or tenancy. The manual shall include the following items:

1. Storage capacity for urine, flush water and additives.
2. Design loading of the system and expected inputs.
3. Expected schedule of additives.
4. Sources or provider of necessary additives. Source may be on-site.
5. Comprehensive maintenance schedule, including a pipe cleaning schedule.
6. Cleaning agents and instructions for each.
7. Instructions for all maintenance tasks.
8. If container transfer is used, container transfer plan and container cleaning instructions.

9. Disposal or beneficial use plan containing all of the following, as applicable:
   9.1. Removal schedule and service provider.
   9.2. Instructions for diversion to sewer or private sewage disposal system.
   9.3. Treatment plan and treatment system operations.
   9.4. Plan for licensing, certification, or labeling of *urine derived products.*
   9.5. Land application following a *nutrient management plan.*

G102
DEFINITIONS

G102.1 Scope. The following words and terms shall, for the purposes of this appendix, have the meanings shown herein. Refer to Chapter 2 for general definitions.

Add new definition as follows:

DIVERTED URINE. Urine that is collected separately from fecal matter.

NUTRIENT MANAGEMENT PLAN. A *nutrient management plan* outlines the quantity, timing, locations, methods and other aspects of applying plant nutrients and soil amendments to the land in order to prevent or minimize environmental impacts while maximizing horticultural benefits.

TREATED URINE. *Diverted urine* that has been treated for beneficial use.

URINE DERIVED PRODUCT. A product that is derived from urine, such as an agricultural amendment, fertilizer, or diesel exhaust fluid.

URINE DIVERSION. Collection of *diverted urine* that occurs at the fixture.

URINE DIVERTING WATER CLOSET. A fixture connected to a plumbing system that separates fecal matter and urine into separate piping. (also urine diverting flush toilet)

Add new text as follows:

SECTION G103
MATERIALS

G103.1 General. Material used for *urine diversion* shall be corrosion resistant, such as stainless steel or durable polymers. Concrete piping is prohibited.

G103.2 Identification. All *urine diversion* piping shall be identified.

G103.3 Screening. Where screening is required to prevent the unintentional entry of insects and vermin, screening shall have openings with a maximum size of 3/32 inches (2.5mm). Screening shall be made of materials compatible with the system components in contact with screen materials. Screen materials shall not generate galvanic corrosion of system components.

SECTION G104
DESIGN OF URINE DIVERSION SYSTEM

G104.1 Pipe sizing. Pipe sizes shall be in accordance with the Table 710.1(1) or shall be *approved.*

G104.2 Change of direction. Changes in direction of *urine diversion* piping shall be made by a long-sweep 90-degree fitting or other approved fittings of equivalent sweep.

G104.3 Traps. Fixtures discharging into *urine diversion* piping shall be trapped in accordance with Section 1002.

G104.4 Slope of horizontal piping. *Urine diversion* piping shall be installed at a slope conforming to the fixture manufacturer's guidelines and of not less than ¼-inch per foot (20 mm per meter), or 2 percent toward the point of storage or disposal.

G104.5 Cleanouts. A cleanout shall be provided at the upper terminal of each drain line, every 50 feet (15 m), and at any aggregate horizontal change of direction exceeding 135 degrees.

G104.6 Venting. *Urine diverting water closets* shall be vented in accordance with Chapter 9. *Urine diverting* commodes shall be vented to a composting toilet system vent in compliance with the International Private Sewage Disposal Code.

> **Exception:** Where the *code official* determines urine storage tank venting or air admittance valves are sufficient to vent fixtures, venting of fixtures shall not be required.

G104.7 Discharge. A *urine diversion* system shall be directed to a storage tank or discharged to an approved *sanitary drainage system*.

SECTION G105
URINE STORAGE TANKS

G105.1 Volume. Total urine tank storage volume shall be in accordance with Equation G-1. Where treatment by retention in accordance with Section G106.1 is specified, days in use for collection (D) shall be at least 365.

V = (C + (N x (U + F) x O)) x D (Equation G-1)

where:

V = total tank volume
C= water used per fixture per day for cleaning
C = (c + w + t)/7
c = water used per cleaning
w = cleanings per week
t = total urine diversion fixtures

N = number of users

U = urine per person per day (0.4 gallons, 1.5L)

F = flush water per day
F = f x e

f = water volume per flush
e = visits to toilet per day (5.9)

O = occupant fraction

D = days in use for collection

G105.2 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. Dedicated urine storage tank vents extending to the outdoors shall terminate no less than 12 inches (300 mm) above grade. The vent terminal shall be directed downward and screened to prevent entry of insects and vermin. Storage tank vents shall be permitted to connect to the plumbing venting system at least 6 inches (150 mm) above the flood level rim of the highest fixture.

G105.2.1 Vent size. Pressure equalization vents that prevent nitrogen loss through the use of restrictions, or of piping or tubing that is less than the minimum pipe diameter required in the plumbing code, shall be *approved*.

G105.3 Traps. Urine storage tanks shall prevent odors and nitrogen loss from the tank inlet by means of a P-trap, mechanical trap, submerged inlet piping, or other *approved* means. Submerged inlet piping shall remain submerged during use and after pumpout.

Exception: Tanks of 5.5 gallons (20 L) or less with connection to a fixture with active venting.

G105.4 Overflow. Where urine storage tank overflows are installed, they shall be connected to the *sanitary drainage system*.

G105.5 Backwater valve. When connected to a public sewer system or private sewage disposal system and where subject to *backflow*, storage tank overflows shall be provided with a *backwater valve* or check valve at the point of connection to the *sanitary drainage system*. The *backwater valve* shall be *accessible* for inspections and maintenance.

G105.6 Water level monitoring and warning. Urine storage tanks shall be provided with a water level monitoring device connected to an alarm system. The alarm system shall provide a visual and auditory warning signal when 80 percent volume is reached.

Exception: Tanks meeting one of the following requirements:

1. Where tank volume does not exceed 5.5 gallons (20 L) and the tank is located within the toilet room, a visible indicator of tank volume shall be provided.
2. Where the tank has no direct connection to urine diversion piping, is filled manually, and has a visible indicator of tank volume.

G105.7 Construction. Urine storage tanks shall be constructed of corrosion resistant materials such as stainless steel or durable polymers.

G105.8 Above grade. Where subject to freezing conditions, above grade storage tanks and associated piping shall be provided with an *approved* means of freeze protection, or fitted with high level alarms that are suitable for detecting a high level condition in the presence of ice.

G105.9 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 per square foot (lb/ft^2) (1500 kg/m^2) when the tank is designed for underground installation. Below grade urine tanks installed underground shall be provided with manholes. The manhole opening shall have a diameter of at least 20 inches (500 mm) and located at least 4 inches (100 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 hold-down capacity of the tank and hold down system shall meet or exceed the buoyancy force of the tank.

G105.10 Marking. Where openings are provided to allow a person to enter the tank, the openings shall be marked with the following words: "DANGER—CONFINED SPACE." The letters shall be not less than 0.5 inch (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied.

G105.11 Openings. All openings shall be covered and secured to prevent tampering. Openings shall be screened or covered to prevent insect and vermin entry and be protected against unauthorized human entry.

G105.12 Transfer. Where urine is transferred between tanks, cleaning of tanks and provisions for limiting user exposure shall be according to the operation and maintenance manual.

SECTION G106
TREATMENT, DISPOSAL AND BENEFICIAL USE

G106.1 Approved treatment methods.

1. Retention of diverted urine without addition for six months before usage. Two or more holding tanks shall be required for retention.
2. Heat sanitization with one of the following methods:
   2.1. Heat treatment for not less than 15 seconds and not greater than 30 minutes at a temperature calculated using Equation G-2.

   $$D = 131{,}700{,}000/10^{0.14T} \quad \textbf{(Equation G-2)}$$

   where:
   D = treatment duration (days)

   T = temperature (degrees Celsius)

   2.2. Heat treatment for not less than 30 minutes at a temperature of at least 122°F (50°C) for a period calculated using Equation G-3.

   $$D = 50{,}070{,}000/10^{0.14T} \quad \textbf{(Equation G-3)}$$

   where:
   D = treatment duration (days)

   T = temperature (degrees Celsius)

3. Other *approved* method.

G106.2 Disposal and beneficial use. *Urine diversion* systems shall have a plan for disposal or shall have a plan for beneficial use with one of the following methods. The plan shall be recorded in the operation and maintenance manual.

1. **Disposal.** Urine shall be removed by one of the following methods:
   1.1. An *approved* service provider.

   1.2. Discharge to a public sewer system or *private* sewage disposal system.

   1.3. Discharge to a nonliquid treatment system in compliance with the International Private Sewage Disposal Code.

2. **Urine derived products.** Urine shall be processed into u*rine derived products* for commercial product licensing, certification, and labeling as required by the authority having jurisdiction.
3. **Land application.** Treated urine complying with Section 105 shall be land applied following an *approved nutrient management plan* if required by the authority having jurisdiction.

Reason: Urine diversion captures urine at toilet room fixtures and directs it to collection tanks, enabling the conversion of what is currently a polluting waste into a resource for agricultural or other uses. Urine diversion has been extensively employed and researched for more than 40 years, largely in an international development context, and is now being deployed as a nutrient recovery technology at building and municipal scales. Clear code guidance is needed to enable consistent and strict public health protections, provide reliable and maintainable plumbing, and encourage proper growth of an emerging industry. This proposed appendix has the following features:

- Contains clear and enforceable standards.
- Mandates documentation on all aspects of system operation and maintenance.
- Ensures urine sanitization through onsite treatment or professional disposal.

- Controls onsite land application through nutrient management requirements.

Urine diversion has emerged as a leading technology for nutrient recovery, because 70-80% of the nitrogen and 50-65% of the phosphorus in residential wastewater come from urine alone. To meet nutrient discharge limits (without which algae blooms and other environmental harm can occur in public waterways), wastewater treatment plants must remove extremely dilute nutrients from wastewater streams using processes that are capital and energy intensive and generate potent greenhouse gasses.[1] Although nutrient recovery is a major goal of current wastewater treatment, only 11% of nitrogen and 21% of phosphorus are recovered from wastewater in the US.[2] Urine diversion has the potential to cut the energy demands and greenhouse gas emissions of water treatment by approximately a third to a half.[3]

The cost of nutrient removal from wastewater is increasingly constraining sewer districts, thereby limiting development.[4] To increase the supply of housing without increasing nutrient discharges, many cities are exploring urine diversion. For example, in 2020, the OCAPI program, a collaboration between Toulouse and Paris water authorities, installed urine diversion in a 1000-person district of Paris, France to pilot municipal-scale urine diversion and protect the Seine River.[5] In the US, the PAE Building in Portland, Oregon has a urine diversion system licensed by the Oregon Departments of Environmental Quality and Agriculture to produce commercial fertilizer directly from diverted urine.[6] The University of Michigan Department of Civil & Environmental Engineering was recently invited by the New York Department of Environmental Protection to evaluate if adding urine diversion to new buildings in New York City could enable development in an area whose treatment plant is at capacity.[7]

This proposed appendix to the IPC is based on the Recode Model Code, which incorporates the latest urine diversion research and practice from around the globe. The Recode Model Code was created in 2015 through a consensus process with a national team of U.S. experts, and was incorporated into IAPMO's 2017 Water Efficiency and Sanitation Standard (WE Stand), which was revised in 2020 and 2023. The latest Recode Model Code incorporates refinements from the WE Stand process, as well as insights derived from international codes, such as the Dutch ISSO NTR 3216 standard.

This Urine Diversion Systems proposal was created in parallel with a Composting Toilet Systems proposal for the International Private Sewage Disposal Code, which adds the Recode Model Code's clear design, installation, and inspection guidance for composting toilet systems. (1) Ahn, J. H.; Kim, S.; Park, H.; Rahm, B.; Pagilla, K; Chandran, K. N2O Emissions from Activated Sludge Processes, 2008-2009: Results of a National Monitoring Survey in the United States. Environ. Sci. Technol. 2010, 44 (12), 4505-4511. https://doi.org/10.1021/es903845y

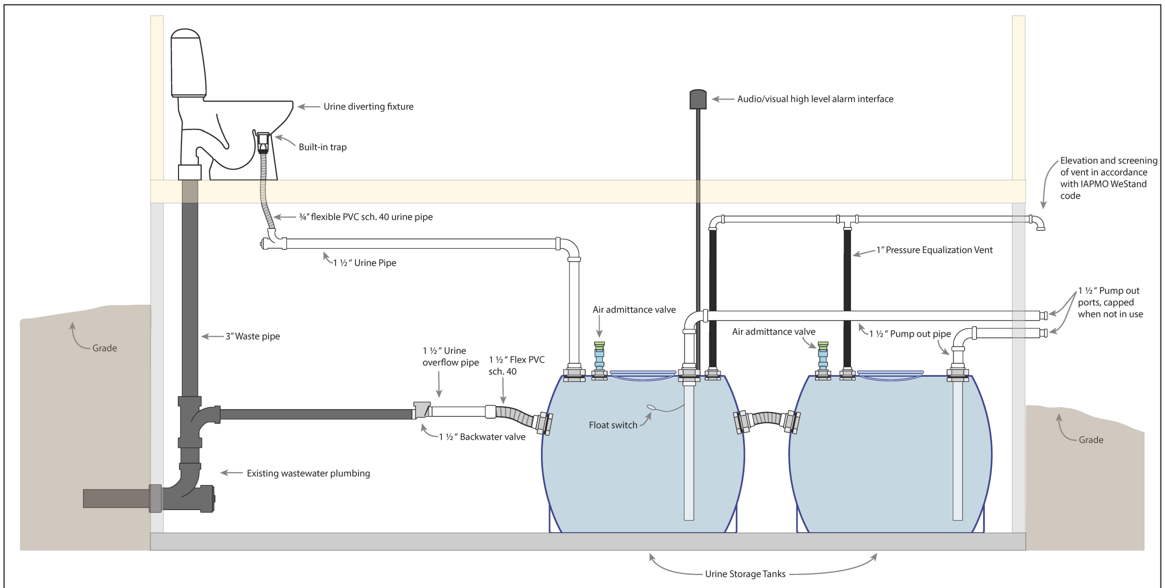
(2) Rauch-Williams, T.; Marshall, M.; Davis, D. Baseline Data to Establish the Current Amount of Resource Recovery from WRRs; Technical Report WSEC-2018-TR-003; Water Environment Federation: Alexandria, VA, 2018. https://watereuse.org/wp-content/uploads/2018/10/WRRFBaselineDataFinalReportWEF.pdf

(3)Hilton, S. P.; Keoleian, G.A.; Daigger, G.T.; Zhou, B.; Love, N. G. Life Cycle Assessment of Urine Diversion and Conversion to Fertilizer Products at the City Scale. Environ. Sci. Technol. 2021, 55 (1), 593-603. https://doi.org/10.1021/acs.est.0c04195

(4) Boyer, T.H.; Saetta, D.; Opportunities for Building-Scale Urine Diversion and Challenges for Implementation. Accounts of Chemical Research, 25 Mar 2019, 52(4):886-895. https://doi.org/10.1021/acs.accounts.8b00614

(5) Fabien Esculier, F.; Keynote. Rich Earth Summit, Brattleboro, VT, 2023. https://www.richearthsummit.org/2023recordings

(6) Lando, P.; Munoz, P. The Urine-to-Fertilizer System at the PAE Living Building. Rich Earth Summit, Brattleboro, VT, 2023. https://www.richearthsummit.org/2023recordings(7) Li, L. Advancing Urine Separation for Sustainable Food, Energy, and Water Systems. Dissertation, University of Michigan, 2023.



Notes:

- Urine pump-out pipes slope backward toward the storage tank. Pump-out to be performed using vacuum suction, using gasketed cam-lock connection between pump-out pipe and service provider's collection hose. Fitting on pump-out pipe to be capped with gasketed cam-lock connector after pump-out.
- Storage tanks sized to exceed 14 day storage capacity.
- A high-level alarm will report when storage tanks are at 75% capacity. In configurations with multiple connected tanks, the float alarm will be on the tank that receives urine from the urine collection plumbing.
- All horizontal pipe runs between fixture and storage tank: ½" : 12" slope
- Rigid pipe sch. 40 ABS or PVC unless noted
- Cleanouts or sweep fittings at corners or where appropriate
- Relative pipe elevations shown in the schematic will be recognized in installation
- Pipe connections to tank are made using bulkhead fittings or manufacturer-installed fittings.

Title:
Configuration A: Gravity flow to storage tank, overflow from storage tank
Also showing ganged tank arrangement

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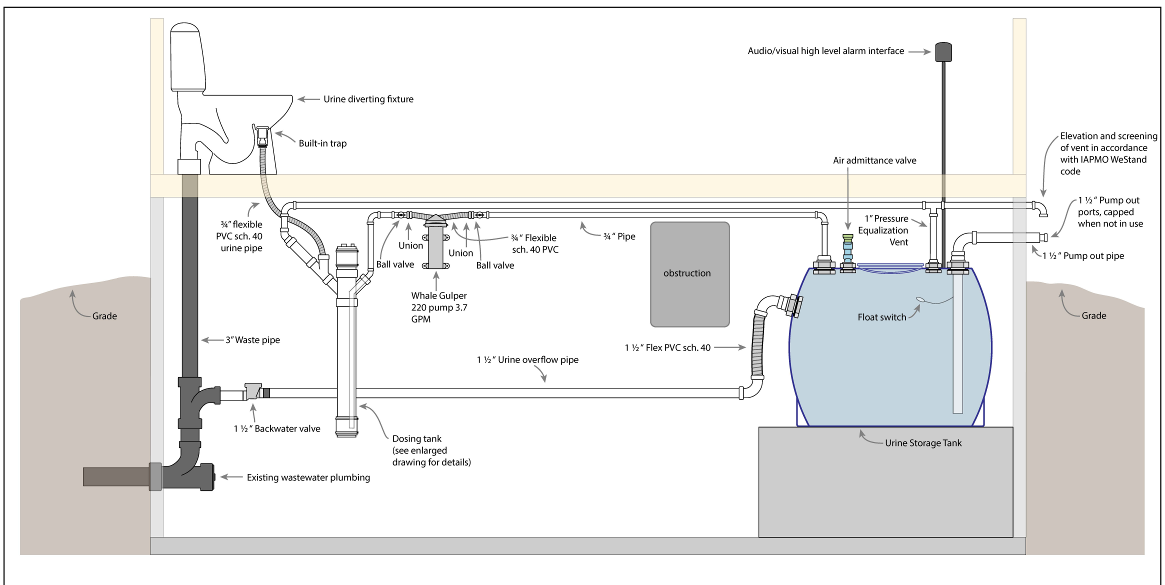
STATE OF MAINE DANIEL & MARKS NO. 10288 LICENSED PROFESSIONAL ENGINEER

Sheet: *Configuration A*
Date: *7/15/2020*
Version: *1.0*



Notes:

- Urine pump-out pipes slope backward toward the storage tank. Pump-out to be performed using vacuum suction, using gasketed cam-lock connection between pump-out pipe and service provider's collection hose. Fitting on pump-out pipe to be capped with gasketed cam-lock connector after pump-out.
- Storage tanks sized to exceed 14 day storage capacity.
- A high-level alarm will report when storage tanks are at 75% capacity. In configurations with multiple connected tanks, the float alarm will be on the tank that receives urine from the urine collection plumbing.
- All horizontal pipe runs between fixture and dosing tank: ½" : 12" slope
- Rigid pipe sch. 40 ABS or PVC unless noted
- Cleanouts or sweep fittings at corners or where appropriate
- Relative pipe elevations shown in the schematic will be recognized in installation
- Pipe connections to tank are made using bulkhead fittings or manufacturer-installed fittings.

Title:
Configuration B: Pumped flow to storage tank, overflow from storage tank

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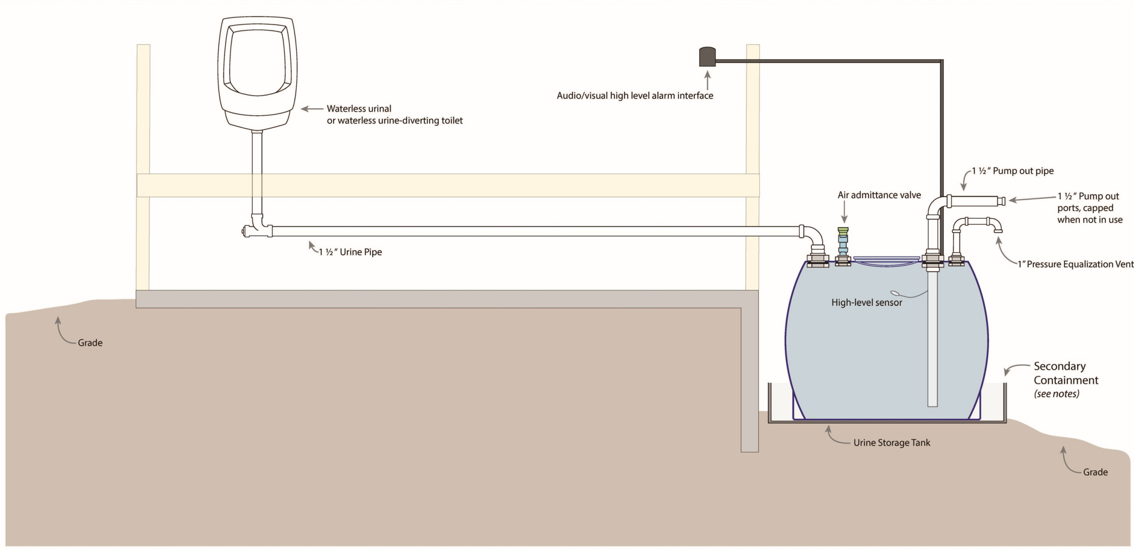
Sheet: *Configuration B*
Date: *7/15/2020*
Version: *1.0*



Notes:

- Urine pump-out pipes slope backward toward the storage tank. Pump-out to be performed using vacuum suction, using gasketed cam-lock connection between pump-out pipe and service provider's collection hose. Fitting on pump-out pipe to be capped with gasketed cam-lock connector after pump-out.
- Storage tanks sized to exceed 14 day storage capacity. Storage tanks located outside of a structure will have secondary containment equal to at last one week of storage capacity.
- A high-level alarm will report when storage tanks are at 75% capacity. In **configurations with multiple connected tanks, the alarm will be on the tank that** receives urine from the urine collection plumbing.
- **All horizontal pipe runs between fixture and storage tank: ½" : 12" slope**
- Rigid pipe sch. 40 ABS or PVC unless noted
- **Cleanouts or sweep fittings at corners or where appropriate**
- Relative pipe elevations shown in the schematic will be recognized in installation
- **Pipe connections to tank are made using bulkhead fittings or manufacturer-installed fittings.**
- **Plumbed storage tanks will be located on a concrete pad, flat undisturbed ground,** or other solid weight-bearing surface.

Title:
Configuration D: Gravity flow to storage tank, no overflow
Also showing outdoor tank

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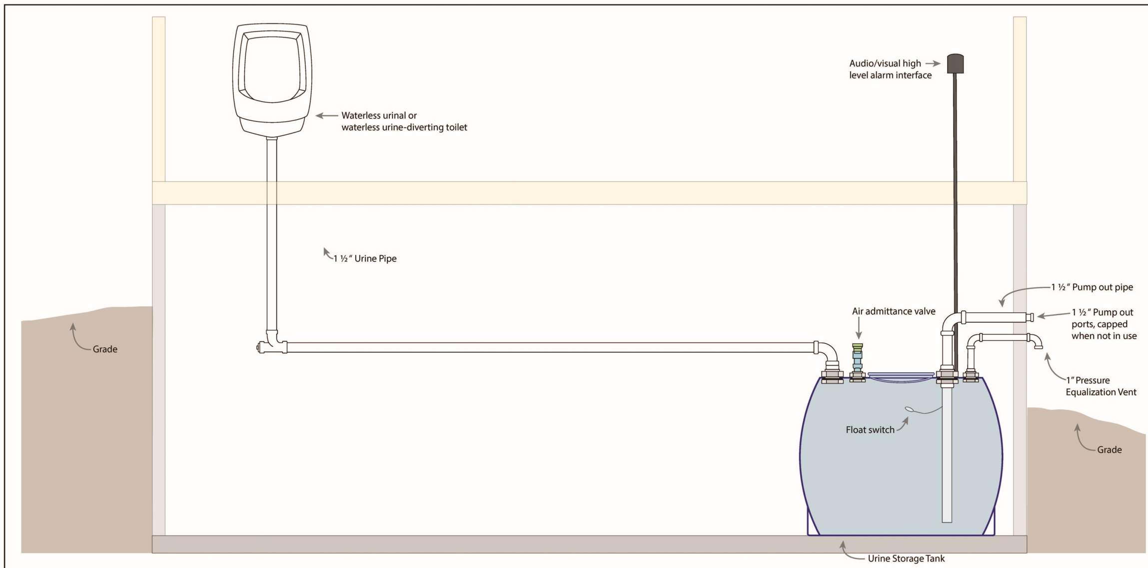
Sheet: *Configuration D (outdoor)*
Date: *3/14/2022*
Version: *1.1*



Notes:

- Urine pump-out pipes slope backward toward the storage tank. Pump-out to be performed using vacuum suction, using gasketed cam-lock connection between pump-out pipe and service provider's collection hose. Fitting on pump-out pipe to be capped with gasketed cam-lock connector after pump-out.
- Storage tanks sized to exceed 14 day storage capacity. Storage tanks located outside of a structure will have secondary containment equal to at least 7 days of storage capacity.
- A high-level alarm will report when storage tanks are at 75% capacity. In **configurations with multiple connected tanks, the float alarm will be on the tank** that receives urine from the urine collection plumbing.
- **All horizontal pipe runs between fixture and storage tank: ½" : 12" slope**
- Rigid pipe sch. 40 ABS or PVC unless noted
- **Cleanouts or sweep fittings at corners or where appropriate**
- Relative pipe elevations shown in the schematic will be recognized in installation
- **Pipe connections to tank are made using bulkhead fittings or manufacturer-installed fittings.**
- **Plumbed storage tanks will be located on a concrete pad, flat undisturbed ground,** or other solid weight-bearing surface.

Title:
Configuration D: Gravity flow to storage tank, no overflow
showing indoor tank

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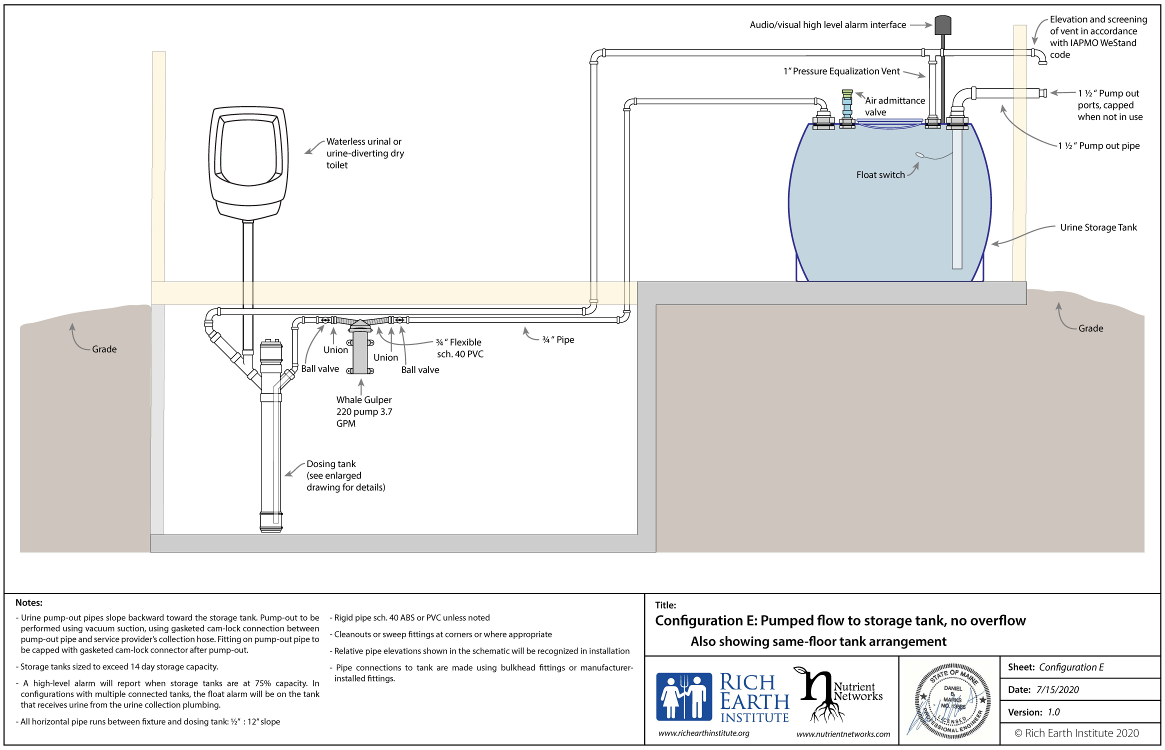
Sheet: *Configuration D (indoor)*
Date: *3/14/2022*
Version: *1.0*



Bibliography: G104.4 Slope of horizontal piping:

Per the requirements of K.3.4 *NTR 3216*, ISSO 2023. An ideal slope may be higher than 2 percent; "at least 2% (ideally 3%)," per Section 3.1 of the *Urine Diversion System with LAUFEN Save! WC Installation Guide* Version No. 01, LAUFEN, 2022.

G105.1 Volume:

Equation based on the volume calculator of Appendix K, *NTR 3216*, ISSO 2023.

Quantity of urine based on 550L per year, a number widely used in European guidance, including von Münch and Winker's *Technology Review of Urine Diversion Components,* Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH 2011. Originally from Jönsson et. al *Composition of Urine, Faeces, Greywater, and Biowaste for Utilisation in the URWARE Model*, Mistra Programme for Urban Water, 2006.

G106.1 Approved treatment methods:

Method 1, retention, per Table 5.3, *Guidelines for the Safe Use of Wastewater, Excreta and Greywater: Volume 1: Policy and Regulatory Aspects*, WHO, 2006.

Method 2, heat sanitization, per *Technical Support Document for Reduction of Pathogens and Vector Attraction in Sewage Sludge,* EPA, 1992 (EPA 822/R-93-004).

Cost Impact: Increase

Estimated Immediate Cost Impact:

Utilization of this appendix will increase the cost of initial construction by requiring additional system components and labor. In new construction, urine diversion system materials are estimated to cost an additional $940.00 per water closet, with system installation requiring an additional 8 hours of labor, for an estimated labor cost of $400.00 per installation. Jurisdictions may also require additional permitting fees, estimated to be $270.

Estimated Immediate Cost Impact Justification (methodology and variables):

Costs are estimated based on the latest (2023) cost of residential installation of a single water closet system by the Rich Earth Institute's staff in Vermont, USA. Only tank, piping, fittings, and float alarm are included in material fees, as the price of a urine diverting water closet is estimated to be equivalent to a standard water closet. While systems with multiple water closets may see lower costs per water closet due to shared tanks, piping, and float alarm, such savings are not included in the estimate. Please see Attached file Rich-Earth-UD-Options.pdf for schematic diagrams of typical installations.

Tank (including shipping): $670
Water closet: $300
Pipe and fittings: $120
Float alarm: $150
Labor (8 hours @ $50/hour): $400
Permit filing fee: $270
Wastewater design fee: $400
SUBTOTAL: $2310

P161-24

P162-24 Part I

IPC: APPENDIX G (New), SECTION G101 (New), G101.1 (New), G101.2 (New), SECTION G201 (New), G201.1 (New), SECTION 202 (New), SECTION G301 (New), G301.1 (New), G301.2 (New), G301.3 (New), G301.3.1 (New), G301.3.2 (New), G301.3.3 (New), G301.3.4 (New), G301.3.5 (New), G301.3.6 (New), G301.3.7 (New), G301.4 (New), G301.4.1 (New), G301.4.2 (New), G301.5 (New), G301.5.1 (New), G301.5.2 (New), G301.5.3 (New), G301.5.4 (New), G301.5.5 (New), G301.5.6 (New), G301.5.7 (New), G301.5.8 (New), G301.5.9 (New), G301.5.10 (New), G301.6 (New), G301.6.1 (New), G301.6.2 (New), G301.6.3 (New), G301.6.4 (New), G301.6.4.1 (New), G301.6.5 (New), TABLE G301.6.5 (New), SECTION G401 (New), G401.1 (New), TABLE G401.1 (New), G401.2 (New), G401.2.1 (New), G401.2.2 (New), G401.3 (New), TABLE G401.3 (New), G401.4 (New), SECTION G501 (New), G501.1 (New), G501.2 (New), G501.2.1 (New), G501.2.1.1 (New), G501.2.1.1.1 (New), G501.2.1.2 (New), G501.2.2 (New), G501.2.2.1 (New), 501.2.2.1.1 (New), G501.2.2.1.2 (New), G501.2.2.1.3 (New), G501.2.2.1.3.1 (New), G501.2.2.1.3.2 (New), G501.2.2.1.3.2.1 (New), G501.2.2.1.3.2.1.2 (New), G501.2.2.1.3.3 (New), G501.2.2.1.3.4 (New), G501.2.2.1.3.5 (New), G501.2.2.2 (New), G501.2.2.2.1 (New), G501.2.2.2.2 (New), G501.2.2.2.3 (New), G501.2.2.2.3.1 (New), G501.2.2.2.3.2 (New), G501.2.2.2.4 (New), G501.2.2.2.5 (New), G501.2.2.2.6 (New), G501.2.2.3 (New), G501.2.3 (New), G501.2.3.1 (New), G501.2.3.2 (New), G501.2.3.4 (New), G501.2.3.5 (New), G501.2.3.6 (New), G501.2.4 (New), G501.2.4.1 (New), G501.2.4.1.1 (New), G501.2.4.1.2 (New), G501.2.4.1.3 (New), G501.2.4.2 (New), G501.2.4.2.1 (New), G501.2.4.2.2 (New), G501.2.4.2.3 (New), G501.2.4.3 (New), G501.2.4.3.1 (New), G501.2.4.3.2 (New), G501.2.4.3.3 (New), G501.3 (New), G501.3.1 (New), G501.3.1.1 (New), G501.3.1.2 (New), G501.3.1.3 (New), G501.3.1.4 (New), G501.3.1.5 (New), G501.3.2 (New), SECTION G601 (New), G601.1 (New), TABLE G601.1 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Plumbing Code

Add new text as follows:

APPENDIX G Calculation and Labeling of the Water Use Performance of One- and Two-Family Dwellings

SECTION G101 GENERAL

G101.1 Purpose. The provisions of this appendix establish a uniform methodology for evaluating, rating and labeling the water use performance of one and two-family dwellings.

G101.2 Scope. This appendix shall provide a uniform methodology for evaluating, rating and labeling the indoor and outdoor water use performance of one- and two-family dwellings. Such evaluations, rating and labeling shall be in accordance with this appendix and RESNET/ICC-850.

SECTION G201 DEFINITIONS

G201.1 Definitions. The following terms and acronyms have specific meanings as used in this Appendix. In the event that definitions given here differ from definitions given elsewhere, the definitions given here shall govern.

Add new definition as follows:

APPROVED RATING PROVIDER.
An approved entity responsible for the certification of home water efficiency raters working under its auspices and who is responsible for the quality assurance of such Certified Raters and for the quality assurance of water efficiency ratings produced by such home water efficiency raters.

APPROVED SOFTWARE RATING TOOL.
A computerized procedure that is approved for the purpose of conducting home water efficiency ratings and calculating the annual water

consumption, annual water costs and a Water Rating Index for a home.

AUTOMATIC IRRIGATION SYSTEM.
An irrigation system that is initiated by a clock timer, irrigation controller, or other method that does not require human intervention to initiate an irrigation event.

BEDROOM.
A room or space 70 square feet of floor area or greater, with egress window and closet, used or intended to be used for sleeping. A “den,” “library,” “home office” with a closet, egress window, and 70 square feet of floor area or greater or other similar rooms shall count as a Bedroom, but living rooms and foyers shall not.

IRRIGATED AREA.
The portion of a lot that receives supplemental water for irrigation.

LOT SIZE.
The area of a single parcel of land on which the Rated Home is located.

OTHER WATER USE.
Water use associated with leaks, minor draws, and other end uses not specified in the Reference Home or Rated Home.

OUTDOOR WATER USE.
Water use that occurs outside of the exterior walls of a dwelling unit.

RATED HOME.
The specific real property that is evaluated using the water use performance rating procedures specified by this Appendix.

REFERENCE HOME.
A hypothetical home configured in accordance with the specifications set forth in Section G301.3 of this code and the basis of comparison for the purpose of calculating the Water Rating Index of a Rated Home.

RESIDENTIAL IRRIGATION CAPACITY INDEX (RICI).
The intensity with which an automatic irrigation system applies water calculated in accordance with Section G301.6.3.

WATER RATING INDEX (WRI).
An integer representing the relative water use of a Rated Home as compared with the water use of the Reference Home and where an Index value of 100 represents the water use of the Reference Home and each integer reduction represents a one percent improvement in water use efficiency.

Add new text as follows:

SECTION G301
HOME WATER RATING CALCULATION PROCEDURE

G301.1 Determining the Water Rating Index. The Water Rating Index (WRI) shall be determined in accordance with Sections G301.2 through G301.6. The Reference Home shall be configured in accordance with Sections G301.3 and G301.4, and the Rated Home shall be configured in accordance with Section G301.5 and G301.6 .

G301.2 Calculating the Water Rating Index. . A Water Rating Index shall be calculated as follows:

$$WRI = \frac{\text{indoor and outdoor daily water use for the Rated Home}}{\text{indoor and outdoor daily water use for the Reference Home}} \times 100$$

Equation G301.2-1

G301.3 Determining the Daily Indoor Water Use for the Reference Home. The indoor daily water use for the Reference Home shall be calculated as follows:
refingpd = refFgpd + refWgpd + refDWgpd + refCWgpd +

refTgpd + refSofgpd + refOther

(Equation G301.3-1)

Where:

refFgpd = daily fixture water use for the Reference Home

refWgpd = daily water use wasted from hot water outlets for the Reference Home

refDWgpd = daily dishwasher water use for the Reference Home

refCWgpd = daily clothes washer water use for the Reference Home

refTgpd = daily toilet water use for the Reference Home

refSofgpd = daily water softener water use for the Reference Home

refOther = daily total other/unidentified water use for the Reference Home

G301.3.1 Determining Daily Reference Home Fixture Water Use. Reference Home daily fixture water use shall be calculated as follows:

$refFgpd = 14.6 + 10 \times Nbr$ **(Equation G301.3.1-1)**

Where:

Nbr = number of bedrooms in the Rated Home

G301.3.2 Determining Daily Reference Home Hot Water Waste. Reference Home daily hot water waste shall be calculated as follows:

$refWgpd = 9.8 \times Nbr0.43$ **(Equation G301.3.2-1)**

Where:

Nbr = number of bedrooms

G301.3.3 Determining Daily Reference Home Dishwasher Water Use. Reference Home dishwasher water use shall be calculated as follows:

$refDWgpd = \frac{(88.4 + 34.9 \times Nbr) \times 8.16}{365}$

(Equation G301.3.3-1)

Which simplifies to:

$refWgpd = 1.97 + 0.7802 \times Nbr$

Where:

Nbr = number of bedrooms

($88.4 + 34.9 \times Nbr$) = best fit regression equation for dishwasher cycles per year using data from the 2005 Residential Energy Consumption Survey

8.16 = gallons per cycle from the DOE Technical Support Document from the NAECA standard in effect in 2006

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

G301.3.4 Determining Daily Reference Home Clothes Washer Water Use. Reference Home daily clothes washer water use shall be calculated as follows:

$refCWgpd = \frac{(3.0 \times 11.4 \times ACY)}{365}$ **(Equation G301.3.4-1)**

Where:

3.0 = reference washer capacity ($CAPw$) in ft3

11.4 = reference integrated water factor (IWF) in (gal/cyc) per ft3

ACY = Adjusted Cycles per Year = ($164 + 46.5 \times Nbr$)

Nbr = number of bedrooms

G301.3.5 Determining Daily Reference Home Toilet Water Use. Reference Home daily toilet water use shall be calculated as follows:

$refTgpd = refFPO \times refGPF \times Occ$ **(Equation G301.3.5-1)**

Where:

$RefFPO$ = the Reference Home flushes per person per day = 5.05

$RefGPF$ = the Reference Home gallons per flush for toilets = 1.6

Occ = the number of occupants = $1.09 + 0.54 \times Nbr$

Nbr = number of bedrooms

G301.3.6 Determining Daily Reference Home Water Softener Use. Where the Rated Home has a water softener and the water hardness at the Rated Home location is greater than or equal to 180 milligrams/liter, the Reference Home water softener daily water use shall be calculated as follows:

$refSofgpd = \frac{\text{grains of hardness}}{\text{gallon of water}} \times$ sum of indoor water uses in the

Reference Home $\times \frac{\text{5 gallons used}}{\text{1,000 grains removed}}$ **(Equation G301.3.6-1)**

Where the Rated Home does not meet these conditions, the *refSofgpd* = 0.

G301.3.7 Determining Daily Reference Home Other Water Use. Reference Home daily other water use shall be determined as follows:

refOther = 5.93 × *Nbr* **(Equation G301.3.7-1)**

Where:

Nbr = the number of bedrooms in the Rated Home

G301.4 Determining the Reference Home Outdoor Water Use. The reference home outdoor annual water use (in thousands of gallons per year) shall be calculated using the following two equations:

If the rated home has a netET of less than 12 inches/year OR the rated home has an automatic irrigation system, use Equation G301.4-1.

$\left[\frac{Exp(A)}{1+Exp(A)}\right] \times 1.18086 \times [2.0341 \times netET0.7154 \times Ref\_Irr\_Area0.6227 + 0.5756 \times ind\_Pool \times netET]$

(Equation G301.4-1)

If the rated home has a netET of greater than 12 inches/year AND the rated home does NOT have an automatic irrigation system, use Equation G301.4-2.

$[\left[\frac{Exp(B)}{1+Exp(B)}\right] \times 1.22257 \times [1.4233 + 0.6311 \times netET + 0.9376 \times Ref\_Irr\_Area]] + ref\_Pool$ (Equation G301.4-2)

Either equation shall be constrained as follows:

IF

Rat_Irr_Area < Ref_Irr_Area

THEN

Ref_Out = Equation G301.4-1 or G301.4-2

$\frac{\text{Equation 1 (Using Rat\_Irr\_Area and ind\_Pool = 0)}}{\text{Equation 1 (with Ref\_Irr\_Area and ind\_Pool = 0)}}$

AND

Outdoor Reference Home Annual Water

Use shall never be lower than Equation G301.4-2

Where:

Exp(A) = exponent of [1.4416 + 0.5069 × (*Irr_Area*/1,000)]

Exp(B) = exponent of [0.6911 + 0.00301 × *netET* × (*Irr_Area*/1,000)]

Ref_Irr_Area = the size of the irrigated area in the Reference Home, calculated in accordance with Section G301.4.1

Rat_Irr_Area = the size of the irrigated area in the Rated Home

NetET = the annual historic sum of mean reference evapotranspiration minus the mean precipitation for all months that evapotranspiration exceeds precipitation

ind_Pool = indicator representing the presence or absence of a swimming pool in the Rated Home

ref_Pool = Equation G301.4-1 (using *ind_Pool* = 1) – Equation G301.4-1 (using *ind_Pool* = 0)

G301.4.1 Determining Outdoor Daily Water Use for the Reference Home. Reference Home daily outdoor water use shall be determined by multiplying the result of either Equation G301.4-1 or Equation G301.4-2, as appropriate, by 1,000 and dividing the product by 365.

G301.4.2 Determining Irrigated Area for the Reference Home. Reference Home Irrigated Area shall be calculated as follows: Where the lot size of the Rated Home is less than 7,000 ft2, the Irrigated Area of the Reference Home shall be calculated as follows:

Ref_Irr_Area = *Lot_Area* × (0.002479 × *Lot_Area*0.6157) **(**Equation G301.4.2-1)

Where the Lot Size of the Rated Home is greater than or equal to 7,000 ft2, the Irrigated Area of the Reference Home shall be calculated as follows:

Ref_Irr_Area = *Lot_Area* × 0.577 **(Equation G301.4.2-2)**

Where:

Ref_Irr_Area = the size of the landscape that receives supplemental water in the Reference Home

Lot_Area = the size of the lot on which the Rated Home is being constructed

G301.5 Determining Daily Indoor Water Use of the Rated Home. The daily Indoor Water Use of the Rated Home shall be calculated as follows:
Indoorgpd = *Showergpd* + *KitchFgpd* + *LavFgpd* + *Wastegpd* + *CWgpd* + *DWgpd* + *Toiletsgpd* + *Softgpd* + *Other* + *EPgpd* **(Equation G301.5-1)**

Where:

Showergpd = daily shower water use for the Rated Home

KitchFgpd = daily kitchen faucet water use for the Rated Home

LavFgpd = daily lavatory water use for the Rated Home

Wastegpd = daily water use wasted for the Rated Home

CWgpd = daily clothes washer water use for the Rated Home

DWgpd = daily dishwasher water use for the Rated Home

Toiletsgpd = daily toilet water use for the Rated Home

Softgpd = daily water softener water use for the Rated Home

Othergpd = daily other/unidentified water use for the Rated Home

EPgpd = daily excess pressure adjustment

G301.5.1 Determining Daily Shower Water Use for the Rated Home. Rated Home daily shower water use shall be calculated as follows:

Showergpd = *FixtureTot* × *showerpc* × *SHeff* **(Equation G301.5.1-1)**

Where:*FixtureTot* = determined in accordance with ANSI/RESNET/ICC 301, Addendum A = $\frac{adjFmix}{Fmix} \times refFgpd$

Shower_pc = percent of fixture water use consumed by showers = 54%

SHeff = the ratio of the average rated flow rate of showerheads to the reference home flow rate $= \frac{\text{average flow rate of showerheads in the Rated Hame}}{2.5}$

G301.5.2 Determining Daily Kitchen Faucet Water Use for the Rated Home. Rated Home daily kitchen faucet water use shall be calculated as follows:
KitchFgpd = *FixtureTot* × *faucetpc* × *KitchFeff* × *kitch* **(Equation 301.5.2-1)**

Where:

FixtureTot = determined in accordance with ANSI/RESNET/ICC 301 Addendum A =

$\frac{adjFmix}{Fmix}$ × *refFgpd*

faucetpc = percent of fixture water use consumed by faucets = 46%

KitchFeff = the ratio of the average rated flow rate of kitchen faucets to the Reference Home flow rate

$= \frac{\text{average flow rate of kitchen faucets in the Rated Hame}}{2.2}$

Kitch = the percentage of faucet use that is attributed to kitchen faucets = 69%

G301.5.3 Determining Daily Lavatory Faucet Water Use for the Rated Home. Rated Home daily lavatory faucet use shall be calculated as follows:*LavFgpd* = FixtureTot × faucetpc × LavFeff × Lav (Equation G301.5.3-1)
Where:

Lav = the percentage of faucet use that is attributed to lavatory faucets= 31%

FixtureTot = determined in accordance with ANSI/RESNET/ICC 301 Addendum A =

$\frac{adjFmix}{Fmix}$ × *refFgpd*

faucet pc = percent of fixture water use consumed by faucets = 46%

LavFeff = the ratio of the average rated flow rate of lavatory faucets to the Water Rating Reference Home flow rate = 1 for standard faucets and 0.95 for high-efficiency faucets

G301.5.4 Determining Daily Hot Water Waste for the Rated Home. Rated Home daily hot water waste shall be calculated as follows:
Wastegpd = *Feff* × (*oWgpd* + *sWgpd* × *WDeff*) **(Equation G301.5.4-1)**

Where:

Feff = fixture efficiency of showerheads, kitchen faucets, and lavatory faucets weighted by contribution to total fixture use = daily standard operating condition hot water wasted quantity as determined by ANSI/RESNET/ICC 301 Addendum A

sWgpd = daily structural hot water wasted quantity as determined by ANSI/RESNET/ICC 301 Addendum A

WDeff = distribution system water use effectiveness from Table 4.2.2.5.2.11(3) of ANSI/RESNET/ICC 301 Addendum A

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

G301.5.5 Determining Daily Clothes Washer Water Use for the Rated Home. Rated Home daily clothes washer water use shall be calculated as follows:

$$CW_{gpd} = \frac{CAPw \times IWF \times ACY}{365}$$

(Equation G301.5.5-1)

Where:

CAPw = washer capacity in cubic feet = the manufacturer's data or the CEC database or the EPA Energy Star® website

IWF = Integrated Water Factor from manufacturer's data [(gal/cyc)/ft3]

ACY = Adjusted cycles per year

Determining ACY:

ACY = (164 + 46.5 × *Nbr*)

$$\times \frac{(3.0 \times 2.08 + 1.59)}{(CAPw \times 2.08 + 1.59)}$$

Where:*CAPw* = the capacity of the clothes washer in ft3

(164 + 46.5 × *Nbr*) = standard cycles per year based on 2005 Residential Energy Consumption Survey data

$\frac{(3.0 \times 2.08 + 1.59)}{(CAPw \times 2.08 + 1.59)}$ = best fit regression equation to adjust the standard cycles per year to account for occupancy and size of clothes washer; based on 2005 Residential Energy Consumption Survey data

G301.5.6 Determining Daily Dishwasher Water Use for the Rated Home. Rated Home daily dishwasher water use shall be calculated as follows:
DWgpd = [(88.4 + 34.9 × *Nbr*) × (12/*dWcap*) × gal/cycle/365 **(Equation G301.5.6-1)**

Where:

Nbr = number of bedrooms in the Rated Home

DWcap = capacity of the dishwasher in the Rated Home (in place settings) as included in the manufacturer's data (88.4 + 34.9 × *Nbr*) = best fit regression equation for dishwasher cycles per year using data from the 2005 Residential Energy Consumption Survey gal/cycle can be entered either directly or as listed on:

a. The ENERGY STAR product finder database.
b. The California Energy Commission (CEC) Modernized Appliance Efficiency Database.
c. The Department of Energy (DOE) Compliance Certification Management System (CCMS).

OR gal/cycle can be calculated from the Energy Guide label as follows (developed using the equations from 10 CFR 430, Subpart B, Appendix C and values on the Energy Guide label) to isolate the energy used by the appliance from the energy used in water heating):
gal/cycle = h2o_kWh × elec_h2o

h2o_kWh = LER-Appl_kWh

LER = Labeled Energy Rating in kWh per year per the dishwasher Energy Guide label

Appl_kWh = dishwasher appliance annual electric energy use = (GHWC × gas_h2o/$_therm-LER × $_kWh × elec_h2o/per_kWh) / ($_kWh × gas_h2o/$_therm-elec_h2o)

Where:

$_kWh = the cost of one kWh per the dishwasher Energy Guide label

$_therm = the cost of one therm per the dishwasher Energy Guide label

GHWC = Gas Hot Water Cost per the dishwasher Energy Guide label

elec_h2o = gallons of hot water use per cycle per unit of annual electricity use in gal × y/kWh × cyc = 1/(80 × 0.0024 × 208) = 0.02504

gas_h2o = gallons of hot water use per cycle per unit of annual gas use in gal × y/therm × cyc = 1/(80 × 8.2/0.75 × 208/100,000) = 0.5497

80 = the average hot water heater temperature rise per 10 CFR 430, Subpart B, Appendix C

0.0024 = specific heat of water in kWh/gal × F per 10 CFR 430, Subpart B, Appendix C

8.2 = specific heat of water in Btu/gal × F per 10 CFR 430, Subpart B, Appendix C

0.75 = recovery efficiency of gas hot water heater per 10 CFR 430, Subpart B, Appendix C

208 = cycles per year

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

G301.5.7 Determining Daily Toilet Water Use for the Rated Home. Rated Home daily toilet water use shall be calculated as follows:
Toiletgpd = *refFPO* × *gpf* × *Occ*
Where:

RefFPO = the reference flushes per person per day = 5.05

gpf = the average gallons per flush of all toilets installed in the Rated Home; for tank-type dual-flush toilets, use the effective flush volume per flush based on EPA Water Sense specification for Tank-Type Toilets

Occ = the number of predicted occupants in the Rated Home = 1.09 + 0.54 × *Nbr*

Nbr = the number of bedrooms in the Rated Home

G301.5.8 Determining Daily Water Softener Water Use for the Rated Home. Rated Home daily water softener water use shall be calculated as follows:

$Softgpd = \frac{\text{grains of hardness}}{\text{gallon of water}}$ × [sum of softened water

uses in the Rated Home] × [gallons used per 1,000 grains of hardness]

(Equation G301.5.8-1)

Where:

softened water = water conditioned by a water softener

G301.5.9 Determining Daily Other Water Use for the Rated Home. Rated Home daily other water use shall be calculated as follows: $Othergpd = 5.93 \times Nbr$ **(Equation G301.5.9-1)**

Where:

Nbr = the number of bedrooms in the rated home

G301.5.10 Determining Daily Excess Pressure Adjustment Water Use for the Rated Home. Where a Rated Home does not have a pressure-reducing valve or pressure tank, additional water use attributed to excess water pressure shall be calculated as follows: $EPgpd = \text{MAX}\ \{[(Showergpd + (0.5 \times (LavFgpd + KitchFgpd + Othergpd))) \times 0.006 \times (PR - 90)],0\}$ **(Equation G301.5.10-1)**

Where:

PR = static water pressure (in psi) measured at the indoor fixture outlet on the lowest floor and (if more than one) closest to the water service entry to the house

Shower and lavatory faucets controlled by integral or accessory pressure-compensating devices shall be permitted to be excluded from this equation.

G301.6 Determining Outdoor Water Use for the Rated Home. The Rated Home outdoor water use shall be calculated as follows: Where the Rated Home has an automatic irrigation system, outdoor water use shall be calculated as follows:

$\left[\frac{Exp(A)}{1 + Exp(A)}\right] \times 1.18086 \times [2.0341 \times netET0.7154 \times Rat\_Irr\_Area0.6227 + 0.5756 \times ind\_Pool \times netET]$ **(Equation G301.6-1)** Where the Rated Home does not have an automatic irrigation system, outdoor water use shall be calculated as follows:

$[\left[\frac{Exp(B)}{1 + Exp(B)}\right] \times 1.22257 \times [1.4233 + 0.6311 \times netET + 0.9376 \times Rat\_Irr\_Area]] + Pool\_use$ **(Equation G301.6-2)**

The outdoor water use for the Rated Home shall never be less than the result of the following calculation:

$\left[\frac{Exp(B)}{1+Exp(B)}\right]$ × 1.22257 × [1.4233 + 0.6311 × *netET* + 0.9376 × *Rat_Irr_Area*] **(Equation G301.6-3)**

Where:

Exp(A) = exponent of [1.4416 + 0.5069 × (*Rat_Irr_Area*/1,000)]

Exp(B) = exponent of [0.6911 + 0.00301 × netET * (*Rat_Irr_Area*/1,000)]

Rat_Irr_Area = the size of the landscape that might receive supplemental water in the Rated Home

NetET = the annual historic sum of mean reference evapotranspiration minus the mean precipitation for all months that evapotranspiration exceeds precipitation

ind_Pool = indicator representing the presence or absence of a swimming pool

Pool_use = Equation G301.6-1 (using *ind_Pool* = 1) – Equation G301.6-1 (using *ind_Pool* = 0)

G301.6.1 Determining Outdoor Daily Water Use for the Rated Home. Rated Home daily outdoor water use shall be determined by multiplying the result of either Equation G301.6-1 or Equation G301.6-2, as appropriate, as such result may be further modified pursuant to Sections G301.6.1 through G301.6.4, by 1,000 and dividing the product by 365.

G301.6.2 Weather-based Controllers. Sensor- and weather- based irrigation controllers that are certified by the US EPA WaterSense program shall decrease the portion of predicted Rated Home outdoor water use associated with irrigation (less the water use associated with pools) by 15% in homes that have automatic irrigation system.

G301.6.3 Commissioning of an Automatic Irrigation System. In Rated Homes with an automatic irrigation system, where documentation is provided, the water use associated with irrigation shall be decreased by 5% where a certified professional, as identified by a WaterSense labeled certification, has inspected the irrigation system according to the protocols identified in ASABE S626 and verified as follows:

1. Average distribution uniformity of at least 65% on turf areas.
2. Sprinklers are operating at the manufacturer's recommended water pressure +/- 10%.
3. The system operates without leaks
4. The system prevents runoff and overspray from leaving the property (checked during the audit).
5. Two seasonal water schedules (initial grow-in period and established landscape) are posted at the controller.

G301.6.4 Residential Irrigation Capacity Index (RICI). In a Rated Home with an automatic irrigation system, where documentation is provided, a RICI shall be calculated as follows:

$RICI_{rat} = \frac{\text{sum of flow (gpm) of all irrigation valves}}{\text{square feet irrigated area}} \times 1{,}000$ **(Equation G301.6.4-1)**

G301.6.4.1 Applying RICI. A Rated Home, where documentation for a RICI is provided, may adjust the volume of water use associated with irrigation (less the water use associated with pools) in the outdoor water use of the Rated Home by 10% for every point from a baseline RICI (RICI_ref) of 5.

G301.6.5 Applying Adjustments to the Outdoor Water Use of Rated Homes. Because the Water Rating Index model includes a number of percent adjustments for the outdoor water use of the Rated Home, the order of application becomes important. The correct order in which to apply these adjustments is as indicated in Table G301.6.5.

TABLE G301.6.5 APPLYING ADJUSTMENTS TO OUTDOOR WATER USE OF THE RATED HOME

STEP	SECTION	DETERMINED BY
1	G301.6.2 —Weather-based Controllers	Shall be determined by the presence or absence of a smart controller in the installed portion of the landscape.
2	G301.6.3 — Commissioning of an Automatic Irrigation System	Shall be determined by the presence or absence of commissioning in the installed portion of the landscape.
3	CI301.6.4 —Residential Irrigation Capacity Index (RICI)	Shall be calculated in accordance with Section G301.6.4 and adjusted in partially finished landscapes to be calculated as: *RICI_rat* $= \frac{\text{sum of flow (gpm) of all irrigation valves } + (0.005 \times \text{predicted } Back\_irr)}{\text{square feet irrigated area}} \times 1{,}000$ (Predicted *Back_irr* is defined in Section G401.5 .)

SECTION G401
MINIMUM RATED FEATURES

G401.1 N/A MINIMUM RATED FEATURES TABLE. The estimated annual indoor and outdoor water use shall be determined using the minimum rated features set forth in Table G401.1.

TABLE G401.1 MINIMUM RATED FEATURES

Building Element	Minimum Rated Feature
Toilet	Flush volume for each toilet as measured on-site or from manufacturer's data.
Shower/Bath	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Bathroom Faucet	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Kitchen Faucet	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Clothes Washer	Washer capacity (cubic feet) from manufacturer's data or the CEC Appliance Efficiency Database or the EPA ENERGY STAR website for all clothes washers located within the Rated Home.
Dishwasher	Capacity of the dishwasher (in place settings) as included in the manufacturer's data, labeled energy factor (cycles/kWh) for all dishwashers located within the Rated Home.
Water Softener	Gallons of water used per 1,000 grains of hardness removed.
Hot Water Distribution	Insulation *R*-value of pipe insulation, type of recirculation system, length of pipe.
Outdoor Water Use	Irrigation system type (automatic or manual), lot size, irrigated area (square feet).
Pool/Spa	Indicate presence or absence of a pool or spa.
Service Water Pressure	Service pressure of water being supplied to the home, as established by the setting of an installed pressure-reducing valve OR the setting of an installed pressure tank OR written documentation from the water supplier that service pressure to the site is 90 psi OR an on-site static pressure test.

G401.2 Data Sources. Data required for the calculation of indoor and outdoor daily water use in the Rated and Reference Homes shall be determined by the location of the Rated Home and using data as set forth in Sections G401.2.1 and G401.2.2.

G401.2.1 Net Evapotranspiration. Data for net evapotranspiration shall be determined for the location of the Rated Home using the World Water and Climate Atlas.

G401.2.2 Hardness of Water. Data for the hardness of water shall be determined by the location of the Rated Home and one of the following:

1. US Geological Survey Concentrations of Hardness as Calcium Carbonate Map.
2. Data provided by the local water supplier.
3. A hardness test of water collected in the home using an EPA-approved method for determination of hardness.

G401.3 Default Values. Values that are not available in accordance with Table G401.1 or are absent from the home at the time of the rating shall use default values in accordance with Table G401.3. Values for building elements that are not specified in Table G401.3 are required for a rating to be issued.

TABLE G401.3 DEFAULT VALUES

Building Element	Default
Water Softeners	Can be entered as 0 if they are absent from a Rated Home. If they are present and no documentation is available, they may be assumed to use 5 gallons/1,000 grains removed for cation water softeners if information is unavailable.
Clothes Washer	Same as Reference Home.
Dishwasher	Determined by ANSI/RESNET/ICC 301. A Rated Home without either a dishwasher or an undercounter cavity for placement of a dishwasher shall be assigned a Daily Dishwasher Water Use of 0.
Hot Water Distribution	Determined by ANSI/RESNET/ICC 301 Addendum A.
Outdoor Water Use	Must be done in accordance with Section G301.4.

G401.4 Incomplete Outdoor Area. To receive a rating, a home must (at a minimum) have the front yard landscape completed. Homes that do not have landscaping completed in the back yard shall be determined in accordance with Section G301.6 with the portion of landscaping that is done determining the presence or absence of an automatic irrigation system. The following steps shall be followed in determining irrigated area in this instance:
Rater must determine a line between the front and back area (*Front_area* + *Back_area* must = *Total_available_area*)

Lot_Area – Pad Footprint = *Total_available_area*

(Back_area/*Total_available_area*) × *Ref_Irr_Area* = *Predicted Back_irr*

Irr_Area = *Predicted Back_irr* + *Front_irr*

Where:

Pad Footprint = the portion of the lot area covered by the dwelling unit and any attached or detached garage

Total_available_area = the portion of the lot excluding the pad of the house that is available for landscaping or other design features (hardscape, softscape, etc.)

Front_area = the area (ft2) of the total available area that is located primarily in front of the house

Back_area = the area (ft2) of the total available area that is located primarily behind the house

Front_irr = the area located primarily in front of the house that receives supplemental water for irrigation at the time of the rating

Predicted Back_irr = the portion of the area located primarily behind the house that can be predicted to receive supplemental water for irrigation in the future

SECTION G501
CERTIFICATION AND LABELING

G501.1 STANDARD FOR CERTIFICATION AND LABELING. This section establishes minimum uniform standards for certifying and labeling home water use performance using the Water Rating Index. These include minimum requirements of the home water use rating process, standard methods for estimating water use, minimum reporting requirements, and specification of the types of ratings that are performed in accordance with this code.

G501.2 Rating Requirements. .

G501.2.1 General. The rating for a home shall be determined in accordance with Sections G501.2.1.1 through G501.2.1. 2 .

G501.2.1.1 EXISTING HOMES. For an existing home, required data shall be collected on-site.

G501.2.1.1.1 NEW HOMES. For a new, to-be-built home, the procedures of Section G401 shall be used to collect required data.

G501.2.1.2 ESTIMATED ANNUAL WATER CONSUMPTION. The collected data shall be used to estimate the annual water consumption for indoor and outdoor water use for both the Rated Home and the Reference Home as specified by Section G301.

G501.2.2 Cost Savings Estimates. Where determined, cost savings estimates for water and wastewater (sanitary sewer) service for the Rated Home shall be calculated in accordance with Sections G501.2.2.1 through G501.2.2.1.3 .

G501.2.2.1 Water Cost Savings.

501.2.2.1.1 Water Prices. Water cost savings for homes receiving potable water service from a water supplier shall be based on the schedule of rates and charges adopted by the water supplier serving the Rated Home.

G501.2.2.1.2 Relevant Rates and Charges. Water cost savings shall be calculated from the volumetric portion of the schedule of rates and charges, sometimes referred to as the commodity charge. Fixed or flat charges that do not vary with the volume of water delivered to the home, sometimes referred to as the meter charge or service charge, shall not contribute to the cost savings estimate.

G501.2.2.1.3 Water Cost Savings Calculations. .

G501.2.2.1.3.1 Average Billed Indoor Volume of the Reference Home. Convert the total annual volume of indoor water use by the Reference Home to an increment of indoor use during a water billing period by dividing the annual indoor volume by the number of bills per year generated by the water supplier (e.g., for monthly billing divide by 12 and for quarterly billing divide by 4). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed indoor volume of the Reference Home.

G501.2.2.1.3.2 Determine Outdoor Water Use for a Billing Period. Convert the total annual volume of outdoor water use in the Reference Home to an increment of outdoor use during a water billing period using one of two methods, based on prevailing practice at the location of the Rated Home.

G501.2.2.1.3.2.1 Peak Season Irrigation. Divide the annual outdoor volume by the number of bills generated by the water supplier during the irrigation season (e.g., for a 6-month irrigation season with monthly billing, divide by 6; for a 6-month irrigation season with quarterly billing, divide by 2). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed outdoor volume of the Reference Home.

G501.2.2.1.3.2.1.2 Year-Round Irrigation. Divide the annual outdoor volume by the number of bills generated by the water supplier during a full year (e.g., for monthly billing, divide by 12 and for quarterly billing, divide by 4). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed outdoor volume of the Reference Home.

G501.2.2.1.3.3 Combine Indoor and Outdoor Water Use Charges. For each billing period in a year, calculate the billed water volume by combining the average billed indoor volume with any average billed outdoor volume applicable to such billing period. Note that where peak season irrigation has been calculated, the billed water volume for the billing period outside of the irrigation season will consist entirely of the average billed indoor volume. Apply the volumetric portion of the rate schedule to the billed volume for each billing period, accounting for any rate blocks or seasonal variations in the rate schedule, to produce the billed volume charge (in dollars) for each billing period. Combine the billed volume charge for each billing period to yield the annual water volume charge of the Reference Home.

G501.2.2.1.3.4 Determine Water Use Cost for the Rated Home. Repeat the process described in Sections G501.2.2.1.3 through G501.2.2.1.3.3 for the Rated Home to calculate the annual water volume charge of the Rated Home.

G501.2.2.1.3.5 Total Estimated Water Cost Savings. Estimated water cost savings shall be the difference between the estimated annual water volume charge of the Reference Home and the estimated annual water volume charge of the Rated Home.

G501.2.2.2 Sanitary Sewer Service Cost Saving. .

G501.2.2.2.1 Sewer Service Prices. Sanitary sewer service cost savings for homes with a permanent connection to sanitary collection and treatment works shall be based on the schedule of rates and charges adopted by the sanitary sewer service provider serving the Rated Home. Note that collection and treatment of sanitary discharges may be performed by separate entities, and that billing to the Rated Home by such entities may be combined or separate.

G501.2.2.2.2 Relevant Rates and Charges. Sanitary sewer service cost savings shall be calculated from the volumetric portion of the schedule of rates and charges. Fixed or flat charges that do not vary with the volume of water delivered to the home shall not contribute to the cost savings estimate.

G501.2.2.2.3 Sewer Cost Savings Calculations. .

G501.2.2.2.3.1 Average Billed Indoor Volume of the Reference Home. Convert the total annual volume of indoor water use by the Reference Home to an increment of indoor use during a sewer billing period by dividing the annual indoor volume by the number of bills per year generated by the sewer service provider (e.g., for monthly billing, divide by 12 and for semi-annual billing, divide by 2). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed indoor volume of the Reference Home.

G501.2.2.2.3.2 Annual Sewer Volume Charge for the Reference Home. Apply the volumetric portion of the sewer rate schedule to the average billed indoor volume for each billing period, accounting for any rate blocks or seasonal variations in the rate schedule, to produce the billed volume charge (in dollars) for each billing period. Combine the billed volume charge for each billing period to yield the annual sewer volume charge of the Reference Home.

G501.2.2.2.4 Determine Annual Sewer charge for the Rated Home. Repeat the process described in Section CI501.2.2.2.3 for the

Rated Home to calculate the annual sewer volume charge of the Rated Home.

G501.2.2.2.5 Estimated Sewer Cost Savings. Estimated sewer cost savings shall be the difference between the estimated annual sewer volume charge of the Reference Home and the estimated annual sewer volume charge of the Rated Home.

G501.2.2.2.6 Combined Presentation of Cost Savings. Estimated water cost savings and estimated sewer cost savings may be presented as a total estimated cost savings when designated as “water and sewer” savings.

G501.2.2.3 Other Cost Savings. Performance attributes of the Rated Home may influence other types of charges, depending on the fee structure in the jurisdiction of the Rated Home. While less common, these savings may be significant. Any determinations for cost savings associated with the following charges shall be submitted for individual review and approval by the body providing quality assurance for the rating service provider of the Rated Home.

1. Water service connection charges, also known as tap fees.
2. Sanitary sewer service connection charges, also known as capacity charges.
3. Stormwater fees.

G501.2.3 Reports. All reports generated by an Approved Software Rating Tool shall, at a minimum, contain the information specified by Sections G501.2.3.1 through G501.2.3.6

G501.2.3.1 Location. The property location, including city, state, zip code and either the street address or the Community Name and Plan Name for the Rating.

G501.2.3.2 Name of rater. The name of the certified rater conducting the Rating.

G501.2.3 Name of provider. The name of the Approved Rating Provider under whose auspices the rater is certified.

G501.2.3.4 DATE. The date the Rating was conducted.

G501.2.3.5 TOOL NAME AND VERSION. The name and version number of the Approved Software Rating Tool used to determine the Rating.

G501.2.3.6 DISCLOSURE. The following statement in not less than 10-point font: “The Home Water Rating Standard Disclosure for this home is available from the Rating Provider.” At a minimum, this statement shall also include the Rating Provider’s mailing address and phone number.

G501.2.4 Rating Types. There shall be three Rating Types in accordance with Sections G501.2.4.1 through G501.2.4.3.

G501.2.4.1 Confirmed Rating. A Rating Type that encompasses one individual dwelling and is conducted in accordance with Sections G501.2.4.1.1 through G501.2.4.1.3.

G501.2.4.1.1 Field verified. All Minimum Rated Features of the Rated Home shall be field-verified through inspection and testing in accordance with Section G401.

G501.2.4.1.2 Entry into tool. All field-verified Minimum Rated Features of the Rated Home shall be entered into the Approved Software Rating Tool that generates the home water rating. The home water rating shall report the Water Rating Index that comports with these inputs.

G501.2.4.1.3 Quality Assurance. Confirmed Ratings shall be subjected to Quality Assurance requirements equivalent to Section 900 of the Mortgage Industry National Home Energy Rating Systems Standard.

G501.2.4.2 Sampled Ratings. A Rating Type that encompasses a set of dwellings and is conducted in accordance with Sections G501.2.4.2.1 through G501.2.4.2.3.

G501.2.4.2.1 Set of rated homes. For the set of Rated Homes, all Minimum Rated Features shall be field verified through inspection and testing of a single home in the set, or distributed across multiple homes in the set, in accordance with the requirements equivalent to Section 600 of the Mortgage Industry National Home Energy Rating Systems Standard.

G501.2.4.2.2 Worst case analysis. The threshold specifications from the Worst-Case Analysis for the Minimum Rated Features of the set of Rated Homes shall be entered into the Approved Software Rating Tool that generates the home water use rating. The home water use rating shall report the Water Rating Index that comports with these inputs.

G501.2.4.2.3 QUALITY ASSURANCE. Sampled Ratings shall be subjected to Quality Assurance requirements equivalent to Section 900 of the Mortgage Industry National Home Energy Rating Systems Standard.

G501.2.4.3 Projected Ratings. A Rating Type that encompasses one individual dwelling and is conducted in accordance with Sections G501.2.4.3.1 through G501.2.4.3.3.

G501.2.4.3.1 Minimum rated features. All Minimum Rated Features of the Rated Home shall be determined from architectural drawings, threshold specifications, and the planned location for a new home or from a site audit and threshold specifications for an existing home that is to be improved.

G501.2.4.3.2 Unknown values. Unknown values shall be determined in accordance with Section G401.3.

G501.2.4.3.3 Text required. The Projected Rating Report shall contain the following text in not less than 14-point font at the top of the first page of the report: “Projected Rating Based on Plans—Field Confirmation Required.”

G501.3 Innovative Design Requests. .

G501.3.1 Petition. Water Rating providers can petition for adjustment to the Water Rating Index for a Rated Home with features or technologies not addressed by Approved Software Rating Tools or this Standard. Innovative Design Requests (IDRs) shall be submitted to an Approved IDR authority and shall include, at a minimum, the following:

G501.3.1.1 Features required. A Rating generated from an Approved Software Rating Tool for the Rated Home without feature(s) that cannot be modeled in the software tool.

G501.3.1.2 Features not included. Written description of feature(s) not included in the Rating generated from software.

G501.3.1.3 Manufacturer’s specifications. Manufacturer’s technical and/or performance specifications for feature(s) not included in the Rating generated from the Approved Software Rating Tool.

G501.3.1.4 Estimated water use impact. Calculations or simulation results estimating the water use impact of feature(s) not included in the Rating generated from an Approved Software Rating Tool and documentation to support the calculation methodology and/or describe the modeling approach used.

G501.3.1.5 Estimated adjustment. Estimated adjustment to the Water Rating Index. Calculations shall follow the procedures of Sections G301.1 and G301.2.

G501.3.2 Approval. IDRs shall be approved on a case by case basis. The Approved IDR review authority shall accept or reject the IDR as submitted, or request additional information. The Approved IDR review authority shall assign a unique identifier to each IDR and maintain a database of IDRs. If the IDR is approved, the Water Rating provider is authorized to issue a supplemental report that adjusts the Water Rating Index, as approved.

SECTION G601
REFERENCE STANDARD

G601.1 General. See Table G601.1 for standards that are referenced in various section of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference this standard.

TABLE G601.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/RESNET/ICC-301-2022	Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index.	
RESNET/ICC-850-2020	Calculation and Labeling of the Water Use Performance of One-and Two-Family Dwellings Using the Water Rating Index	
ANSI/ASABE S626 SEP2016 (R2020)	Landscape Irrigation System Uniformity and Application Rate Testing	
--	CEC appliance database	
--	EPA Energy Star Website	
--	ENERGY STAR product finder database	
--	California Energy Commission (CEC) Modernized Appliance Efficiency Database	
--	Department of Energy (DOE) Compliance Certification Management System (CCMS).	
--	EPA Water Sense specification for Tank-Type Toilets	
--	US Geological Survey Concentrations of Hardness as Calcium Carbonate Map	
--	Mortgage Industry National Home Energy Rating Systems Standard.	

Staff Analysis: A review of the standards proposed for inclusion in the code,
ANSI/RESNET/ICC-301-2022 *Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index.*
RESNET/ICC-850-2020 *Calculation and Labeling of the Water Use Performance of One-and Two-Family Dwellings Using the Water Rating Index*
ANSI/ASABE S626 SEP2016 (R2020) *Landscape Irrigation System Uniformity and Application Rate Testing*
CEC appliance database
EPA Energy Star Website
ENERGY STAR product finder database
California Energy Commission (CEC) Modernized Appliance Efficiency Database
Department of Energy (DOE) Compliance Certification Management System (CCMS).
EPA Water Sense specification for Tank-Type Toilets
US Geological Survey Concentrations of Hardness as Calcium Carbonate Map
Mortgage Industry National Home Energy Rating Systems Standard.
, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: In response to water resources becoming increasingly strained throughout the country and water prices rising fast due to aging infrastructure and water utility rate structures, ANSI/RESNET/ICC 850-2020 was developed to provide a consistent, uniform methodology for evaluating, quantifying, and labeling the water use performance of one- and two-family dwellings and to serve as the basis for RESNET's residential water efficiency rating system (known as $HERS_{H2O}$®).

Drought, new development and aging water infrastructure can all put a strain on local water resources. In some instances this has caused local officials to put a moratorium on new permits for fear the water utility could not meet the increased demand, as described in a New York Times article. ANSI/RESNET/ICC 850 provides a much-needed resource for states, municipalities and builders to not only evaluate a home's water efficiency but to estimate their annual water use. This estimate of annual water use can serve as an important tool for anticipating the water needs of new development.

For user convenience and to provide a resource for builders to measure the water efficiency of the homes they build, ANSI/RESNET/ICC 850 should be added in its entirety as a new appendix in both the International Plumbing Code and International Residential Code since both are adopted for use in residential construction.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)

PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Bibliography: RESNET's Water Efficiency Rating System HERS$_{H2O}$® - https://www.resnet.us/about/hersh2o/

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposed language is being recommended for inclusion into the code(s) as a voluntary appendix.

P162-24 Part I

P162-24 Part II

IRC: APPENDIX CI (New), SECTION CI101 (New), CI101.1 (New), CI101.2 (New), CI201 (New), CI201.1 (New), SECTION 202 (New), SECTION CI301 (New), CI301.1 (New), CI301.2 (New), CI301.3 (New), CI301.3.1 (New), CI301.3.2 (New), CI301.3.3 (New), CI301.3.4 (New), CI301.3.5 (New), CI301.3.6 (New), CI301.3.7 (New), CI301.4 (New), CI301.4.1 (New), CI301.4.2 (New), CI301.5 (New), CI301.5.1 (New), CI301.5.2 (New), CI301.5.3 (New), CI301.5.4 (New), CI301.5.5 (New), CI301.5.6 (New), CI301.5.7 (New), CI301.5.8 (New), CI301.5.9 (New), CI301.5.10 (New), CI301.6 (New), CI301.6.1 (New), CI301.6.2 (New), CI301.6.3 (New), CI301.6.4 (New), CI301.6.4.1 (New), CI301.6.5 (New), TABLE CI301.6.5 (New), SECTION CI401 (New), CI401.1 (New), TABLE CI401.1 (New), CI401.2 (New), CI401.2.1 (New), CI401.2.2 (New), CI401.3 (New), TABLE CI401.3 (New), CI401.4 (New), CI501 (New), CI501.1 (New), CI501.2 (New), CI501.2.1 (New), CI501.2.1.1 (New), CI501.2.1.1.1 (New), CI501.2.1.2 (New), CI501.2.2 (New), CI501.2.2.1 (New), CI501.2.2.1.1 (New), CI501.2.2.1.2 (New), CI501.2.2.1.3 (New), CI501.2.2.1.3.1 (New), CI501.2.2.1.3.2 (New), CI501.2.2.1.3.2.1 (New), CI501.2.2.1.3.2.1.2 (New), CI501.2.2.1.3.3 (New), CI501.2.2.1.3.4 (New), CI501.2.2.1.3.5 (New), CI501.2.2.2 (New), CI501.2.2.2.1 (New), CI501.2.2.2.2 (New), CI501.2.2.2.3 (New), CI501.2.2.2.3.1 (New), CI501.2.2.2.3.2 (New), CI501.2.2.2.4 (New), CI501.2.2.2.5 (New), CI501.2.2.2.6 (New), CI501.2.2.3 (New), CI501.2.3 (New), CI501.2.3.1 (New), CI501.2.3.2 (New), CI501.2.3.4 (New), CI501.2.3.5 (New), CI501.2.3.6 (New), CI501.2.4 (New), CI501.2.4.1 (New), CI501.2.4.1.1 (New), CI501.2.4.1.2 (New), CI501.2.4.1.3 (New), CI501.2.4.2 (New), CI501.2.4.2.1 (New), CI501.2.4.2.2 (New), CI501.2.4.2.3 (New), CI501.2.4.3 (New), CI501.2.4.3.1 (New), CI501.2.4.3.2 (New), CI501.2.4.3.3 (New), CI501.3 (New), CI501.3.1 (New), CI501.3.1.1 (New), CI501.3.1.2 (New), CI501.3.1.3 (New), CI501.3.1.4 (New), CI501.3.1.5 (New), CI501.3.2 (New), CI601 (New), CI601.1 (New), TABLE CI601.1 (New)

Proponents: Andrew Bevis, Chair, Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

Add new text as follows:

APPENDIX CI Calculation and Labeling of the Water Use Performance of One- and Two-Family Dwellings

SECTION CI101 GENERAL

CI101.1 Purpose. The provisions of this appendix establish a uniform methodology for evaluating, rating and labeling the water use performance of one and two-family dwellings.

CI101.2 Scope. This appendix shall provide a uniform methodology for evaluating, rating and labeling the indoor and outdoor water use performance of one- and two-family dwellings. Such evaluations, rating and labeling shall be in accordance with this appendix and RESNET/ICC-850.

Add new definition as follows:

CI201 DEFINITIONS

Add new text as follows:

CI201.1 Definitions. The following terms and acronyms have specific meanings as used in this Appendix. In the event that definitions given here differ from definitions given elsewhere, the definitions given here shall govern.

Add new definition as follows:

Approved Rating Provider.
An approved entity responsible for the certification of home water efficiency raters working under its auspices and who is responsible for the quality assurance of such Certified Raters and for the quality assurance of water efficiency ratings produced by such home water

efficiency raters.

Approved Software Rating Tool.
A computerized procedure that is approved for the purpose of conducting home water efficiency ratings and calculating the annual water consumption, annual water costs and a Water Rating Index for a home.

Automatic Irrigation System.
An irrigation system that is initiated by a clock timer, irrigation controller, or other method that does not require human intervention to initiate an irrigation event.

Bedroom.
A room or space 70 square feet of floor area or greater, with egress window and closet, used or intended to be used for sleeping. A "den," "library," "home office" with a closet, egress window, and 70 square feet of floor area or greater or other similar rooms shall count as a Bedroom, but living rooms and foyers shall not.

Irrigated Area.
The portion of a lot that receives supplemental water for irrigation.

Lot Size.
The area of a single parcel of land on which the Rated Home is located.

Other Water Use.
Water use associated with leaks, minor draws, and other end uses not specified in the Reference Home or Rated Home.

Outdoor Water Use. Water use that occurs outside of the exterior walls of a dwelling unit.

Rated Home.
The specific real property that is evaluated using the water use performance rating procedures specified by this Appendix.

Reference Home. A hypothetical home configured in accordance with the specifications set forth in Section CI301.3of this code andthe basis of comparison for the purpose of calculating the Water Rating Index of a Rated Home.

Residential Irrigation Capacity Index (RICI). The intensity with which an automatic irrigation system applies water calculated in accordance with Section **CI301.6.3.**

Water Rating Index (WRI). An integer representing the relative water use of a Rated Home as compared with the water use of the Reference Home and where an Index value of 100 represents the water use of the Reference Home and each integer reduction represents a one percent improvement in water use efficiency.

Add new text as follows:

SECTION CI301
HOME WATER RATING CALCULATION PROCEDURES

CI301.1 Determining the Water Rating Index. The Water Rating Index (WRI) shall be determined in accordance with Sections CI301.2 through CI301.6. The Reference Home shall be configured in accordance with Sections CI301.3 and CI301.4, and the Rated Home shall be configured in accordance with Section CI301.5 and CI301.6 .

CI301.2 Determining the Daily Indoor Water Use for the Reference Home. The indoor daily water use for the Reference Home shall be calculated as follows:

$$WRI = \frac{\text{indoor and outdoor daily water use for the Rated Home}}{\text{indoor and outdoor daily water use for the Reference Home}} \times 100$$ **(Equation CI301.2-1)**

CI301.3 Determining the Daily Indoor Water Use for the Reference Home.. The indoor daily water use for the Reference Home shall be calculated as follows:

refingpd = refFgpd + refWgpd + refDWgpd + refCWgpd +refTgpd + refSofgpd + refOther(Equation CI301.3-1)

where: $refF_{gpd}$ = daily fixture water use for the Reference Home

refWgpd = daily water use wasted from hot water outlets for the Reference Home

refDWgpd = daily dishwasher water use for the Reference Home

refCWgpd = daily clothes washer water use for the Reference Home

refTgpd = daily toilet water use for the Reference Home

refSofgpd = daily water softener water use for the Reference Home

refOther = daily total other/unidentified water use for the Reference Home

CI301.3.1 Determining Daily Reference Home Fixture Water Use. Reference Home daily fixture water use shall be calculated as follows:

$refFgpd = 14.6 + 10 \times Nbr$ **(Equation CI301.3.1-1)**

where:

Nbr = number of bedrooms in the Rated Home

CI301.3.2 Determining Daily Reference Home Hot Water Waste. Reference Home daily hot water waste shall be calculated as follows:

$refWgpd = 9.8 \times Nbr^{0.43}$ **(Equation CI301.3.2-1)**

where:

Nbr = number of bedrooms

CI301.3.3 Determining Daily Reference Home Dishwasher Water Use. Reference Home dishwasher water use shall be calculated as follows:

$$refDWgpd = \frac{(88.4 + 34.9 \times Nbr) \times 8.16}{365}$$ **(Equation CI301.3.3-1)**

Which simplifies to:

$refWgpd = 1.97 + 0.7802 \times Nbr$

Where:

Nbr = number of bedrooms

$(88.4 + 34.9 \times Nbr)$ = best fit regression equation for dishwasher cycles per year using data from the 2005 Residential Energy Consumption Survey

8.16 = gallons per cycle from the DOE Technical Support Document from the NAECA standard in effect in 2006

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

CI301.3.4 Determining Daily Reference Home Clothes Washer Water Use. Reference Home daily clothes washer water use shall be calculated as follows:

$$refCWgpd = \frac{(3.0 \times 11.4 \times ACY)}{365}$$ **(Equation CI301.3.4-1)**

Where:

3.0 = reference washer capacity (*CAPw*) in ft3

11.4 = reference integrated water factor (IWF) in (gal/cyc) per ft3

ACY = Adjusted Cycles per Year = (164 + 46.5 × *Nbr*)

Nbr = number of bedrooms

CI301.3.5 Determining Daily Reference Home Toilet Water Use.

refTgpd= *refFPO* × *refGPF* × *Occ* **(Equation CI301.3.5-1)**

where:

refFPO = the Reference Home flushes per person per day = 5.05

refGPF = the Reference Home gallons per flush for toilets = 1.6

Occ = the number of occupants = 1.09 + 0.54 ×*Nbr*

Nbr = number of bedrooms

CI301.3.6 Determining Daily Reference Home Water Softener Use.. Where the Rated Home has a water softener and the water hardness at the Rated Home location is greater than or equal to 180 milligrams/liter, the Reference Home water softener daily water use shall be calculated as follows:

$$refSofgpd = \frac{\text{grains of hardness}}{\text{gallon of water}} \times \text{sum of indoor water uses in the Reference Home} \times \frac{\text{5 gallons used}}{\text{1,000 grains removed}}$$

Where the Rated Home does not meet these conditions, the *refSofgpd* = 0. **(Equation CI301.3.6-1)**

CI301.3.7 Determining Daily Reference Home Other Water Use. . Reference Home daily other water use shall be determined as follows:

refOther = 5.93 × *Nbr* **(Equation CI301.3.7-1)**

where:

Nbr = the number of bedrooms in the Rated Home

CI301.4 Determining the Reference Home Outdoor Water Use. The reference home outdoor annual water use (in thousands of gallons per year) shall be calculated using the following two equations:

If the rated home has a netET of less than 12 inches/year OR the rated home has an automatic irrigation system, use Equation **CI301.4-1**.

(Equation CI301.4-1)

$$\left[\frac{Exp(A)}{1 + Exp(A)}\right] \times 1.18086 \times [2.0341 \times netET0.7154 \times$$

*Ref_Irr_Area*0.6227 + 0.5756 × *ind_Pool* ×

netET]

If the rated home has a netET of greater than 12 inches/year AND the rated home does NOT have an automatic irrigation system, use

Equation CI301.4-2. $\left[\dfrac{Exp(B)}{1+Exp(B)}\right]$ × 1.22257 × [1.4233 + 0.6311 × *netET* +

0.9376 × *Ref_Irr_Area*]]+ *ref_Pool* (Equation **CI301.4-2**)*Either equation shall be constrained as follows:*

IF

Rat_Irr_Area < Ref_Irr_Area ***THEN*** *Ref_Out* = Equation **CI301.4-1** or **CI301.4-2**

$$\frac{\text{Equation 1 (Using Rat\_Irr\_Area and ind\_Pool = 0)}}{\text{Equation 1 (with Ref\_Irr\_Area and ind\_Pool = 0)}} \quad \text{(Equation CI301.4-3)}$$

AND

Outdoor Reference Home Annual Water

Use shall never be lower than Equation **CI301.4-2**

Where:

Exp(A) = exponent of [1.4416 + 0.5069 × (*Irr_Area*/1,000)]

Exp(B) = exponent of [0.6911 + 0.00301 × *netET* × (*Irr_Area*/1,000)]

Ref_Irr_Area = the size of the irrigated area in the Reference Home, calculated in accordance with Section **CI301.4.1**

Rat_Irr_Area = the size of the irrigated area in the Rated Home

netET = the annual historic sum of mean reference evapotranspiration minus the mean precipitation for all months that evapotranspiration exceeds precipitation

ind_Pool = indicator representing the presence or absence of a swimming pool in the Rated Home

ref_Pool = Equation **CI301.4-1** (using *ind_Pool* = 1) – Equation **CI301.4-1** (using *ind_Pool* = 0)

CI301.4.1 Determining Outdoor Daily Water Use for the Reference Home. . Reference Home daily outdoor water use shall be determined by multiplying the result of either Equation **CI301.4-1** or Equation **CI301.4-2**, as appropriate, by 1,000 and dividing the product by 365.

CI301.4.2 Determining Irrigated Area for the Reference Home. Reference Home Irrigated Area shall be calculated as follows: Where the lot size of the Rated Home is less than 7,000 ft2, the Irrigated Area of the Reference Home shall be calculated as follows:

Ref_Irr_Area = *Lot_Area* × (0.002479 × *Lot_Area*0.6157) **(Equation CI301.4.2-1)**

wherethe Lot Size of the Rated Home is greater than or equal to 7,000 ft2, the Irrigated Area of the Reference Home shall be calculated as follows:

Ref_Irr_Area = *Lot_Area* × 0.577Equation **CI301.4.2-2**)

Where:

Ref_Irr_Area = the size of the landscape that receives supplemental water in the Reference Home

Lot_Area = the size of the lot on which the Rated Home is being constructed

CI301.5 Determining Daily Indoor Water Use of the Rated Home.. The daily Indoor Water Use of the Rated Home shall be calculated as follows:

Indoorgpd = Showergpd + KitchFgpd + LavFgpd + Wastegpd + CWgpd + DWgpd + Toiletsgpd + Softgpd + Other + EPgpd
where: **(Equation CI301.5-1)**

Where:

Showergpd = daily shower water use for the Rated Home

KitchFgpd = daily kitchen faucet water use for the Rated Home

LavFgpd = daily lavatory water use for the Rated Home

Wastegpd = daily water use wasted for the Rated Home

CWgpd = daily clothes washer water use for the Rated Home

DWgpd = daily dishwasher water use for the Rated Home

Toiletsgpd = daily toilet water use for the Rated Home

Softgpd = daily water softener water use for the Rated Home

Othergpd = daily other/unidentified water use for the Rated Home

EPgpd = daily excess pressure adjustment

CI301.5.1 Determining Daily Shower Water Use for the Rated Home. Rated Home daily shower water use shall be calculated as follows:

Showergpd = *FixtureTot × showerpc × SHeff* **(Equation CI301.5.1-1)**
where:
FixtureTot = determined in accordance with ANSI/RESNET/ICC 301, Addendum A =

$$\frac{adjFmix}{Fmix} \times refFgpd$$

Shower_pc = percent of fixture water use consumed by showers = 54%

SHeff = the ratio of the average rated flow rate of showerheads to the reference home flow rate

$$= \frac{\text{average flow rate of showerheads in the Rated Hame}}{2.5}$$

CI301.5.2 Determining Daily Kitchen Faucet Water Use for the Rated Home. Rated Home daily kitchen faucet water use shall be calculated as follows:

KitchFgpd = FixtureTot × faucetpc × KitchFeff × kitch **(Equation CI301.5.2-1**

where:

FixtureTot = determined in accordance with ANSI/RESNET/ICC 301 Addendum A = $\frac{adjFmix}{Fmix}$ × *refFgpdfaucetpc*

= percent of fixture water use consumed by faucets = 46%

KitchFeff = the ratio of the average rated flow rate of kitchen faucets to the Reference Home flow rate

average flow rate of kitchen faucets in rated home

2.2

Kitch = the percentage of faucet use that is attributed to kitchen faucets = 69%

-

CI301.5.3 Determining Daily Lavatory Faucet Water Use for the Rated Home. . Rated Home daily lavatory faucet use shall be calculated as follows:

LavFgpd = FixtureTot × faucetpc × LavFeff × Lav **(Equation CI301.5.3-1)**

where:

Lav = the percentage of faucet use that is attributed to lavatory faucets= 31%*FixtureTot* = determined in accordance with ANSI/RESNET/ICC 301 Addendum A =

$\frac{adjFmix}{Fmix}$ x *refFgpdfaucet_pc* = percent of fixture water use consumed by faucets = 46%

LavFeff = the ratio of the average rated flow rate of lavatory faucets to the Water Rating Reference Home flow rate = 1 for standard faucets and 0.95 for high-efficiency faucets

-

CI301.5.4 Determining Daily Hot Water Waste for the Rated Home. Rated Home daily hot water waste shall be calculated as follows:

Wastegpd = *Feff* × (*oWgpd* + *sWgpd* × *WDeff*) **(Equation CI301.5.4-1)**

where:

Feff = fixture efficiency of showerheads, kitchen faucets, and lavatory faucets weighted by contribution to total fixture use (by volume)

oWgpd = daily standard operating condition hot water wasted quantity as determined by ANSI/RESNET/ICC 301 Addendum A

sWgpd = daily structural hot water wasted quantity as determined by ANSI/RESNET/ICC 301 Addendum A

WDeff = distribution system water use effectiveness from Table 4.2.2.5.2.11(3) of ANSI/RESNET/ICC 301 Addendum A

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

CI301.5.5 Determining Daily Clothes Washer Water Use for the Rated Home. Rated Home daily clothes washer water use shall be calculated as follows:

(Equation CI301.5.5-1)

$$CW_{gpd} = \frac{CAPw \times IWF \times ACY}{365}$$

where:

CAPw = washer capacity in cubic feet = the manufacturer's data or the CEC database or the EPA Energy Star® website

IWF = Integrated Water Factor from manufacturer's data [(gal/cyc)/ft3]

ACY = Adjusted cycles per year

Determining ACY:

ACY = (164 + 46.5 × *Nbr*)

$$\times \frac{(3.0 \times 2.08 + 1.59)}{(CAPw \times 2.08 + 1.59)} =$$

best fit regression equation to adjust the standard cycles per year to account for occupancy and size of clothes washer; based on 2005 Residential Energy Consumption Survey data

Where:

CAPw = the capacity of the clothes washer in ft3(164 + 46.5 × *Nbr*) = standard cycles per year based on 2005 Residential Energy Consumption Survey data

$$\frac{(3.0 \times 2.08 + 1.59)}{(CAPw \times 2.08 + 1.59)}$$

CI301.5.6 Determining Daily Dishwasher Water Use for the Rated Home. . Rated Home daily dishwasher water use shall be calculated as follows:

DWgpd = [(88.4 + 34.9 × *Nbr*) × (12/*dWcap*) × gal/cycle/365 **(Equation CI301.5.6-1)**

where:

Nbr = number of bedrooms in the Rated Home

dWcap = capacity of the dishwasher in the Rated Home (in place settings) as included in the manufacturer's data (88.4 + 34.9 × *Nbr*) = best fit regression equation for dishwasher cycles per year using data from the 2005 Residential Energy Consumption Survey gal/cycle can be entered either directly or as listed on:

a. The ENERGY STAR product finder database.
b. The California Energy Commission (CEC) Modernized Appliance Efficiency Database.
c. The Department of Energy (DOE) Compliance Certification Management System (CCMS).

OR gal/cycle can be calculated from the Energy Guide label as follows (developed using the equations from 10 CFR 430, Subpart B, Appendix C and values on the Energy Guide label) to isolate the energy used by the appliance from the energy used in water heating):gal/cycle = h2o_kWh × elec_h2o

h2o_kWh = LER-Appl_kWh

LER = Labeled Energy Rating in kWh per year per the dishwasher Energy Guide label

Appl_kWh = dishwasher appliance annual electric energy use = (GHWC × gas_h2o/$_therm-LER × $_kWh × elec_h2o/per_kWh) / ($_kWh × gas_h2o/$_therm-elec_h2o)

Where:

$_kWh = the cost of one kWh per the dishwasher Energy Guide label

$_therm = the cost of one therm per the dishwasher Energy Guide label

GHWC = Gas Hot Water Cost per the dishwasher Energy Guide label

elec_h2o = gallons of hot water use per cycle per unit of annual electricity use in gal × y/kWh × cyc = 1/(80 × 0.0024 × 208) = 0.02504gas_h2o = gallons of hot water use per cycle per unit of annual gas use in gal × y/therm × cyc = 1/(80 × 8.2/0.75 × 208/100,000) = 0.5497

80 = the average hot water heater temperature rise per 10 CFR 430, Subpart B, Appendix C

0.0024 = specific heat of water in kWh/gal × F per 10 CFR 430, Subpart B, Appendix C

8.2 = specific heat of water in Btu/gal × F per 10 CFR 430, Subpart B, Appendix C

0.75 = recovery efficiency of gas hot water heater per 10 CFR 430, Subpart B, Appendix C

208 = cycles per year

This value is determined in accordance with ANSI/RESNET/ICC 301 Addendum A.

CI301.5.7 Determining Daily Toilet Water Use for the Rated Home. Rated Home daily toilet water use shall be calculated as follows: *Toiletgpd = refFPO × gpf × Occ*

Where:

refFPO = the reference flushes per person per day = 5.05

gpf = the average gallons per flush of all toilets installed in the Rated Home; for tank-type dual-flush toilets, use the effective flush volume per flush based on EPA Water Sense specification for Tank-Type Toilets

Occ = the number of predicted occupants in the Rated Home = 1.09 + 0.54 × *Nbr*

Nbr = the number of bedrooms in the Rated Home

CI301.5.8 Determining Daily Water Softener Water Use for the Rated Home. .

Rated Home daily water softener water use shall be calculated as follows: $Softgpd = \frac{\text{grains of hardness}}{\text{gallon of water}}$ × [sum of softened water uses in the Rated Home] × [gallons used per 1,000 grains of hardness]

where: **(Equation CI301.5.8-1)**

softened water = water conditioned by a water softener

CI301.5.9 Determining Daily Other Water Use for the Rated Home. . Rated Home daily other water use shall be calculated as follows:

$Othergpd = 5.93 \times Nbr$ **(Equation CI301.5.9-1)**

where:

Where:

Nbr = the number of bedrooms in the rated home

CI301.5.10 Determining Daily Excess Pressure Adjustment Water Use for the Rated Home.. Where a Rated Home does not have a pressure-reducing valve or pressure tank, additional water use attributed to excess water pressure shall be calculated as follows:

$EPgpd = MAX \{[(Showergpd + (0.5 \times (LavFgpd + KitchFgpd + Othergpd))) \times 0.006 \times (PR - 90)],0\}$ **(Equation CI301.5.10-1)**

where:

Where:

PR = static water pressure (in psi) measured at the indoor fixture outlet on the lowest floor and (if more than one) closest to the water service entry to the house

Shower and lavatory faucets controlled by integral or accessory pressure-compensating devices shall be permitted to be excluded from this equation.

CI301.6 Determining Outdoor Water Use for the Rated Home. The Rated Home outdoor water use shall be calculated as follows: Where the Rated Home has an automatic irrigation system, outdoor water use shall be calculated as follows:

(Equation CI301.6-1)

$$\left[\frac{Exp(A)}{1 + Exp(A)}\right] \times 1.18086 \times [2.0341 \times netET0.7154 \times Rat\_Irr\_Area0.6227 + 0.5756 \times ind\_Pool \times netET]$$

Where the Rated Home does not have an automatic irrigation system, outdoor water use shall be calculated as follows:

$$\left[\frac{Exp(B)}{1 + Exp(B)}\right] \times 1.22257 \times [1.4233 + 0.6311 \times netET + 0.9376 \times Rat\_Irr\_Area]] + Pool\_use$$

(Equation **CI301.6-2**)

The outdoor water use for the Rated Home shall never be less than the result of the following calculation:

$$\left[\frac{Exp(B)}{1 + Exp(B)}\right] \times 1.22257 \times [1.4233 + 0.6311 \times netET + 0.9376 \times Rat\_Irr\_Area]$$

(Equation **CI301.6-3**)

Where:

Exp(A) = exponent of [1.4416 + 0.5069 × (*Rat_Irr_Area*/1,000)]

Exp(B) = exponent of [0.6911 + 0.00301 × netET * (*Rat_Irr_Area*/1,000)]

Rat_Irr_Area = the size of the landscape that might receive supplemental water in the Rated Home

netET = the annual historic sum of mean reference evapotranspiration minus the mean precipitation for all months that evapotranspiration exceeds precipitation

ind_Pool = indicator representing the presence or absence of a swimming pool

Pool_use = Equation **CI301.6-1** (using *ind_Pool* = 1) – Equation **CI301.6-1** (using *ind_Pool* = 0)

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CI301.6.1 **Determining Outdoor Daily Water Use for the Rated Home.** Rated Home daily outdoor water use shall be determined by multiplying the result of either Equation CI301.6-1 or Equation CI301.6-2 as appropriate, as such result may be further modified pursuant to Sections CI301.6.1 through CI301.6.4 , by 1,000 and dividing the product by 365.

CI301.6.2 Weather-based Controllers. . Sensor- and weather- based irrigation controllers that are certified by the US EPA WaterSense program shall decrease the portion of predicted Rated Home outdoor water use associated with irrigation, less the water use associated with pools, by 15% in homes that have automatic irrigation system.

CI301.6.3 **Commissioning of an Automatic Irrigation System.** In Rated Homes with an automatic irrigation system, where documentation is provided, the water use associated with irrigation shall be decreased by 5% where a certified professional, as identified by a WaterSense labeled certification, has inspected the irrigation system according to the protocols identified in ASABE S626 and verified as follows:

1. Average distribution uniformity of at least 65% on turf areas.
2. Sprinklers are operating at the manufacturer's recommended water pressure +/- 10%.
3. The system operates without leaks
4. The system prevents runoff and overspray from leaving the property (checked during the audit).
5. Two seasonal water schedules (initial grow-in period and established landscape) are posted at the controller.

CI301.6.4 **Residential Irrigation Capacity Index (RICI).** In a Rated Home with an automatic irrigation system, where documentation is provided, a RICI shall be calculated as follows:

-

(Equation CI301.6.4-1

$$RICI_{rat} = \frac{\text{sum of flow (gpm) of all irrigation valves}}{\text{square feet irrigated area}} \times 1{,}000$$

CI301.6.4.1 **Applying RICI. .** A Rated Home, where documentation for a RICI is provided, may adjust the volume of water use associated with irrigation (less the water use associated with pools) in the outdoor water use of the Rated Home by 10% for every point from a baseline RICI (RICI_ref) of 5.

CI301.6.5 **Applying Adjustments to the Outdoor Water Use of Rated Homes. .** Because the Water Rating Index model includes a number of percent adjustments for the outdoor water use of the Rated Home, the order of application becomes important. The correct order in which to apply these adjustments is as indicated in Table **CI301.6.5.**

TABLE CI301.6.5 APPLYING ADJUSTMENTS TO OUTDOOR WATER USE OF THE RATED HOME

STEP	SECTION	DETERMINED BY
1	**CI301.6.2** —Weather-based Controllers	Shall be determined by the presence or absence of a smart controller in the installed portion of the landscape.
2	**CI301.6.3** — Commissioning of an Automatic Irrigation System	Shall be determined by the presence or absence of commissioning in the installed portion of the landscape.
3	**CI301.6.4**—Residential Irrigation Capacity Index (RICI)	Shall be calculated in accordance with Section **CI301.6.4** and adjusted in partially finished landscapes to be calculated as: *RICI_rat* $= \frac{\text{sum of flow (gpm) of all irrigation valves } + (0.005 \times \text{predicted } Back\_irr)}{\text{square feet irrigated area}} \times 1{,}000$ (Predicted *Back_irr* is defined in Section **CI401.5**)

SECTION CI401 MINIMUM RATED FEATURES

CI401.1 MINIMUM RATED FEATURES TABLE. The estimated annual indoor and outdoor water use shall be determined using the minimum rated features set forth in Table **CI401.1**

TABLE CI401.1 MINIMUM RATED FEATURES

Building Element	Minimum Rated Feature
Toilet	Flush volume for each toilet as measured on-site or from manufacturer's data.
Shower/Bath	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Bathroom Faucet	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Kitchen Faucet	As imprinted on the product, stated by manufacturer in product documentation, or tested via flow rate test in the field.
Clothes Washer	Washer capacity (cubic feet) from manufacturer's data or the CEC Appliance Efficiency Database or the EPA ENERGY STAR website for all clothes washers located within the Rated Home.
Dishwasher	Capacity of the dishwasher (in place settings) as included in the manufacturer's data, labeled energy factor (cycles/kWh) for all dishwashers located within the Rated Home.
Water Softener	Gallons of water used per 1,000 grains of hardness removed.
Hot Water Distribution	Insulation *R*-value of pipe insulation, type of recirculation system, length of pipe.
Outdoor Water Use	Irrigation system type (automatic or manual), lot size, irrigated area (square feet).
Pool/Spa	Indicate presence or absence of a pool or spa.
Service Water Pressure	Service pressure of water being supplied to the home, as established by the setting of an installed pressure-reducing valve OR the setting of an installed pressure tank OR written documentation from the water supplier that service pressure to the site is 90 psi OR an on-site static pressure test.

CI401.2 Data Sources. Data required for the calculation of indoor and outdoor daily water use in the Rated and Reference Homes shall be determined by the location of the Rated Home and using data as set forth in Sections **CI401.2**.1 and **CI401.2**.2.

CI401.2.1 Net Evapotranspiration. Data for net evapotranspiration shall be determined for the location of the Rated Home using the World Water and Climate Atlas.

CI401.2.2 Hardness of Water. Data for the hardness of water shall be determined by the location of the Rated Home and one of the following:

1. US Geological Survey Concentrations of Hardness as Calcium Carbonate Map.
2. Data provided by the local water supplier.

3. A hardness test of water collected in the home using an EPA-approved method for determination of hardness.

CI401.3 Default Values. Values that are not available in accordance with Table CI401.1 5.0 or are absent from the home at the time of the rating shall use default values in accordance with Table **CI401.3** . Values for building elements that are not specified in Table **CI401.3** are required for a rating to be issued.

TABLE CI401.3 DEFAULT VALUES

Building Element	Default
Water Softeners	Can be entered as 0 if they are absent from a Rated Home. If they are present and no documentation is available, they may be assumed to use 5 gallons/1,000 grains removed for cation water softeners if information is unavailable.
Clothes Washer	Same as Reference Home.
Dishwasher	Determined by ANSI/RESNET/ICC 301. A Rated Home without either a dishwasher or an undercounter cavity for placement of a dishwasher shall be assigned a Daily Dishwasher Water Use of 0.
Hot Water Distribution	Determined by ANSI/RESNET/ICC 301 Addendum A.
Outdoor Water Use	Must be done in accordance with Section CI301.4

CI401.4 Incomplete Outdoor Area. To receive a rating, a home must (at a minimum) have the front yard landscape completed. Homes that do not have landscaping completed in the back yard shall be determined in accordance with Section **CI301.6** with the portion of landscaping that is done determining the presence or absence of an automatic irrigation system. The following steps shall be followed in determining irrigated area in this instance:
Rater must determine a line between the front and back area (*Front_area* + *Back_area* must = *Total_available_area*)

Lot_Area – Pad Footprint = *Total_available_area*

(Back_area/*Total_available_area*) × *Ref_Irr_Area* = *Predicted Back_irr*

Irr_Area = *Predicted Back_irr* + *Front_irr*

Where:

Pad Footprint = the portion of the lot area covered by the dwelling unit and any attached or detached garage

Total_available_area = the portion of the lot excluding the pad of the house that is available for landscaping or other design features (hardscape, softscape, etc.)

Front_area = the area (ft2) of the total available area that is located primarily in front of the house

Back_area = the area (ft2) of the total available area that is located primarily behind the house

Front_irr = the area located primarily in front of the house that receives supplemental water for irrigation at the time of the rating

Predicted Back_irr = the portion of the area located primarily behind the house that can be predicted to receive supplemental water for irrigation in the future

CI501
CERTIFICATION AND LABELING

CI501.1 STANDARD FOR CERTIFICATION AND LABELING. This section establishes minimum uniform standards for certifying and labeling home water use performance using the Water Rating Index. These include minimum requirements of the home water use rating process, standard methods for estimating water use, minimum reporting requirements, and specification of the types of ratings that are performed in accordance with this code.

CI501.2 Rating Requirements. .

CI501.2.1 General. The rating for a home shall be determined in accordance with Sections CI501.2.1.1through CI501.2.1. 2.

CI501.2.1.1 EXISTING HOMES. For an existing home, required data shall be collected on-site.

CI501.2.1.1.1 NEW HOMES. For a new, to-be-built home, the procedures of Section CI401 shall be used to collect required data.

CI501.2.1.2 ESTIMATED ANNUAL WATER CONSUMPTION. The collected data shall be used to estimate the annual water consumption for indoor and outdoor water use for both the Rated Home and the Reference Home as specified by Section CI301

CI501.2.2 Cost Savings Estimates. Where determined, cost savings estimates for water and wastewater (sanitary sewer) service for the Rated Home shall be calculated in accordance with Sections CI501.2.2.1 through CI501.2.2.1.3

CI501.2.2.1 Water Cost Savings. .

CI501.2.2.1.1 Water Prices. Water cost savings for homes receiving potable water service from a water supplier shall be based on the schedule of rates and charges adopted by the water supplier serving the Rated Home.

CI501.2.2.1.2 Relevant Rates and Charges. Water cost savings shall be calculated from the volumetric portion of the schedule of rates and charges, sometimes referred to as the commodity charge. Fixed or flat charges that do not vary with the volume of water delivered to the home, sometimes referred to as the meter charge or service charge, shall not contribute to the cost savings estimate.

CI501.2.2.1.3 Water Cost Savings Calculations. .

CI501.2.2.1.3.1 Average Billed Indoor Volume of the Reference Home. Convert the total annual volume of indoor water use by the Reference Home to an increment of indoor use during a water billing period by dividing the annual indoor volume by the number of bills per year generated by the water supplier (e.g., for monthly billing divide by 12 and for quarterly billing divide by 4). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed indoor volume of the Reference Home.

CI501.2.2.1.3.2 Determine Outdoor Water Use for a Billing Period. Convert the total annual volume of outdoor water use in the Reference Home to an increment of outdoor use during a water billing period using one of two methods, based on prevailing practice at the location of the Rated Home.

CI501.2.2.1.3.2.1 Peak Season Irrigation. Divide the annual outdoor volume by the number of bills generated by the water supplier during the irrigation season (e.g., for a 6-month irrigation season with monthly billing, divide by 6; for a 6-month irrigation season with quarterly billing, divide by 2). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed outdoor volume of the Reference Home.

CI501.2.2.1.3.2.1.2 Year-Round Irrigation. Divide the annual outdoor volume by the number of bills generated by the water supplier during a full year (e.g., for monthly billing, divide by 12 and for quarterly billing, divide by 4). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed outdoor volume of the Reference Home.

CI501.2.2.1.3.3 Combine Indoor and Outdoor Water Use Charges. For each billing period in a year, calculate the billed water volume by combining the average billed indoor volume with any average billed outdoor volume applicable to such billing period. Note that where peak season irrigation has been calculated, the billed water volume for the billing period outside of the irrigation season will consist entirely of the average billed indoor volume. Apply the volumetric portion of the rate schedule to the billed volume for each billing period, accounting for any rate blocks or seasonal variations in the rate schedule, to produce the billed volume charge (in dollars) for each billing period. Combine the billed volume charge for each billing period to yield the annual water volume charge of the Reference Home.

CI501.2.2.1.3.4 Determine Water Use Cost for the Rated Home. Repeat the process described in Sections CI501.2.2.1.3 through CI501.2.2.1.3.3 for the Rated Home to calculate the annual water volume charge of the Rated Home.

CI501.2.2.1.3.5 Total Estimated Water Cost Savings. Estimated water cost savings shall be the difference between the estimated annual water volume charge of the Reference Home and the estimated annual water volume charge of the Rated Home.

CI501.2.2.2 Sanitary Sewer Service Cost Savings. .

CI501.2.2.2.1 Sewer Service Prices. Sanitary sewer service cost savings for homes with a permanent connection to sanitary collection and treatment works shall be based on the schedule of rates and charges adopted by the sanitary sewer service provider serving the Rated Home. Note that collection and treatment of sanitary discharges may be performed by separate entities, and that billing to the Rated Home by such entities may be combined or separate.

CI501.2.2.2.2 Relevant Rates and Charges. Sanitary sewer service cost savings shall be calculated from the volumetric portion of the schedule of rates and charges. Fixed or flat charges that do not vary with the volume of water delivered to the home shall not contribute to the cost savings estimate.

CI501.2.2.2.3 Sewer Cost Savings Calculations. .

CI501.2.2.2.3.1 Average Billed Indoor Volume of the Reference Home. Convert the total annual volume of indoor water use by the Reference Home to an increment of indoor use during a sewer billing period by dividing the annual indoor volume by the number of bills per year generated by the sewer service provider (e.g., for monthly billing, divide by 12 and for semi-annual billing, divide by 2). Convert the units of consumption of the Reference Home as necessary to match the units of the rate schedule (e.g., 1,000 gallons, 100 cubic feet) to yield the average billed indoor volume of the Reference Home.

CI501.2.2.2.3.2 Annual Sewer Volume Charge for the Reference Home. Apply the volumetric portion of the sewer rate schedule to the average billed indoor volume for each billing period, accounting for any rate blocks or seasonal variations in the rate schedule, to produce the billed volume charge (in dollars) for each billing period. Combine the billed volume charge for each billing period to yield the annual sewer volume charge of the Reference Home.

CI501.2.2.2.4 Determine Annual Sewer charge for the Rated Home. . Repeat the process described in Section CI501.2.2.2.3 for the Rated Home to calculate the annual sewer volume charge of the Rated Home.

CI501.2.2.2.5 Estimated Sewer Cost Savings. . Estimated sewer cost savings shall be the difference between the estimated annual sewer volume charge of the Reference Home and the estimated annual sewer volume charge of the Rated Home.

CI501.2.2.2.6 Combined Presentation of Cost Savings. . Estimated water cost savings and estimated sewer cost savings may be presented as a total estimated cost savings when designated as “water and sewer” savings.

CI501.2.2.3 Other Cost Savings. Performance attributes of the Rated Home may influence other types of charges, depending on the fee structure in the jurisdiction of the Rated Home. While less common, these savings may be significant. Any determinations for cost savings associated with the following charges shall be submitted for individual review and approval by the body providing quality assurance for the rating service provider of the Rated Home.

1. Water service connection charges, also known as tap fees.
2. Sanitary sewer service connection charges, also known as capacity charges.
3. Stormwater fees.

CI501.2.3 Reports. All reports generated by an Approved Software Rating Tool shall, at a minimum, contain the information specified by Sections CI501.2.3.1 through CI501.2.3.6.

CI501.2.3.1 LOCATION. The property location, including city, state, zip code and either the street address or the Community Name and Plan Name for the Rating.

CI501.2.3.2 NAME OF RATER. The name of the certified rater conducting the Rating.

CI501.2.3.2 NAME OF Provider. The name of the Approved Rating Provider under whose auspices the rater is certified.

CI501.2.3.4 DATE. The date the Rating was conducted.

CI501.2.3.5 TOOL NAME AND VERSION. The name and version number of the Approved Software Rating Tool used to determine the Rating.

CI501.2.3.6 DISCLOSURE. The following statement in not less than 10-point font: “The Home Water Rating Standard Disclosure for this home is available from the Rating Provider.” At a minimum, this statement shall also include the Rating Provider’s mailing address and phone number.

CI501.2.4 Rating Types. . There shall be three Rating Types in accordance with Sections CI501.2.4.1through CI501.2.4.3.

CI501.2.4.1 Confirmed Rating. . A Rating Type that encompasses one individual dwelling and is conducted in accordance with Sections CI501.2.4.1.1 through CI501.2.4.1.3 .

CI501.2.4.1.1 Field verified. All Minimum Rated Features of the Rated Home shall be field-verified through inspection and testing in accordance with Section CI401 .

CI501.2.4.1.2 Entry into tool. All field-verified Minimum Rated Features of the Rated Home shall be entered into the Approved Software Rating Tool that generates the home water rating. The home water rating shall report the Water Rating Index that comports with these inputs.

CI501.2.4.1.3 Quality Assurance. Confirmed Ratings shall be subjected to Quality Assurance requirements equivalent to Section 900 of the Mortgage Industry National Home Energy Rating Systems Standard.

CI501.2.4.2 Sampled Ratings. . A Rating Type that encompasses a set of dwellings and is conducted in accordance with Sections CI501.2.4.2.1 through CI501.2.4.2.3.

CI501.2.4.2.1 Set of rated homes. For the set of Rated Homes, all Minimum Rated Features shall be field verified through inspection and testing of a single home in the set, or distributed across multiple homes in the set, in accordance with the requirements equivalent to Section 600 of the Mortgage Industry National Home Energy Rating Systems Standard.

CI501.2.4.2.2 Worst case analysis. The threshold specifications from the Worst-Case Analysis for the Minimum Rated Features of the set of Rated Homes shall be entered into the Approved Software Rating Tool that generates the home water use rating. The home water use rating shall report the Water Rating Index that comports with these inputs.

CI501.2.4.2.3 QUALITY ASSURANCE. Sampled Ratings shall be subjected to Quality Assurance requirements equivalent to Section 900 of the Mortgage Industry National Home Energy Rating Systems Standard.

CI501.2.4.3 Projected Ratings. . A Rating Type that encompasses one individual dwelling and is conducted in accordance with Sections CI501.2.4.3.1 through CI501.2.4.3.3 .

CI501.2.4.3.1 Minimum rated features. All Minimum Rated Features of the Rated Home shall be determined from architectural drawings, threshold specifications, and the planned location for a new home or from a site audit and threshold specifications for an existing home that is to be improved.

CI501.2.4.3.2 Unknown values. Unknown values shall be determined in accordance with Section CI401.3 5.2.

CI501.2.4.3.3 Text required. The Projected Rating Report shall contain the following text in not less than 14-point font at the top of the first page of the report: “Projected Rating Based on Plans—Field Confirmation Required.”

CI501.3 Innovative Design Requests. .

CI501.3.1 Petition. Water Rating providers can petition for adjustment to the Water Rating Index for a Rated Home with features or technologies not addressed by Approved Software Rating Tools or this Standard. Innovative Design Requests (IDRs) shall be submitted to an Approved IDR authority and shall include, at a minimum, the following:

CI501.3.1.1 Features required. A Rating generated from an Approved Software Rating Tool for the Rated Home without feature(s) that cannot be modeled in the software tool.

CI501.3.1.2 Features not included. Written description of feature(s) not included in the Rating generated from software.

CI501.3.1.3 Manufacturer’s specifications. Manufacturer’s technical and/or performance specifications for feature(s) not included in the Rating generated from the Approved Software Rating Tool.

CI501.3.1.4 Estimated water use impact. Calculations or simulation results estimating the water use impact of feature(s) not included in the Rating generated from an Approved Software Rating Tool and documentation to support the calculation methodology and/or describe the modeling approach used.

CI501.3.1.5 Estimated adjustment. Estimated adjustment to the Water Rating Index. Calculations shall follow the procedures of Sections CI301.1 and CI301.2 .

CI501.3.2 Approval.. IDRs shall be approved on a case by case basis. The Approved IDR review authority shall accept or reject the IDR as submitted, or request additional information. The Approved IDR review authority shall assign a unique identifier to each IDR and maintain a database of IDRs. If the IDR is approved, the Water Rating provider is authorized to issue a supplemental report that adjusts the Water Rating Index, as approved.

CI601
REFERENCE STANDARDS

CI601.1 General. See Table CI601.1 for standards that are referenced in various section of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference this standard.

TABLE CI601.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/RESNET/ICC-301-2022	Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index.	

RESNET/ICC-850-2020	Calculation and Labeling of the Water Use Performance of One-and Two-Family Dwellings Using the Water Rating Index	
ANSI/ASABE S626 SEP2016 (R2020)	Landscape Irrigation System Uniformity and Application Rate Testing	
--	CEC appliance database	
--	EPA Energy Star Website	
--	ENERGY STAR product finder database	
--	California Energy Commission (CEC) Modernized Appliance Efficiency Database	
--	Department of Energy (DOE) Compliance Certification Management System (CCMS).	
--	EPA Water Sense specification for Tank-Type Toilets	
--	US Geological Survey Concentrations of Hardness as Calcium Carbonate Map	
--	Mortgage Industry National Home Energy Rating Systems Standard.	

Staff Analysis: A review of the standards proposed for inclusion in the code,

ANSI/RESNET/ICC-301-2022 *Standard for the Calculation and Labeling of the Energy Performance of Dwelling and Sleeping Units using an Energy Rating Index.*

RESNET/ICC-850-2020 *Calculation and Labeling of the Water Use Performance of One-and Two-Family Dwellings Using the Water Rating Index*

ANSI/ASABE S626 SEP2016 (R2020) *Landscape Irrigation System Uniformity and Application Rate Testing*

CEC appliance database

EPA Energy Star Website

ENERGY STAR product finder database

California Energy Commission (CEC) Modernized Appliance Efficiency Database

Department of Energy (DOE) Compliance Certification Management System (CCMS).

EPA Water Sense specification for Tank-Type Toilets

US Geological Survey Concentrations of Hardness as Calcium Carbonate Map

Mortgage Industry National Home Energy Rating Systems Standard.

, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: In response to water resources becoming increasingly strained throughout the country and water prices rising fast due to aging infrastructure and water utility rate structures, ANSI/RESNET/ICC 850-2020 was developed to provide a consistent, uniform methodology for evaluating, quantifying, and labeling the water use performance of one- and two-family dwellings and to serve as the basis for RESNET's residential water efficiency rating system (known as HERS$_{H2O}$®).

Drought, new development and aging water infrastructure can all put a strain on local water resources. In some instances this has caused local officials to put a moratorium on new permits for fear the water utility could not meet the increased demand, as described in a New York Times article. ANSI/RESNET/ICC 850 provides a much-needed resource for states, municipalities and builders to not only evaluate a home's water efficiency but to estimate their annual water use. This estimate of annual water use can serve as an important tool for anticipating the water needs of new development.

For user convenience and to provide a resource for builders to measure the water efficiency of the homes they build, ANSI/RESNET/ICC 850 should be added in its entirety as a new appendix in both the International Plumbing Code and International Residential Code since both are adopted for use in residential construction.

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC) PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Bibliography: RESNET's Water Efficiency Rating System HERS$_{H2O}$® - https://www.resnet.us/about/hersh2o/

Cost Impact: Increase

Estimated Immediate Cost Impact:

$50 to $300 per home

Estimated Immediate Cost Impact Justification (methodology and variables):

This cost comes from a small survey of what third party home rating firms currently charge for completing the water efficiency rating for various sizes of typical homes. Larger homes may cost more than small homes and builders with more homes may receive volume discounts. The costs also vary based on geographic location of the home rating companies.

Estimated Life Cycle Cost Impact:

N/A

Estimated Life Cycle Cost Impact Justification (methodology and variables):

N/A

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IPC: APPENDIX G (New), SECTION G101 (New), A101 (New), A101.1 (New), SECTION G102 (New), 303.1 (New), SECTION G103 (New), 303.2 (New), 303.3 (New), 303.4 (New), 303.5 (New), G103.5 (New), G103.6 (New), G103.7 (New), SECTION G104 (New), G104.1 (New), SECTION G105 (New), G105.1 (New), G106 (New), G106.1 (New), TABLE G106.1 (New)

Proponents: Edward R. Osann, Natural Resources Defense Council, Natural Resources Defense Council (eosann@nrdc.org); Sun Kim, SGK Consulting (iso30500toilet@gmail.com); CJ Lagan, LIXIL (cj.lagan@lixil.com); ALBERT ROBERT (BoB) RUBIN, NCSU, ncsu (rubin@ncsu.edu)

2024 International Plumbing Code

Add new text as follows:

APPENDIX G NONSEWERED SANITATION SYSTEMS

SECTION G101 GENERAL

G101.1 Applicability. The provisions of this chapter shall apply to the installation of nonsewered sanitation systems.

G101.2 System requirements.
Nonsewered sanitation systems shall comply with ANSI/CAN/IAPMO/ISO 30500.

SECTION G102 DEFINITIONS

G102.1 General. For purposes of this chapter, the following definitions shall apply:

CONDITIONED SPACE. An area, room, or space normally occupied and being heated or cooled for human habitation by any equipment.

NONSEWERED SANITATION SYSTEM. A prefabricated integrated sewage treatment unit that is not connected to a public sewer or private sewage disposal system.

SECTION G103 INSTALLATION

G103.1 General.
The installation of nonsewered sanitation systems shall be in accordance with the manufacturer's installation instructions and with Sections G103.2 through G103.7.

G103.2 Operating conditions.
A nonsewered 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.

G103.3 Clearances for servicing and maintenance.
A nonsewered 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.

G103.4 Backflow prevention.

A domestic water supply connection to a nonsewered sanitation system shall be protected in accordance with Section 608 of this code.

G103.5 Effluent storage. Any container or vessel for the storage of effluent discharged from a nonsewered sanitation system and not integral to such system shall be installed in accordance with Section 1301.9.

G103.6 Systems employing combustion. A nonsewered sanitation system employing combustion shall comply with the *International Mechanical Code* .

G103.7 Connection to plumbing system not required. A nonsewered sanitation system is not required to be connected to the sanitary drainage system of the *building* or premises.

SECTION G104 MANUAL REQUIRED

G104.1 Operation and maintenance manual. Nonsewered sanitation systems shall have an operation and maintenance manual provided by the manufacturer.

SECTION G105 SYSTEM OUTPUT

G105.1 General. The use or disposal of all substances exiting the nonsewered sanitation system shall be determined by the authority having jurisdiction.

G106 REFERENCE STANDARDS

G106.1 General. See Table G106.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title and the section or sections of this appendix that reference the standard.

TABLE G106.1 REFERENCE STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/CAN/IAPMO/ISO 30500-2019	*Non-sewered sanitation systems — Prefabricated integrated treatment units — General safety and performance requirements for design and testing*	G101.2

Staff Analysis: A review of the standard proposed for inclusion in the code, CAN/IAPMO/ISO 30500:2019 *Non-Sewered Sanitation Systems-Prefabricated Integrated Treatment Units-General Safety and performance Requirements for Design and Testing*, with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.

Reason: This proposal covers the essential considerations that a building official must assess when a nonsewered sanitation system (NSSS) as defined herein is installed in a building. **It is identical to language adopted as Appendix CG in the 2024 IRC.** Because the early entries of NSSSs into the marketplace are likely to be multi-user systems for installation in multifamily and commercial buildings covered by the IPC, this proposal will be useful to adopting jurisdictions.

Designed for operation without a sewer connection and, in many cases, without a dedicated water supply, NSSSs are anticipated to meet critical public health needs in areas with limited water and wastewater infrastructure, water supply constraints, and/or unfavorable soils for traditional on-site disposal methods. In the U.S., over 20% of the population relies on an on-site wastewater system. And even today, a portion of our population does not have access to fully functioning sanitation, largely due to lack of affordable infrastructure or to challenging site conditions. In 2011, the Bill & Melinda Gates Foundation launched the "Reinvent the Toilet Challenge" to bring new technology to bear to achieve sustainable sanitation solutions. The target is a factory-built device that provides complete and effective treatment of human sanitary waste, unconnected to any sewer or drainage network and with minimal inputs of energy and water. Eight teams received Foundation support to develop prototypes for lab testing, field trials, and commercialization. Among these initial devices, three broad pathways for treatment technology have emerged -- electro-chemical, biological, and combustion -- and in some cases, combinations of these in the same device. Manufacturers have been involved in these efforts, and LIXIL (owner of the American Standard brand) and other companies are working to develop compliant systems for both domestic and international installations. It is the general preference of manufacturers to design and market systems that are compliant with published codes and standards, rather than one-off compliance reviews by individual jurisdictions.To facilitate commercialization of hi-tech toilets and their acceptance by state and national regulatory bodies, an ISO standard was adopted in 2018 to establish the key performance attributes of NSSSs. Standard 30500, *Non-sewered sanitation systems - Prefabricated integrated treatment units - General safety and performance requirements for design and testing*, sets performance requirements for solid and liquid outputs, odor, noise, air emissions, materials, safety, marking, and ergonomics, together with relevant test procedures for measuring the attainment of these requirements. This ISO standard was adopted in identical form as a U.S. and Canadian national standard in 2019, designated as ANSI/CAN/IAPMO/ISO 30500:2019.This proposal addresses the considerations that must be taken into account by building officials regarding the placement and installation of NSSSs in buildings. The proposal would permit (but not require) the installation of a NSSS listed to the ISO standard, and provide an exception to the general requirement in the IPC that sanitation devices be connected to the building drainage system. Certain key protections, such as backflow prevention, proper ventilation of combustion-based units, and proper siting of storage tanks (if any) external to the unit are each specified in the proposal. Considerations of the use and disposal of outputs of the system are specifically referred to an AHJ, which most likely will be a health department.

Criteria for the functioning of the unit for its intended purpose are established by the ISO standard and do not need to be repeated in plumbing code language. It should be noted that the ISO standard was developed by an international group of scientists, engineers, and regulators to assure the highest levels of treatment would apply to all outputs (air, water, and solids) from the device. The performance-based standards allow a variety of technologies to be applied, so long as key metrics are achieved. The microbiological reduction requirements for solid and liquid waste are based on the quantitative microbial risk assessment (QMRA) method recognized by the World Health Organization for this purpose. The requirements of the standard mimic the highest quality standards imposed by regulatory agencies on waste-derived materials destined for reuse. The standard's test procedures are rigorous (both lab and field tests are required), and the proposal allows only NSSSs listed to the standard to be approved for installation under this appendix.

With "Reinvented Toilets" meeting the 30500 standard now on the cusp of commercialization, the arrival of such toilets at job sites across the country can reasonably be expected by the time this code update is published and adopted by states and localities, e.g., 2028. Clear code language will accelerate the availability of safe sanitation for people who lack it today. While much is still unknown about the cost, maintenance, and reliability of NSSSs, or even the business model for their installation and servicing, forward-looking communities and jurisdictions with acute sanitation needs or water supply constraints will want to be prepared for the safe installation and use of this promising new technology as it enters the market. **Section 311 of the 2024 IPC already allows ISO 30500-compliant systems to be used for toilets for construction workers.** This proposal lays out the necessary groundwork for code officials to inspect and approve their installation within buildings, set out in an appendix available for voluntary adoption by state and local code bodies.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0. This voluntary appendix sets basic requirements for the installation of NSSSs in buildings, but as with the IPSDC, it does not *require* their installation in *any* building. A project developer will only incur the costs of an NSSS if he/she elects to do so.

Estimated Immediate Cost Impact Justification (methodology and variables):

A nonsewered sanitation system (NSSS) can be expected to cost more than a traditional flush toilet. However, NSSSs may be more cost competitive in applications that would otherwise require a traditional on-site treatment system, i.e., septic tank and drain field, and may become the system of choice where soil conditions or space constraints preclude the traditional approach. Section 1101 of the 2024 IPSDC requires residential on-site treatment systems to comply with *either* NSF 40 *or* ISO 30500, allowing the project applicant to make the choice based on price and other relevant factors.

Nonsewered sanitation systems (NSSSs) have yet to enter the US market, so reliable cost data is not available for analysis. But it is reasonable to assume that the cost of purchasing and installing a sanitation system providing complete on-site treatment of human waste will be more than the cost of a conventional toilet discharging to a sanitary sewer. At a meeting of the ISO Project Committee 305's working group in South Africa in June 2023, a European NSSS developer stated plans to bring a household-scale NSSS to market for $1,000 by early 2025, but there is no way to evaluate this claim in advance of market entry.

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