IRC — Plumbing

2018 GROUP A PROPOSED CHANGES TO THE I-CODES COLUMBUS COMMITTEE ACTION HEARINGS

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2018 GROUP A – PROPOSED CHANGES TO THE INTERNATIONAL RESIDENTIAL CODE – PLUMBING/ MECHANICAL

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TENTATIVE ORDER OF DISCUSSION
2018 PROPOSED CHANGES TO THE INTERNATIONAL RESIDENTIAL BUILDING CODE – PLUMBING

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 RP code change proposals may not be included on this list, as they are being heard by another committee.

- P1-18 Part II
- RB4-18
- P58-18 Part II

RP1-18

RP2-18

- P11-18 Part II
- P8-18 Part II
- P7-18 Part II

RP3-18

- P63-18 Part II
- P44-18 Part II
- P45-18 Part II
- P46-18 Part II

RP4-18

- P47-18 Part II
- P50-18 Part II
- P48-18 Part II
- P33-18 Part II
- P71-18 Part II
- F14-18 Part II
- P97-18 Part II
- P98-18 Part II
- P79-18 Part II
- P82-18 Part II
- RP16-18
- P77-18 Part II

RP5-18

RP6-18

RP7-18

RP8-18

RP9-18

RP10-18

- RP15-18
- P87-18 Part II
- P88-18 Part II

RP11-18

- P89-18 Part II

RP12-18

- P131-18 Part II
- P132-18 Part II
- P103-18 Part II
- P106-18 Part II
- P109-18 Part II
- P113-18 Part II
- P133-18 Part II

RP13-18

- P115-18 Part II

RP14-18

RP1-18

IRC: P2503.4

Proponent: Gary Kozan, Ridgeway Plumbing, representing Ridgeway Plumbing (garyk@ridgewayplumbing.com)

2018 International Residential Code

Revise as follows:

P2503.4 Building sewer testing. The *building sewer* shall be tested by insertion of a test plug at the point of connection with the public sewer, filling the *building sewer* with water and pressurizing the sewer to not less than a ~~10~~5-foot (3048 mm) head of water. The test pressure shall not decrease during a period of not less than 15 minutes. The *building sewer* shall be water tight at all points.
A forced sewer test shall consist of pressurizing the piping to a pressure of not less than 5 psi (34.5 kPa) greater than the pump rating and maintaining such pressure for not less than 15 minutes. The forced sewer shall be water tight at all points.

Reason:
For consistency with P2503.5.1, which requires a 5-foot head test for interior DWV systems. There is no reason for outside drainage piping to be tested differently than inside piping.

Cost Impact
The code change proposal will not increase or decrease the cost of construction .

This is only a change in test pressure. There is no extra labor or extra materials required that would impact the cost of construction.

Internal ID: 274

RP2-18

IRC: P2503.5.1

Proponent: Janine Snyder, City of Thornton, representing Colorado Association of Plumbing & Mechanical Officials (CAPMO) (Janine.Snyder@cityofthornton.net)

2018 International Residential Code

P2503.5.1 Rough plumbing. DWV systems shall be tested on completion of the rough piping installation by water or, for piping systems other than plastic, by air, without evidence of leakage. Either 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 ~~5~~ 10 feet (~~1524~~ 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.

Reason:

In the 2015 cycle, the IRC was changed to reduce the DWV water test pressure from 10 feet of head to 5 feet of head, yet the air test pressure remains at the equivalent of 10 feet of head or 5 psi. Since it is important enough to maintain the equivalent air test pressure for the 10 feet of head then why are we creating a conflict within the same code section between water and air tests. The DWV material performs in the exact same manner in an IRC building as it does in an IPC building, and the pipe used for DWV systems in an IRC building is the same pipe allowed for use in an IPC building. Furthermore, the integrity of the 10 feet of head test was important enough for the IPC committee to disapprove the reduction in the water test pressure in the 2015 and 2018 codes, so why are we risking a compromise to the IRC structures by allowing a reduced test pressure that allows leaks in the system to go undetected until they cause damage. This code change corrects the conflict between the air and water test within the IRC requirements, and this code change will also address the conflicting test pressures between the IPC and the IRC for the water test.

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

The test is already a requirement within the code and a change in test pressure doesn't impact labor or materials.

Internal ID: 2378

RP3-18

IRC: P2705.1, P2708.6 (New), P2713.4 (New), SECTION P2726 (New), P2726.1 (New), P2726.2 (New), P2726.2.1 (New), P2726.2.2 (New), P2726.3 (New), P2726.4 (New), P2726.4.1 (New), P2726.4.2 (New), P2726.4.3 (New), P2726.5 (New), P2726.6 (New)

Proponent: Jake Pauls, representing Jake Pauls Consulting Services (bldguse@aol.com)

2018 International Residential Code

Revise as follows:

P2705.1 General. The installation of fixtures shall conform to the following:

1. Floor-outlet or floor-mounted fixtures shall be secured to the drainage connection and to the floor, where so designed, by screws, bolts, washers, nuts and similar fasteners of copper, copper alloy or other corrosion-resistant material.
2. Wall-hung fixtures shall be rigidly supported so that strain is not transmitted to the plumbing system.
3. Where fixtures come in contact with walls and floors, the contact area shall be water tight.
4. Plumbing fixtures shall be usable including safety of users of showers, bathtubs and bathtub-shower combinations in accordance with R301.1, R306, R307, R308, R311, R320, P2701, P2708, P2713, and P2726.
5. Water closets, lavatories and bidets. A water closet, lavatory or bidet shall not be set closer than 15 inches (381 mm) from its center to any side wall, partition or vanity or closer than 30 inches (762 mm) center-to-center between adjacent fixtures. There shall be a clearance of not less than 21 inches (533 mm) in front of a water closet, lavatory or bidet to any wall, fixture or door.
6. The location of piping, fixtures or equipment shall not interfere with the operation of windows or doors.
7. In flood hazard areas as established by Table R301.2(1), plumbing fixtures shall be located or installed in accordance with Section R322.1.6.
8. Integral fixture-fitting mounting surfaces on manufactured plumbing fixtures or plumbing fixtures constructed on site, shall meet the design requirements of ASME A112.19.2/CSA B45.1 or ASME A112.19.3/CSA B45.4.

Add new text as follows:

P2708.6 Grab Bars and Stanchions for Showers and Bathtub-Shower Combinations. Showers and bathtub-shower combinations shall provide stanchions or similar vertically-oriented, handholds typically not attached to walls, and grab bars in accordance with P2726.

P2713.4 Grab Bars and Stanchions for Bathtubs and Bathtub-Shower Combinations. Bathtubs and bathtub-shower combinations shall provide grab bars or stanchions in accordance with P2726.

SECTION P2726 GRAB BARS FOR BATHTUBS AND SHOWERS.

P2726.1 General. Grab Bars and Stanchions for Bathtubs, Bathtub-Shower Combinations, and Showers. Bathtubs, bathtub-shower combinations, and showers not required to be accessible shall be provided with grab bars or stanchions complying with P2726.1 through P2726.6. Dimensions specified are to the centerline of the grab bar or stanchion.

P2726.2 Grab Bars or Stanchions for Bathtubs and Bathtub-Showers. Grab bars or stanchions complying with P2726.2.1 and P2726.2.2 shall be provided at bathtubs and bathtub-shower combinations.

P2726.2.1 Vertical Grab bar or Stanchion. A vertical grab bar or stanchion shall be provided and shall comply with the following criteria.

1. Approach. The grab bar or stanchion shall be located so that it is usable without any obstruction. An unobstructed clear floor space 21 inches (533 mm) wide minimum and 21 inches (533 mm) deep minimum, measured from the outer side of the bathtub, shall be provided and shall be located within 12 inches (305 mm) of the grab bar or stanchion.

2. Length. The grab bar or stanchion shall be 36 inches (914 mm) long minimum.

3. Position. The grab bar or stanchion shall be positioned in accordance with the following criteria:

   3.1. The lower end of the grab bar or stanchion shall be 24 inches (610 mm) minimum and 27 inches maximum above the finished floor.

   3.2. Grab bars located inside a combination bathtub-shower compartment shall have their centerline 6 inches (152 mm) minimum, measured horizontally, to the shower curtain rod and 8 inches (200 mm) maximum, measured horizontally from the outer side of the bathtub.

   3.3. Grab bars and stanchions shall be permitted within 6 inches (152 mm) outside of the outer side of the bathtub complying with P2726.2.1.1

P2726.2.2 Horizontal Grab Bar. A 24-inch (610 mm) long minimum grab bar shall be provided on the long, non-entry side of bathtubs and bathtub-shower combinations. The grab bar shall be installed in a horizontal position and shall be centered, plus or minus two inches, along the length of the tub. The horizontal grab bar shall be located 8 inches (205 mm) minimum and 10 inches (255 mm) maximum above the tub rim.

Exception: A diagonal grab bar or, with 24 inches (610 mm) minimum length is permitted if installed with its higher end 12 inches (305mm) maximum from the control wall. The higher end of the grab bar shall be 25 inches (635 mm) minimum and 27 inches (685 mm) maximum above the tub rim. The lower end shall be located 8 inches (205 mm) minimum and 10 inches (255 mm) maximum above the tub rim.

P2726.3 Vertical Grab Bar or Stanchion for Showers. A vertical grab bar or stanchion shall be provided for showers. The vertical grab bar or stanchion shall be located either interior to or outside the shower compartment, within 3 inches (76 mm) of the compartment access and egress opening. The grab bar or stanchion shall be 24 inches (610 mm) long minimum with its lower end 39 inches (991 mm) maximum above the finished floor.

P2726.4 Other Details. Grab bars and stanchions shall comply with P2726.4

P2726.4.1 Cross Section. Grab bars and stanchions shall be circular in cross section having an outside diameter of 1.25 inches (32 mm) minimum and 2 inches (51 mm) maximum.

P2726.4.2 Spacing. The space between the grab bar or stanchion and adjacent surfaces plus water controls shall be 1.5 inches (32 mm) minimum.

P2726.4.3 Surface Hazards. Grab bars, stanchions and adjacent surfaces shall be free of sharp or abrasive elements. Edges shall be rounded with a minimum radius of 0.25 inch (6 mm).

P2726.5 Structural Characteristics. Allowable stresses shall not be exceeded for materials used when a vertical or horizontal force of 250 pounds (1112 N) is applied an any point on the grab bar, stanchion, fasteners, mounting device or supporting structure. Grab bars and stanchions shall not rotate within their fittings.

P2726.6 Design and Installation for Water. Grab bars, stanchions, fasteners, mounting device or supporting structure shall be designed and installed in accordance with P2701.1, with suitable materials, to withstand effects of water, including corrosion and other deterioration through their service life.

Reason:

"Reason Statement" or Justification for Grab Bars and Stanchions

for Bathtubs, Bathtub-Shower Combinations and Showers

Complying with New Requirements in IRC, especially Section P2726

Proposed by Jake Pauls, BArch, CPE, HonDSc

Introduction

Points of Control. Grab bars, handrails and stanchions are important building components providing—in combination with our hands and our feet—what are called (in ergonomics) "points of control" to maintain balance and aid in ambulation and other movement activities that are crucial to utilizing means of egress for safety generally (in both normal and emergency conditions) and which pose dangers of injurious falls, the leading source of injuries in most countries, including the USA.

A brief digression to explain "stanchions." You see them routinely on transportation vehicles such as subway trains and city buses. They are the **vertical** assemblies of graspable tubing that are fixed between ceilings, horizontal handrails just above head height, seats, floors, etc. usually located between seating and passageways or aisles. The term, stanchions is used in ADA requirements for transportation vehicles and for this context Wikipedia has the following description: “On board most buses and trams/subways, vertical supports to provide stability when passengers are standing. They are located throughout most city buses and are connected to seats, floor, roof, etc.” This term is used in contexts similar to those for the “poles” referred to in NFPA’s recent adoption of new requirements for grab bars or poles for new bathtubs, bathtub-shower combinations and showers.

Examples of Points of Control in Specific Contexts. The starred, central cell of Table 1. shows the equity, with points of control—**shown in bold italics**—achieved with now-proposed grab bars, handrails and stanchions being required, in Section 1003, in the same way that handrails are required for stairs in the rest of the IBC.

Table 1. Minimum Number of Points of Control Provided

with New (★) or Currently Imposed Rules or Practices

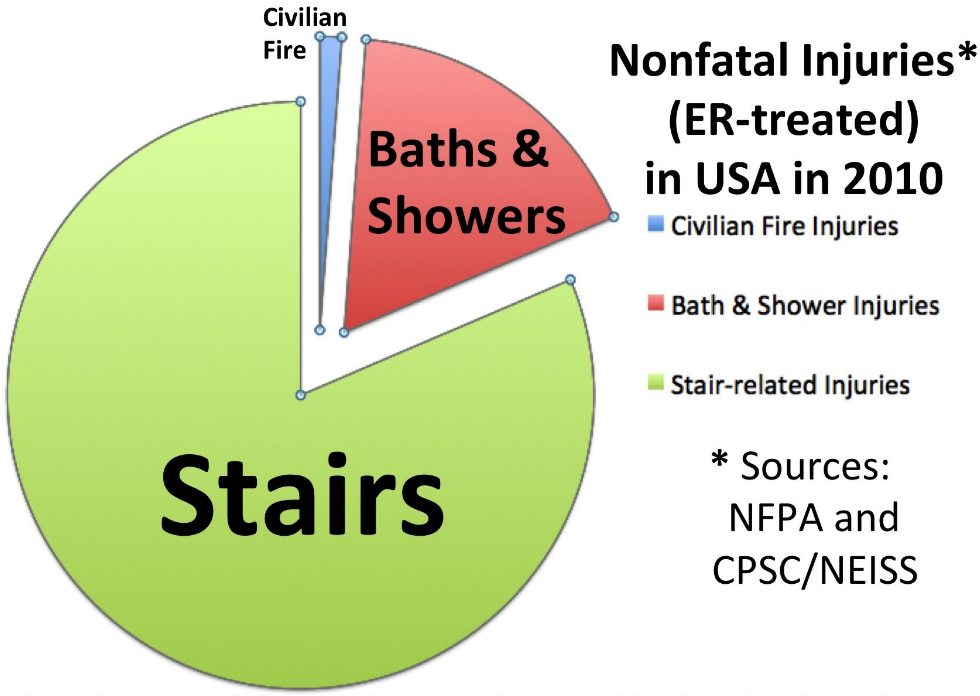
Number of Points of Control Via Hands or Feet	≤1	1	2	3	3-4
Standard walker for older adult with altered gait.					✔
Occupational settings with risk of worker falls from heights. Also, stairs where users can use two handrails simultaneously, one on each side.				✔	
Stairs where users have only a single handrail. ***Grab bar(s) usable for bathtub/shower entry/egress.***			✔ ★		
Bathtubs/showers with slip resistant underfoot surfaces when wet.		✔			
Bathtubs/showers without slip resistant underfoot surfaces when wet, the common condition currently.	✔				

The Problems To Be Solved with A New Requirement for Grab bars, handrails and stanchions. The central and most important point of this code change proposal is to respond to the relatively high risk of injurious falls when entering and exiting bathing/showering facilities, in all new settings where they occur. Such risks exceed those for stairs on an exposure-adjusted basis. That is, the time during which one is stepping into or out of a bathtub or shower is more risky than a similar stepping behavior on a stair. The former result in about 25 percent of the injuries as do falls on stairs. This is based on about 300,000 US hospital emergency room visits per year for bathtubs and showers versus about 1.2 million US hospital emergency room visits per year for stairs, using comparably serious injury data for 2010 (discussed by Lawrence, et al., 2015 in the journal Injury Prevention). The societal cost of these injuries, plus about two and a half times additional, medically treated injuries, was (for 2010) about 20 billion dollars for US bathtubs and showers and about 93 billion dollars for US stairs with the greatest risk for both being in homes, where bathing/showering is a near daily activity for most people in the US (Lawrence, et al, 2015). (See also the annex to this justification for details of injuries documented by the US Consumer Product Safety Commission, CPSC.)

Table 1 depicts the current inequity as well as the increased equity that will be achieved when bathtubs and showers are subject to the same principle about availability of points of control (usable by ones hands or feet) that are crucial to our stability in utilizing those portions of the means of egress that entail elevation differences, changes of slope, and changes in slip resistance. The current—at best—one point of control provided with typical bathtubs and showers (i.e., one foot in a stable placement on a slip-resistant surface) would be augmented by one point of control available reliably to one hand. This achieves equity of safety with stairs where we can count on one foot planted on a tread and one hand on a handrail. For some situations, involving bathtubs used for immersion bathing (with occupants seated or lying on the bottom of the tub) two points of control, utilizing grab bars, handrails or stanchions—one for each hand—are needed for this equity and, more practically, to accomplish the relatively difficult stand-to-sit and sit-to-stand transfers within the tub.

Size of the Problem with Bathtubs and Showers Compared to Other Large Problems. Figure 1, a pie chart, shows the approximate scales of the nonfatal injury problem for three dangers to building occupants. In the US, the traditional danger of fire-related injuries is far smaller than that from bathing/showering and even smaller in relation to stair-related injuries. Right now, in the I-Codes, the segment for bathing/showering is not addressed while many, many pages of the I-Codes deal with fire-related injury prevention. Again, the proposal for grab bars and other points of control to be provided equitably, will provide a major improvement to injury prevention that, heretofore, has been largely ignored in code development and in practice except in some hotel properties where no more than half of the grab bars, handrails or stanchions to be required under the new proposal are provided for bathtubs.

Figure 1. Comparing three dangers resulting in injuries in buildings



There is an inverse relationship between these epidemiological insights and the extent of coverage of the great dangers of stairs and baths/showers in building codes and housing codes plus leading healthy homes literature.

International Codes, Scientific/Technical/Policy/Managerial Perspectives

Precedent Set by NFPA Codes. The foregoing is the philosophical and epidemiological foundation for the proposed addition of requirements for grab bars, handrails and stanchions in Section 1003 of the IBC and, in future or elsewhere, in the I-Codes generally. There is also the precedent taken in NFPA 101 and NFPA 5000 in their 2018 editions where grab bars (alternatively poles which are given the more-technical name "stanchions" in this IBC proposal) were proposed and almost completely adopted (with the exception of health care, discussed below) for new bathtubs and showers in buildings regulated by these codes. The new requirements were mostly noncontroversial and it is hoped that the same will be true with the proposals now submitted to the I-Codes. The justification for the new requirements far outweigh the opposition to them as the ergonomic, biomechanics, epidemiological, etiological and economic aspects have been carefully considered and addressed to the satisfaction of many people who know building codes and safety standards well and whose votes on the many committees considering the issue attest to the multiple justifications for this new feature of building codes and safety standards.

Parallel Code Development Activity in Canada. A proposal, comparable to what NFPA has adopted, is being addressed by a Grab Bar Task Group for the National Building Code of Canada and, when its next cycle commences, will also be proposed for action by the ICC A117 Committee for a new section, on mainstreamed grab bar, handrail and stanchion features for the A117.1 standard. Leaders in the standards and codes field, conversant with the value of grab bars, handrails and stanchions have been discussing such mainstreaming since early 2016, at an international meeting of experts on bathing/showering safety held in Toronto and partly available for study in a free streaming video that is available with several other streaming videos addressing points of control, grab bars, cost-benefit issues, etc., that are all listed in the Bibliography provided with this proposal. So a lot of the groundwork has been laid and different perspectives have been elicited and discussed.

Survey of Existing Facilities. Centered on hotels, health care facilities**, airport airline club shower facilities*, and homes, the proponent for this code change has been conducting a personal, opportunity-based survey of bathing/showering facilities worldwide, including the following countries where his work on building use and safety has taken him in recent years or his work is followed by other professionals, including public health authorities.

- Canada**
- USA* **
- UK*

- Sweden**
- Finland
- Netherlands
- Italy
- Singapore*
- Australia**
- New Zealand
- Japan

The survey is documented in many hours of video and thousands of photographs plus many measurements, in residential occupancies, of three-, four-, five-piece bathrooms ranging in size from a few square meters (20 square feet) to spaces big enough to park an automobile, occasionally with tubs and showers almost that big. Generally, the more compact the bathroom, the easier it is to provide the needed points of control—and with very substantial cost savings.

Hotels Surveyed. They were operated by Marriott, Sheraton, Intercontinental, Holiday Inn, Best Western, Hyatt, Hilton in almost of the countries listed above. In some of them, meetings were held with hotel managers and those responsible for risk management.

Detailed Justifications for Specific New Sections in IRC

P2705.1 already has the heart of the proposal in its item 4, "Plumbing fixtures shall be usable." The proposal simply fleshes this out with sufficient detail to implement this objective.

P2708. The new text, for the Section for Showers, clarifies, for Showers, that stanchions (sometimes termed "poles," as in NFPA's requirements) are equivalent to required grab bars of the conventional sort. It directs IRC users to a new P2726 for requirements.

P2713. 4. The new text, for the section on Bathtubs, directs users to a new P2726 for requirements.

P2726.1. This new text introduces the detailed requirements and clarifies that dimensions (taken at right angles to the grab bar or stanchion) are to the centerline of the device.

P2726.2. These detailed requirements, here for vertical points of control, are based on research findings and recommendations described below and are roughly similar to what NFPA adopted for the 2018 edition of NFPA 101 and NFPA 5000. They are also being considered currently for the National Building Code of Canada.

In these detailed requirements for the vertical points of control, the first thing is to establish where within the plan of the bathroom, they will adequately serve users. This is based on Section R307of the IRC which, along with Figure R307.1, sets the required minimum 21-inch (533 mm) clearances in front of fixtures (toilet, lavatory and tub), the areas through which bathers need to move reasonably unobstructed to access the tub and to exit the tub. The required points of control have to be within 12 inches (905 mm), measured horizontally, of these clear areas.

The dimensions shown here, plus the general superiority of vertical grab bars for ambulatory transfers, are based on extensive Canadian research over the last two decades as well as a meeting of US and Canadian experts in early 2016 that is partially available—for its presentations of Principal Investigators—on free steaming video (with links also provided in the Bibliography). An example of a vertical pole that is recognized as at least equivalent to the conventional vertical grab bar is shown in Figure 2, above, along with relevant discussion that supports the superiority of a properly installed stanchion which can be more easily positioned where the tub is most likely to be accessed. These dimensions are generally similar to what NFPA adopted for its 2018 editions of NFPA 101 and NFPA 5000. They are stated slightly differently in the IBC proposal to take better account of bathtubs that do not have walls on one to three sides. As in the NFPA-adopted requirements, P2726.2.1.3(2) addresses the often-missed issue of a wall-mounted conventional, vertical grab bar interfering with the shower curtain getting a good seal on the end wall.

Figure 2. Demonstration set up of both conventional grab bars (nominally meeting the length and location criteria of proposed IRC requirements and a stanchion plus a horizontally-fixed section—like a handrail—of the same tubing used for the stanchion (both completely meeting the length, location and structural strength requirements of proposed IRC requirements (which are consistent with IBC, ICC A117.1 and NFPA requirements)

Besides aesthetic advantages, the stanchion and the full-tub-length bars /tubing are clearly superior in placement flexibility—as they do not require walls for attachment—and better performance for a wider range of users and uses including here, especially for the stanchion, serving a use that is not addressed in P2726 for stand-to-sit and sit-to-stand transfers for toilet users that might be a bonus benefit used more frequently than would be uses related to bathing and showering. This is especially the case in small, residential-use bathrooms such as serving dwellings, where (for space and plumbing efficiency reasons) often have bathtubs and toilets in close proximity. This is addressed further in the Cost Impact section of the justification.

Note that the straight tubing based stanchion and the horizontal bar/tubing are not held by mere compression fit; they are held by adhesive that is permanent and waterproof. The lower part of the stanchion was tested at sustained loads of 300 pounds of horizontal, shearing force without any indication of failure. Its fixing plate shear area exceeds the shear area of conventional grab bar screws by a factor of six and unlike the case for conventional grab bar screws there is no issue with water intrusion and corrosion as well as deterioration of the structural backing for the screws. (See the section below describing field observations of serious deterioration of conventional grab bars fixing details that are often not designed for water intrusion.) Here it should be noted that automobiles, today, utilize high-performance adhesives where, in the past, screws were the norm but these, and the necessary perforations in parts, performed poorly from a corrosion perspective. Water pumps as well as body panels and headlamp plus taillight assemblies are examples of how modern automobiles are built with waterproof, automotive-grade adhesives. Examples of greater use of modern adhesives are also found increasingly in building construction.

Here it must be emphasized that grab bars and stanchions have to be structurally installed; some of the products available in the marketplace, e.g., suction-cup grab bars—that have a temporary and precarious adhesion to smooth tiles—and compression-fit (via a jackscrew mechanism) temporary transfer poles do not meet the structural requirements imposed in the proposed new requirements, the same structural performance requirements applied—withstanding loads of 250 pounds—currently applicable to conventional grab bars in the IBC. In Figure 2, below, the photograph shows a demonstration bathtub-shower combination with a redundant set of both conventional (vertical and diagonal) grab bars and (vertical and horizontal, straight lengths of tubing fixed at their ends)—the latter easily meet the 250-pound structural load criterion.

P2726.2.2 Horizontal Grab Bar. As with the vertical grab bar, described above (for P27262.1), the dimensions and need for this second grab bar are based on Canadian research identified in the Bibliography and is addressed in the video of the presentation by Dr. Nancy Edwards, Principal Investigator of the early Canadian work which also addressed the option of a diagonal grab bar provided via the exception to 2726.2. Note that the base requirement covers installations where the bathtub is not enclosed on one or more sides with a wall. Such horizontal grab bars are intended for use by persons using the tub for immersion bathing which requires stand-to-sit and sit-to-stand transfers that utilize a horizontal or diagonal grab bar (and might also utilize a vertical grab bar or pole addressed by 27.2.1). 2726.2.2 permits horizontal handrails, which could be the same tubing used for the stanchion, to be used in a horizontal orientation. These could be longer (e.g., full tub length) than conventional, horizontal grab bars which need a parallel wall for support, unlike the horizontal tubing fixed between end walls only.

P2726.2.3. Vertical Grab Bar or Stanchion for Showers. Because of the variety of dedicated showers, especially in plan shape and size, this requirement is stated in a relatively flexible fashion relying more on a performance approach than specific dimensions, other than the minimum length and lower end position that takes into account various statures of users as well as the possibility there might be a seat in the shower. The inclusion of a stanchion takes into account the structural differences between bathtubs and free-standing showers; the latter would be good candidates for a stanchion positioned between the ceiling and the floor just outside the shower entrance.

2726.4. Other Details. Generally the requirements referenced here are based mostly on current requirements of ICC A117.1-2017 and with a new provision that addresses often-seen issues of water damage to conventional grab bars that range from the cosmetic to the catastrophic.

27.26.4.1 Cross Section. This is the same as ICC A117.1-2017 without an exception for noncircular sections which are rarely seen within bathrooms.

P2726.4.2. Spacing. This is based on a simplified version of ICC A117.1-2017.

P2726.4.3. Surface Hazards. This expands on a requirement, P2701.1.

P2726.5. Structural Characteristics. This is based on current requirements of ICC A117.1

2726.6. Design and Installation for Water. This last section is new and it addresses a serious problem with a non-trivial number of grab bars that have been seen in hotels, especially in the USA and Canada. Many are not designed, installed and maintained to address deterioration and corrosion problems with conventional, wall-mounted grab bars due to easy water intrusion and entrapment between conventional grab bar mounting plates and the covers fastened over them. Often, when water is entrapped here, there is no way for it to drain out, particularly from the lower portion of the enclosed space.

Problems Found in the Field with Conventional Grab Bars

Here follows some detail on what has been observed in the field on two large problems addressed in 2726.6 as well as in 2726.2.1.3(2).

During the course of his opportunity-based survey of grab bars provided for bathrooms in hotel guest rooms the proponent of this code change has found two problems with many installations.

The first, affecting over 50 percent of the surveyed bathtub-shower combinations, comes from placement of vertical grab bars underneath—and within a few inches horizontally of the end bracket for shower curtains. This makes sealing the shower curtain against the end wall of the bathtub-shower combination very difficult so that the danger of water getting outside the bathtub, on the adjacent floor is heightened unreasonably and needlessly. The proposed section 1003.8.2.1.3(3) addresses this problem as follows: "If attached to a wall, a grab bar or handrail shall be located inside the bathtub or combination bathtub-shower compartment and shall be no closer than 6 inches (152 mm), measured horizontally to the shower curtain rod."

A much more worrying problem is found with a smaller percentage of conventional, wall-mounted grab bar installations, specifically grab bars which have cover plates over the screw plate onto which the tube of the grab bar is welded. There is invariably a space between the hole in the cover plate through which the tubing (grasped) portion of the grab bar passes and the tubing itself. Water can easily enter here and get trapped by the cover plate thus creating a pool of water and debris (hair, shampoo residue, etc.) from the showering process.

Aside from the hygiene problem here, there is a greatly heightened risk of two structural problems. One is water intrusion into the wall, around the fixing screws—typically two or three for each end of the grab bar, causing deterioration of the backing material so the screws become loose enough to be extractable with ones fingers. The second problem is equally worrisome especially as the quality of the steel used in (off-shore) grab bars is relatively poor in terms of corrosion of the screws and, less often, the mounting plates. The worst case seen recently had the heads of all the screws holding a grab bar so corroded that their heads were completely deteriorated and the grab bar could be pulled away from the walls with little force by one hand—clearly far, far less than the stipulated load of 250 pounds that codes in the US stipulate for structural strength.

The proponent has many photographs of these problems as well as a few videos showing how loose the grab bars have become due to corrosion as well as backing deterioration from water. One such photograph is provided in Figure

3, below; it is not the worst situation seen in the field.

Figure 3. Corrosion behind grab bar cover plate

Clearly such examples need to be addressed in several ways including stronger inspection by authorities and improved management of facilities. Improved design and manufacture of conventional grab bars would help too but, until that occurs, this proposal offers the stanchion options as well as mounting locations that keep the important "points of control" in relatively dry locations, for example at the exterior of a shower enclosure, but still near enough to the entrance to be usable from both outside and inside the enclosure. Proposed Section 2726.2.3 contains the provision, for the grab bar or stanchion to be located either interior to or outside of the shower compartment. . . .

Annexes

Annex 1: Representative sample of narratives of actual bathtub/shower-related injuries that led to US hospital emergency department visits, and for about one in ten of such visits led to hospital admission, **Annex 2,** (plus an additional 30 percent who went directly to hospital admission without an ED visit) in 2010. These are collected and published by the US Consumer Product Safety Commission (CPSC) National Electronic Injury Surveillance System (NEISS) and many more can be downloaded from the CPSC/NEISS Web site, https://www.cpsc.gov/Research--Statistics/NEISS-Injury-Data. Accessed January 8, 2018.

Annex 1: US CPSC NEISS: First 112 Sample Narratives (of 6,946 cases) for Product Code 0611 Injuries in 2010 – <u>ER released w/wo treatment</u>

(Product Code 611 covers bathtubs or showers including fixtures or accessories; excluding enclosures, faucets, spigots and towel racks)

41 YOM FRACTURED A RIB BY SLIPPING IN THE BATHTUB & FALLING AGAINST THE TOILET AT HOME.

53 YOF SUSTAINED A CONTUSION OF A SHIN BY BUMPING IT WHILE SHOWERING AT HOME.

18 YOF SPRAINED HER LOWER BACK BY FALLING IN THE SHOWER AT SCHOOL.

02 YOF SUSTAINED A LACERATION OF THE CHIN BY FALLING IN THE BATHTUB AT HOME.

18 YOF SUSTAINED A HEAD INJURY BY FALLING IN A SHOWER AT HOME.

80 YOM DISLOCATED A HIP BY LIFTING LEG IN SHOWER.

86 YOF SUSTAINED A LACERATION OF THE SCALP BY TRIPPING ON A RUG IN THE SHOWER AT HOME.

71 YOF SUSTAINED A HEAD INJURY BY FALLING FROM TOILET AGAINST THE BATHTUB AT HOME.

68 YOF SPRAINED AN ANKLE BY FALLING IN A SHOWER.

47 YOF FRACTURED A KNEE BY FALLING IN THE SHOWER AT HOME.

02 YOF SUSTAINED A LACERATION OF THE CHIN BY FALLING IN THE BATHTUB.

22 YOM SPRAINED A FOOT WHILE STEPPING OUT OF A SHOWER AT JAIL.

23 YOF SUSTAINED A CONTUSION OF A FOOT BY TRIPPING ON A RUG & STRIKING AGAINST A TUB AT HOME.

40 YOM SUSTAINED A LACERATION OF THE NOSE FROM BEING STRUCK BY THE SHOWER HEAD IN THE SHOWER AT HOME.

21 MOM RUPTURED AN EAR DRUM WITH A COTTON-TIPPED SWAB WHILE BATHING IN TUB AT HOME.

48 YOF SUSTAINED A CONTUSION OF THE NECK BY FALLING IN THE BATHTUB AT HOME.

04 YOF SLIPPED IN BATHTUB FELL AND INJURED FACE DX/ FACIAL LAC L KNEE STR

10 YOF FELL OUT OF SHOWER AND INJURED L KNEE. HAS ABRASION TO KNEE ALSO

80 YOF FELL IN SHOWER AT HOME HIT HEAD. DX/ HEAD INJURY

94 YOM SLIPPED AND FELL IN SHOWER AND HIT FACE ON FLOOR. DX/ FACIAL FX

55 YOM SLL LEG HEMATOMA

72 YOF CAUGHT FOOT IN TUB, INJURING LOWER LEG. NOW HAS HEMATOMA AND INCREASING PAIN.

22 YOF AT HOME FAINTED WHILE IN SHOWER AND FELL CUTTING FOREHEAD.

26 YOF SLIPPED AND FELL IN TUB DX: KNEE STRAIN

90 YOF GETTING OUT OF SHOWER WITH WALKER SLIPPED ON THE FLOOR AND HIT HEAD DX/ SCALP ABRASION

30 YOM SLIPPED AND FELL INTO TUB DX: CONTUSION TO BACK

51 YOF SLIPPED IN TUB AND HIT HEAD DX/ SCALP LAC

60 YOF SLIPPED AND FELL IN TUB DX: CONTUSION TO COCCYX

44 YOM FELL AND HIT ABDOMEN ON BATHTUB AT HOME. DX/ ABDOMINAL CONTUSION

04 YOM WITH CUT TO FACE FELL IN TUB DX: LACERATION TO FACE

51 YOF AT HOME FELL AT 5PM WHEN LOST BALANCE AND HIT L SIDE OF RIBS ON BATHTUB.

33 YOF SLIPPED AND FELL IN TUB DX: HEAD LACERATION

23 MOM FELL IN BATHTUB AT HOME AND HIT CHIN CAUSING LACERATION.

62 YOM WITH BACK PAIN FELL INTO TUB DX; CONTUSION TO LOWER BACK

63 YOF FELL INTO BATHTUB / NO INJURIES OR COMPLAINTS

54 YOM SLIPPED AND FELL IN TUB DX: RIB FRACTURE

02 YOM SLIPPED IN TUB AT HOME AND INJURED FACE   DX/ CHIN LAC

25 YOF WITH CHEST PAIN AFTER FALL INTO TUB DX: CONTUSION TO CHEST

84 YOM FELL OUT OF SHOWER ON TO THE FLOOR AT HOME HIT HEAD DX/ HEAD INJURY

85 YOF SLIPPED AND FELL IN TUB AND HIT HEAD AT HOME DX/ HEAD INJURY

06 YOM AT HM WAS TAKING A BATH & SWIMMING IN TUB WHEN HE STRUCK HIS HEAD AGAINST FAUCET CAUSING HEAD LACERATION.

28 YOM AT HOME FELL IN SHOWER. WAS RESPONSIVE PER EMS.

26 YOF SLIPPED / FELL IN THE SHOWER DX: R EAR LAC. / HEAD & R SHOULDER CONTUSION

36 YOF THIS AM SLIPPED WHILE TRYING TO GET OUT OF BATHTUB AND LANDED ON BUTTOCKS.

28 YOF RIPPED FINGER NAIL OFF WHEN SLIPPED IN THE SHOWER AND THE NAIL BENT BACKWARDS.

26 YOF INJURED KNEE STEPPING OUT OF SHOWER DX/ RIGHT KNEE SPRAIN

50 YOM FELL IN BATHTUB AND HIT CHEST DX/ RIB FX

83 YOM CUT SCROTUM FELL IN TUB DX: LACERATION TO SCROTUM

71 YOF FELL OUT OF BATHTUB AT HOME AND HIT HEAD ON THE FLOOR DX/ HEAD INJURY

89 YOF FELL IN TUB HITTING HEAD DX: CLOSED HEAD INJURY

69 YOF WAS IN SHOWER AND FELL BACKWARDS STRIKING HER BACK.

08 YOF AT HOME LACERATED FACE ABOVE R ORBITAL. HIT HER HEAD ON SOAP DISH WHILE SHOWERING. NO LOC.

40 YOM SLIPPED AND FELL IN SHOWER AND INJURED CHEST. DX/ RIB FX

17 YOF FELL IN TUB HURT NECK DX: NECK STRAIN

23 YOM INJURED LOWER BACK BENDING OVER IN SHOWER AT HOME DX/ LUMBAR STRAIN

83 YOF FELL IN THE TUB AT ASSISTED LIVING AND INJURED SHOULDER DX/ RT SHOULDER CONTUSION

02 YOM HIT FACE ON BATHTUB AT HOME DX/ FACIAL LAC

74 YOM FELL AND HIT HEAD IN TUB DX: CONTUSION TO HEAD

85 YOF SLIPPED AND FELL GETTING OUT OF TUB DX: CONTUSION TO HIP

58 YOF SLIPPED AND FELL INTO TUB HIT HEAD DX: CLOSED HEAD INJURY

13 MOM AT HOME FELL IN BATHTUB AND HIT FOREHEAD AND MOUTH.

06 YOM SLIPPED IN BATHTUB AND HIT HEAD DX/ HEAD CONTUSION

78 YOM SLIPPED AND FELL IN TUB DX: LACERATION TO HEAD

08 YOM SLIPPED IN TUB TWISTED ANKLE DX: ANKLE STRAIN

51 YOF HIT HEAD ON SOAP DISH IN SHOWER 2 TIMES THIS WEEK HAS HEADACHE DX/ CONCUSSION

51 YOF SLIPPED IN SHOWER AND INJURED KNEE AT HOME DX/ RIGHT KNEE CONTUSION

83 YOM SLIPPED AND FELL IN THE SHOWER LAST NIGHT AND INJURED BACK DX/ BACK PAIN

31 YOM HIT EYE WITH TOWEL WHILE GETTING OUT OF THE SHOWER AT HOME DX/ RIGHT EYE CORNEAL ABRASION

24 YOF FELL GETTING OUT OF SHOWER HIT HEAD DX/ SCALP LAC

48 YOF SLIPPED IN SHOWER HIT HEAD + LOC DX/ HEAD INJURY

11 YOM SLIPPED IN SHOWER AND INJURED LEG. DX/ LEFT LEG CONTUSION

30 YOF SLIPPED AND FELL INTO TUB DX: CONTUSION TO HIP

18 MOM FELL IN TUB DX: LACERATION TO FACE

46 YOF SLIPPED AND FELL IN TUB DX: CONTUSION TO LOWER BACK

30 YOM CUT HAND ON BROKEN SOAP DISH AT HOME. DX// RIGHT HAND LAC

70 YOF SLIPPED AND FELL IN TUB DX: CONTUSION TO CHEST

31 YOM CUT THUMB ON SHOWER DRAIN THIS AM.

62 YOF SLIPPED IN THE SHOWER AND FELL ON THE FLOOR AT HOME DX/ LEFT WRIST SPRAIN

67 YOM FELL GETTING OUT OF SHOWER HIT HEAD ON TUB AT HOME DX/ SCALP CONTUSION

45 YOF PASSED OUT IN SHOWER AT GROUP HOME HIT HEAD. DX/ HEAD INJURY

04 YOF FELL IN BATHTUB AND HIT MOUTH DX/ LIP LAC

43 YOM SLIPPED IN BATHTUB AND INJURED KNEE DX/ LEFT KNEE CONTUSION

15 YOM TAKING SHOWER AND SHOWER DOOR SHATTERED AND PT FEET WERE CUT WITH THE GLASS AT HOME DX/ BILAT FOOT LAC

73 YOF AT 9AM TODAY WAS GETTING OUT OF TUB AND SLIPPED AND BUMPED L RIBS ON THE TUB. C/O RIB PAIN.

87 YOF BENT DOWN TO PUT SCALE AWAY FELL AND HIT INTO TUB AT HOME DX/ LEFT HIP CONTUSION22 YOM FELL IN TUB AT HOME AND INJURED CHEST DX/ RIB FX

40 YOF SLIPPED GETTING OUT OF BATHTUB AND INJURED LOWER BACK DX/ LOW BACK PAIN

34 YOM FELL AND HIT TUB DX: SHOULDER STRAIN

70 YOF SLIPPPED FELL HIT CHEST ON SIDE OF TUB DX: CONTUSION TO CHEST

89 YOF SLIPPED AND FELL IN THE SHOWER LAST NIGHT AT NURSING HOME INJURED CHEST DX/ CHEST CONTUSION

44 YOM FELL IN TUB AND HIT CHEST DX.CHEST CONTUSION

36 YOF SLIPPED AND FELL IN TUB DX: LACERATION TO FACE

56 YOM CUT WRIST ON BROKEN SHOWER KNOB AT HOME DX/ LEFT WRIST LAC

88 YOF FELL AT HOME IN SHOWER AND HIT HEAD ON TUB DX/ SCALP CONTUSION

51 YOM SLIPPED AND FELL IN TUB DX: NECK STRAIN

23 YOM FELL IN BATH TUB AND INJURED CHEST DX/ CHEST CONTUSION

59 YOM FELL IN SHOWER AND INJURED SHOULDER DX/ LEFT SHOULDER FX

46 YOM HAD FALL HIT TUB DX: CONTUSION TO FACE

78 YOF FELL AT HOME AND HIT FACE ON BATHTUB DX/ FACIAL CONTUSION

29YOF WITH BACK PAIN AFTER FALL IN TUB DX: LOW BACK STRAIN

31 YOF FELL GETTING OUT OF TUB AT HOME INJURED FLANK DX/ FLANK CONTUSION

72 YOF AT HOME FELL WHEN SLIPPED ON URINE IN BATHROOM AND HIT HEAD ON SIDE OF BATH TUB.

19 YOF SLIPPED AND FELL INTO TUB DX: CONTUSION TO LOWER BACK

08 YOM FELL IN THE SHOWER AT HOME AND HIT EAR DX/ LEFT EAR LAC

62 YOM SLIPPED / FELL IN THE SHOWER. DX: RIB CONTUSION

09 YOF FELL IN TUB AND HIT LIP. DX/ LIP LAC

56 YOF WITH SHOULDER PAIN AFTER USING BATHBRUSH IN SHOWER DX: SHOULDER STRAIN

75 YOF AT HOME FELL OFF HASSOCK APPROX 30 MIN AGO HITTING HEAD AND L ARM ON BATHTUB. DENIES LOC.

62 YOF SLIPPED IN TUB HITTING FOOT DX: CONTUSION TO FOOT

04 YOM SLIPPED IN THE BATHTUB AND HIT CHIN DX/ CHIN LAC

34 YOM FELL IN THE SHOWER AT HOME INJURED BACK DX/ BACK SPRAIN

25 YOF + ETOH BAL 313 FELL IN SHOWER AND HIT HEAD DX/ HEAD CONTUSION

Annex 2: US CPSC NEISS: First 48 Sample Narratives (of 630 cases) for Product Code 0611 Injuries in 2010 – ER treated & Then Admitted to Hospital

(Product Code 611 covers bathtubs or showers including fixtures or accessories; excluding enclosures, faucets, spigots and towel racks)

89 YOF GETTING OUT OF THE SHOWER THE NEXT THING SHE KNEW SHE WAS ON THE FLOOR WITH HEAD AND SHOULDER INJURY; SHOULDER AND HEAD CONTUSION

69 YOM WAS WASHING HIMSELF IN SHOWER, FELL ONTO BLUNT PART OF BATHTUB, IMMEDIATELY HAD PAIN & TROUBLE BREATHING. DX - MULTIPLE RIB FXS

56 YOF SLIPPED IN THE SHOWER AND FELL FORWARD HITTING HER FACE & INJURiNG HER RT ARM- DX- MECHANICAL FALL W/ FRACTURE RT SHOULDER

78 YOF FAMILY FOUND HER ON THE FLOOR BETWEEN TOILET AND BATHTUB, SHE STATED SHE PASSED OUT WHEN SHE WAS IN SHOWER;SHOULDER INJURY

47 YOM HAD A WET SHEETROCK FALL ON HEAD WHILE IN SHOWER, +LOC, WAS CONFUSED. DX - BLUNT HEAD TRAUMA W/BRIEF LOC

62 YOM HAD A SYNCOPAL TODAY AT HOME IN THE SHOWER INJURING EYE AREA- DX- LACERATION TO FACE(EYE)

78 YOF PRESENT TO ER FROM HOME WHEN SHE WAS TAKING A BATH AND COLLAPSED - DX- CARDIAC ARREST, RESUSCITAED

43 YOM PRESENT TO ER AFTER HE WAS IN THE BATHTUB AND SLIP AND FELL GETTING OUT HITTING HEAD ON FLOOR- DX- BLUNT HEAD TRAUMA

81 YOM PRESENT TO ER AFTER A FALL IN THE SHOWER AT HOME TODAY INJURING THE HEAD AREA- DX- BLUNT HEAD TRAUMA

41 YOM FELL OUT OF SHOWER AT ASSISTED LIVING HOME YESTERDAY ONTO RT SIDE C/O RT HIP & RT LEG PAIN. DX - RT HIP FRACTURE

80 YOF TRYING TO GET OUT OF BATHTUB ACCIDENTLY FELL INJURED LOWER BACK; BACK CONTUSION AND AMBULATORY DYSFUNCTION

92 YOM PRESENT TO ER AFTER A FALL IN BATHTUB THIS MORNING INJURING RT HIP-DX- FRACTURE RT LOWER TRUNK (HIP)

88 YOF PRESENT TO ER AFTER A FAL IN BATH TUB AT SNF INJURING LT HIP- DX - FRACTURE LT LOWER TRUNK (HIP)

88 YOF WAS GETTING OUT OF SHOWER, FELT DIZZY & FELL STRIKING BACK OF HEAD ON FLOOR INJURING LT ARM. DX - SKIN TEAR LACERATION

88 YOF GETTING OUT OF BATHTUB THIS MORNING FELL TRIED TO BRACE HERSELF INJURED SHOULDER; SHOULDER FRACTURE

71 YOF WAS FOUND DOWN BY SON IN BATHTUB AT HOME, HAS INJURY TO LT EYE & FOREHEAD, IS REPETITIVE. DX - BLUNT HEAD TRAUMA, +ETOH

86 YOF LOST BALANCE WHEN SHE TURNED AROUND & FELL INTO BATHTUB C/O LOW BACK PAIN. DX - LOW BACK PAIN, POSS FX VS CONTUSION

80 YOF HUSBAND DID NOT WANT HER SMOKING IN HOUSE, WENT TO BATHROOM STOOD ON THE TOILET, OPENED WINDOW, SLIPPED BETWN TOILET/TUB; PELVIC FX

44 YOF FELL IN SHOWER TODAY SUSTAINING HEAD INJURY. DX - SCALP LACERATION

37 YOF SUSTAINED A MECHANICAL FALL IN SHOWER ONTO RT UPPER EXTREMITY, C/O RT SHOULDER PAIN. DX - RT DISTAL CLAVICLE FX

37 YOM HAD A GROUND LEVEL FALL IN BATHROOM STRIKING LOWER BACK ON BATHTUB. DX - SPINAL CONTUSION

84 YOF HAD SYNCOPAL EPISODE IN SHOWER AND FELL. DX: L 10TH RIB FX, INABILITY TO AMBULATE.

87 YOF FELL IN SHOWER. DX: RHABDOMYOLYSIS.

93 YOF FELL IN SHOWER AT ASSISTED LIVING. DX: L DISTAL HUMERUS FX.

79 YOM FELL IN SHOWER. DX: A FIB W/RAPID VENTRICULAR RESP, SYNCOPE, SDH, SAH, ELEVATED INR.

84 YOF FELL WHILE GETTING OUT OF BATHTUB SUSTAINING A FRACTURE TO HER LUMBAR SPINE

90 YOF SLIPPED IN BATHTUB AND GRAZED HEAD ON SHELF AT ASSISTED LIVING. DX: R KNEE STRAIN W/POSS INTERNAL DERANGEMENT, CLOSED HEAD INJURY.

82 YOF WITH NO INJ FROM FALL IN TUB

85 YOM WITH NO IN, FELL IN BATHTUB, ADMITTED FOR OTHER REASONS

52 YOM W/ALS FELL AND BECAME STUCK BETWEEN TOILET AND TUB. DX: RHABDOMYOLYSIS STATUS POST FALL, NASAL FX.

95 YOF FELL IN SHOWER SUSTAINING CHEST CONTUSION

71 YOF SLIPPED AND FELL IN SHOWER. DX: SYNCOPE, LARGE HEAD LAC, COAGULOPATHY, HYPOKALEMIA, LONT QT, ALCO

79 YOF FELL IN SHOWER SUSTAINING A FRACTURED KNEE

87 YOF WITH RIB FRACTURE FROM FALL IN TUB

79 YOM WITH LOWER BACK STRAIN FROM FALL IN SHOWER

81 YOF TURNED IN SHOWER AND FELL SUSTAINING A FRACTURED HIP

97 YOF FELL IN THE SHOWER AT NURSING HOME. DX: TRAUMATIC SDH, AGGITATION.

70 YOF FELL IN SHOWER AT HOME AND WAS UNABLE TO GET UP, SUSTAINED CHI, BACK CONTUSIONS

88 YOF FELL AGAINST BATHTUB AND WALL AT ASSISTED LIVING. DX: BACK/SHOUL PX, SYNCOPE, STAGE I THORACIC DECUBITUS ULCER, MULT OLD THORACIC FX'S.

88 YOF SLIPPED ON WET FLOOR GETTING OUT OF SHOWER AT NURSING HOME. DX: BACK CONT, PNEUMONIA, HYPOXEMIA, PLEURAL EFFUSION.

41YOF WITH NO INJURIES FROM FALL IN SHOWER, WAS ADMITTED

83 YOM FELL IN THE SHOWER. DX: TRAUMATIC ICH, FACIAL LAC, CONCUSSION W/O LOC, RENAL FAILURE.

94 YOM FELL GETTING OUT OF THE SHOWER AND HIT HEAD SUSTAINING A LACERATION

79 YOM FELL ON SIDE OF BATHTUB. DX: SYNCOPE, CHEST WALL CONT.

55 YOM SLIPPED AND FELL IN BATHTUB. DX: R HEMOTHORAX/PNEUMOTHORAX, MULT R RIB FX'S.

86 YOF FELL BACKWARDS INTO BATHTUB & HIT HEAD AT HOME DX: LACERATION TO SCALP/ ACUTE DEHYDRATED

95 YOF TRIPPED OVER THROW RUG WHILE GETTING INTO SHOWER AT HOME DX; AVULSION TO FACE/ MALIGNANT HYPERTENSION

53 YOF SLIPPED IN SHOWER AND FELL HITTING HIP ON TOILET AT HOME DX: STRAINED RIGHT HIP/ UNCONTROLABLE DIABETES

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Approximately 50 internationally-produced scientific and technical references, on bathing/showering safety, were compiled by the proponent, in 2016, for an American Public Health Association (APHA) draft policy highlighting, especially two Canadian research studies that also are addressed in video presentations by Principal Investigators (Dr. Nancy Edwards, Dr. Alison Novak) for the research and posted, for free streaming viewing at, https://vimeo.com/164239941 Accessed January 8, 2018. Additional videos covering technical aspects of bathing and showering safety (including cost impact and benefit issues*) are found at the following links (all of which are available, with descriptions, at www.bldguse.com, the proponent's Professional Practice Website, Accessed January 8, 2018.).

- https://vimeo.com/237294479
- https://vimeo.com/239276202 *
- https://vimeo.com/197742277
- https://vimeo.com/193507768
- https://vimeo.com/173883358
- https://vimeo.com/175101448 *
- https://vimeo.com/117572176

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Note that, given the source and the fairly standard format for scientific papers, this format departs from the suggested ICC format and logistics prevent converting the following to the ICC format.

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Cost Impact

The code change proposal will increase the cost of construction .

Cost Impact

The code change proposal will increase the cost of residential construction, but that increased cost pales in comparison to the benefits of enhanced usability and reduction of fall injuries, the majority of which occur in residential settings, especially homes.

The additional material in the form of conventional grab bars or poles plus their fixings is about 50 dollars per grab bar or pole (using retail prices for the components confirmed as recently as 2017) and with a conventional three-fixture bathroom with a bathtub there would be a need for two such grab bars or poles or one of each. Labor to install these would be about one hour for each. Thus an overall, installed cost is on the order of $200 per bathroom. The service life would be on the order of two or more decades.

Against this added cost of an installed single grab bar or two per bathroom there are the ongoing benefits of enhanced normal (non-injury) uses which, for a typical US household for a 20-year period, for example, number about 7,000 per person or on the order of 20,000 per household. Those enhanced uses, with grab bars, have an economic value that is larger than the benefit of averted injuries from falls.

Currently without grab bars, our bathtubs and showers are the site of injuries serious enough to require professional medical attention at a rate, annually (using 2010 data) of about 1 million per 110 billion uses or about one in 110,000 uses. Every one of those non-injury uses has a value. By comparison, for stairs this ratio is about one professionally treated fall injury for every million flight uses in home settings and one such injury for every ten million flight uses in public settings where, under the IBC and more-detailed inspection procedures, stairs are nearly one order of magnitude safer than those nominally constructed under the IRC. See the video presentation by Jake Pauls to the April 2017 meeting, "The Impact of Building Codes and Standards in Public Health and Safety," held in Melbourne, Australia, in connection with the 15th World Congress on Public Health. The streaming video containing this presentation, which includes the “Injury Pyramids” used for the above stair safety calculation, is available freely at https://vimeo.com/239276202 (as listed in the first part of the Bibliography accompanying this proposal) accessed Jan 8, 2018.

The injuries-averted benefit, over twenty years, has a value, in 2010 dollars, about 6.5 times greater than the installation cost, based on the very reasonable assumption that half the falls are averted with the specified grab bars or poles. For the vertical poles that also enhance and make safer the use of toilets that, being adjacent to a bathtub, can serve stand-to-sit and sit-to-stand transfers for toileting, this benefit increases by about 35 percent to nearly 9 times greater than the installation cost. These projections are based on the injury economic data provided by the 2015 paper in the respected journal, Injury Prevention, by Lawrence, Spicer and Miller (see Bibliography for details).

The bottom line is that the benefits of both enhanced normal uses, in the tens of thousands per household over a 20-year period, combined with the benefit of averted injuries, is on the order of at least 20 or more times the cost of providing the grab bars, especially if they take the form of vertical poles serving bathtub-shower combination users as well as toilet users in a three-piece bathroom provision that is very common in homes and hotels, for example. For hotels, while the lavatory sink(s) may be in a separate space, the toilet and bathtub-shower combination are usually close together so that a single pole can serve transfers for both. Thus the cost impact of grab bar or pole installations is very small in relation to the benefits and that cost of installation is very small in relation to the overall price of a dwelling unit or hotel guest room for example.

Internal ID: 2120

RP4-18

IRC: P2709.4.1 (New)

Proponent: Angel Guzman Rodriguez, ASME, representing The American Society of Mechanical Engineers (ASME)

2018 International Residential Code

Add new text as follows:

P2709.4.1 **Waste Fittings.** Flanged drains shall conform to ASME A112.18.2/CSA B125.2.

Reason:
Section P2709.4 mentions flanged drain requirements and these drains must be approved but to what standard. The latest version of ASME A112.18.2/CSA B125.2 contains specific requirements for flanged drains. This standard also includes requirements for built up shower drains systems which are normally used in field fabricated shower systems.

Cost Impact
The code change proposal will not increase or decrease the cost of construction .

This proposal only identifies the standard that the industry is already making these waste fittings comply with and be certified to. Thus, there will be no impact to material (or labor) cost because of this added requirement.

Internal ID: 1454

RP5-18

IRC: P2904.2.1

Proponent: Jeffrey Shapiro, representing IRC Fire Sprinkler Coalition (jshapiro@ircfiresprinkler.org)

2018 International Residential Code

Revise as follows:

P2904.2.1 Temperature rating and separation from heat sources. Except as provided for in Section P2904.2.2, sprinklers shall have a temperature rating of not less than 135°F (57°C) and not more than ~~170°F (77°C)~~ 225°F (107°C). Sprinklers shall be separated from heat sources as required by the sprinkler manufacturer's installation instructions.

Reason:
NFPA 13D (Section 7.5.6.1 in the 2016 edition) allows intermediate temperature sprinklers to be used in lieu of ordinary temperature sprinklers in dwelling units, even where elevated ambient temperatures are not expected. So long as the sprinkler used qualifies as a residential sprinkler based on the Response Time Index (RTI) and passing the UL1626 fire test, there is no reason for activation temperature to be limited. Permitting intermediate temperature sprinklers to be used in lieu of ordinary temperature sprinklers can help to avoid the risk of mixing up sprinklers during installation and can ensure that intermediate temperature sprinklers will be present in locations where elevated ambient temperatures may or may not have been anticipated.

Cost Impact
The code change proposal will not increase or decrease the cost of construction .

Residential sprinklers of ordinary or intermediate temperature range are typically the same cost, and this proposal does not require the use of a different sprinkler. It simply allows flexibility.

Internal ID: 1346

RP6-18

IRC: P2904.2.3

Proponent: Jeffrey Shapiro, representing IRC Fire Sprinkler Coalition (jshapiro@ircfiresprinkler.org)

2018 International Residential Code

Revise as follows:

P2904.2.3 Freezing areas. Piping shall be protected from freezing as required by Section P2603.5. <u>or by using a dry pipe automatic sprinkler system that is listed for residential occupancy applications.</u> Where sprinklers are required in areas that are subject to freezing, dry-side-wall or dry-pendent sprinklers extending from a nonfreezing area into a freezing area shall be installed.

Reason:
Listed dry pipe residential sprinkler systems are available, are recognized by NFPA 13D, and are a viable option for freeze protection in lieu of other methods that are currently permitted.

Cost Impact
The code change proposal will not increase or decrease the cost of construction .

Proposal allows an additional alternative to current requirements for freeze protection as an option. There is no mandatory requirement being added.

Internal ID: 1194

RP7-18

IRC: P2904.3.2

Proponent: Jeffrey Shapiro, representing IRC Fire Sprinkler Coalition (jshapiro@ircfiresprinkler.org)

2018 International Residential Code

Revise as follows:

P2904.3.2 Shutoff valves prohibited. With the exception of shutoff valves for the entire water distribution system <u>or a single master control valve for the automatic sprinkler system that is locked in the open position</u>, valves shall not be installed in any location where the valve would isolate piping serving one or more sprinklers.

Reason:
The proposal will correlate with an allowance in NFPA 13D to have a control valve on a standalone sprinkler system. Although NFPA 13D allows such valves to be electronically monitored in lieu of locking, this proposal requires that the valve be locked open, which could be accomplished by simply providing a nylon strap to secure the valve handle. If an owner also wants to electronically monitor the valve, that would be permitted in addition to securing the valve to discourage tampering.

Cost Impact
The code change proposal will not increase or decrease the cost of construction .

The proposal adds an allowance to have a master control valve, but there is no mandate to include one.

Internal ID: 1352

RP8-18

IRC: P2904.4, P2904.4.1, P2904.4.1.1 (New), P2904.4.1.2 (New), P2904.4.1.3 (New), P2904.4.2

Proponent: Jeffrey Shapiro, representing IRC Fire Sprinkler Coalition (jshapiro@ircfiresprinkler.org)

2018 International Residential Code

Revise as follows:

P2904.4 Determining system design flow. The flow for sizing the sprinkler piping system shall be based on ~~the flow rating of each sprinkler in accordance with Section P2904.4.1~~ ~~and the calculation in accordance with Section P2904.4.2.~~ Sections P2904.4.1 through P2904.4.2.

P2904.4.1 Determining required flow rate for each sprinkler. The minimum required flow for each sprinkler shall be determined using the sprinkler manufacturer's published data for the specific sprinkler model based on all of the following:

1. The area of coverage.
2. The ceiling configuration, in accordance with Section P2904.4.1.1 through P2904.4.1.3.
3. The temperature rating.
4. Any additional conditions specified by the sprinkler manufacturer.

Add new text as follows:

P2904.4.1.1 Ceiling configurations. Manufacturer's published flow rates for sprinklers tested under an 8 ft (2.4 m) high ceiling, in accordance with the sprinkler listing, shall be used for the following ceiling configurations, provided that the ceiling surface does not have significant irregularities, lumps or indentations and is continuous in a single plane.

1. Ceilings that are horizontal or that have a slope not exceeding 8 units vertical in 12 units horizontal (67%), without beams, provided that the ceiling height, measured to the highest point, does not exceed 24 ft (7.3 m) above the floor. Where the slope exceeds 2 units vertical in 12 units horizontal (17%), the highest sprinkler installed along the sloped portion of a ceiling shall be positioned above all communicating openings connecting the sloped ceiling compartment with an adjacent space.
2. Ceilings that are horizontal or that have a slope not exceeding 8 units vertical in 12 units horizontal (67%), with beams, provided that the ceiling height, measured to the highest point, does not exceed 24 ft (7.3 m) above the floor. Beams shall not exceed 14 in. (350 mm) in depth, and pendent sprinklers shall be installed under the beams as described at the end fo this section. The compartment containing the beamed ceiling shall not exceed 600 ft^2 (56 m^2) in area. Where the slope does not exceed 2 units vertical in 12 units horizontal (17%), the highest sprinkler in the compartment shall be above all communicating openings connecting the compartment with an adjacent space. Where the slope exceeds 2 units vertical in 12 units horizontal (17%) the highest sprinkler installed along the sloped portion of a ceiling shall be positioned above all communicating openings connecting the sloped ceiling compartment with an adjacent space.
3. Ceilings that have a slope exceeding 2 units vertical in 12 units horizontal (17%) but not exceeding 8 units vertical in 12 units horizontal (67%), with beams of any depth, provided that the ceiling height, measured to the highest point, does not exceed 24 ft (7.3 m) above the floor. Sidewall or pendent sprinklers shall be installed in each pocket formed by beams. The compartment containing the sloped, beamed ceiling shall not exceed 600 ft^2 (56 m^2) in area.

Pendent, recessed pendent, and flush-type pendent sprinklers installed directly under a beam having a maximum depth of 14 inches shall have the sprinkler deflector located not less than 1 inch or more than 2 inches below the bottom of the beam. Pendent sprinklers installed adjacent to the bottom of a beam having a maximum depth of 14 inches shall be positioned such that the vertical centerline of the sprinkler is no more than 2 inches from the edge of the beam, with the sprinkler deflector located not less than 1 inch or more than 2 inches below the bottom of the beam. Pendent sprinklers shall also be permitted to be installed less than 1 inch below the bottom of a beam where in accordance with manufacturer's instructions for installation of flush sprinklers.

P2904.4.1.2 Ceiling configurations with special sprinkler listings. For ceiling configurations not specified in Section 2904.4.1.1, the manufacturer's published flow rate for sprinklers that have been listed for protection of such configurations shall be used.

P2904.4.1.3 Other Ceiling Configurations. For ceiling configurations not addressed by Sections P2904.4.1.1 or P2904.4.1.2, the flow rate shall be subject to approval by the fire code official.

Revise as follows:

P2904.4.2 System design flow rate. The design flow rate for the system shall be based on the following:

1. The design flow rate for a room having only one sprinkler shall be the flow rate required for that sprinkler, as determined by Section P2904.4.1.
2. The design flow rate for a room having two or more sprinklers and a ceiling configuration specified in Section P2904.4.1.1 shall be determined by identifying the sprinkler in that room with the highest required flow rate, based on Section P2904.4.1, and multiplying that flow rate by 2.
3. ~~Where the sprinkler manufacturer specifies different criteria for ceiling configurations that are not smooth, flat and horizontal, the required~~ The design flow rate for ~~that room shall comply with the sprinkler~~ a room having two or more sprinklers and a ceiling configuration covered by Section P2904.4.1.2 shall be in accordance with the manufacturer's instructions.
4. The design flow rate for a room having two or more sprinklers and a ceiling configuration covered by Section P2904.4.1.3 shall be subject to approval by the fire code official.
5. The design flow rate for the sprinkler system shall be the flow required by the room with the largest flow rate, based on Items 1 ~~, 2 and 3~~ through 4.
6. For the purpose of this section, it shall be permissible to reduce the design flow rate for a room by subdividing the space into two or more rooms, where each room is evaluated separately with respect to the required design flow rate. Each room shall be bounded by walls and a ceiling. Openings in walls shall have a lintel not less than 8 inches (203 mm) in depth and each lintel shall form a solid barrier between the ceiling and the top of the opening.

Reason:
These revisions are intended to correlate with NFPA 13D and current installation practices for residential sprinklers protecting spaces with sloped and/or beamed ceilings.

The current Section P2904.4.2 (3) sends the user to the manufacturer’s data sheets for special design information related to sloped and/or beamed ceilings, but data sheets for most residential sprinklers no longer provide guidance for these conditions. A 2010 Fire Protection Research Foundation study helped to standardize sprinkler protection criteria for ceilings with slopes and beams by determining that many sloped and beamed ceilings can be sufficiently protected using the same design criteria that apply to horizontal ceilings. This prompted NFPA to add model design criteria to their sprinkler standards and manufacturers are now amending cut sheets to delete criteria for ceiling configurations that are covered by NFPA's standards. Without this revision to Section P2904, the IRC will no longer provide sufficient guidance for protection of sloped or beamed ceilings, and that could be improperly interpreted as only allowing smooth, flat, horizontal ceiling configurations in sprinklered dwellings.

Cost Impact
The code change proposal will decrease the cost of construction .

The sprinkler rules in the IRC, as written, would not allow for sloped ceilings which made the installation of sprinkler systems much more costly than need be.

Internal ID: 421

RP9-18

IRC: TABLE P2904.6.2(2)

Proponent: Jeffrey Shapiro, representing IRC Fire Sprinkler Coalition (jshapiro@ircfiresprinkler.org)

2018 International Residential Code

Revise as follows:

TABLE P2904.6.2(2)
MINIMUM WATER METER PRESSURE LOSS (PLm)a

FLOW RATE (gallons per minute, gpm)[b]	**5/8-INCH METER PRESSURE LOSS (pounds per square inch, psi)**	**3/4-INCH METER PRESSURE LESS (pounds per square inch, psi)**	**1-INCH METER I LOSS (pounds per sq**
8	~~2~~3	~~1~~3	1
10	3	~~1~~3	1
12	4	~~1~~3	1
14	~~5~~6	~~2~~5	1
16	7	~~3~~6	1
18	9	~~4~~7	~~1~~2
20	11	~~4~~9	2
~~22~~23	~~NP~~14	~~5~~11	~~2~~3
~~24~~	~~NP~~	~~5~~	~~2~~
26	~~NP~~18	~~6~~14	~~2~~3
~~28~~	~~NP~~	~~6~~	~~2~~
~~30~~31	~~NP~~26	~~7~~22	~~2~~4
~~32~~39	~~NP~~38	~~7~~35	~~3~~6
~~34~~	~~NP~~	~~8~~	~~3~~
~~36~~52	NP	~~8~~NP	~~3~~10

For SI: 1 inch = 25.4 mm, 1 pound per square inch = 6.895 kPa, 1 gallon per minute = 0.063 L/s.

NP = Not permitted unless the actual water meter pressure loss is known.

a. Table P2904.6.2(2) establishes conservative values for water meter pressure loss or installations where the water meter loss is unknown. Where the actual water meter pressure loss is ~~known~~published and available from the meter manufacturer, P_m shall be the ~~actual loss.~~published pressure loss for the selected meter.

b. Flow rate from Section P2904.4.2. Add 5 gpm to the flow rate required by Section P2904.4.2 where the water service pipe supplies more than one dwelling.

Reason:

This proposal revises the water meter table in the IRC to better correlate with the water meter table in NFPA 13D, which was updated in the 2013 edition based on research that was published in an Fire Protection Research Foundation Report titled, " Residential Fire Sprinklers - Water Usage and Water Meter performance Study" in 2011. The revised IRC table will include NFPA 13D correlated values for 5/8-inch, 3/4-inch and 1-inch meters, and it retains entries for flows less than 18 gpm, which have been adjusted to reflect findings from the Fire Protection Research Foundation study. NFPA 13D does not include these lesser flows, but the IRC has always included them since low-flow system are an option for affordable housing. This proposal does not add values for 1 1/2-inch and 2-inch meters, which are included in NFPA 13D, because these meter sizes are excessive and unnecessary for flow demands associated with home fire sprinkler systems. Including them in the table could be taken as a basis of validation for water purveyors looking to justify local requirements for larger, more expensive meters.

Bibliography:

http://www.nfpa.org/News-and-Research/Fire-statistics-and-reports/Research-reports/Suppression/Residential-Fire-Sprinklers

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

No expected cost consequences are anticipated to be associated with this proposal in most cases since actual meter pressure loss values are typically available. The prescriptive table values are only included in the code for rare occasions where actual values cannot be ascertained.

Internal ID: 1055

RP10-18

IRC: P2905.3 (New)

Proponent: Anthony Floyd, City of Scottsdale, representing City of Scottsdale (afloyd@scottsdaleaz.gov)

2018 International Residential Code

Add new text as follows:

P2905.3 **Hot water supply to fixtures.** The developed length of hot water piping, from the source of hot water to the fixtures that require hot water, shall not exceed 50 feet (15 240 mm). Water heaters and recirculating system piping shall be considered to be sources of hot or tempered water.

Reason:
This change adds a new section to limit the hot water supply line length from the source of hot water to the fixtures that require hot or tempered water. This provision is replicated from existing IPC Section 607.2.

Hot water supply lines greater than 50 feet waste water (proportional to pipe size) while occupants wait for hot water to reach fixtures for bathing, washing and culinary purposes. Even though hot water supply lines are insulated, the hot water remaining in the lines between demand periods cools down. Limiting the length and consequent volume of heated water in the supply lines reduce the amount of wasted water and occupant waiting time.

Cost Impact
The code change proposal will not increase or decrease the cost of construction .

Cost is based on proximity of hot water source to point of use.

Internal ID: 552

RP11-18

IRC: P2906.21

Proponent: William Chapin, Professional Code Consulting, LLC, representing Professional Code Consulting, LLC (bill@profcc.us)

2018 International Residential Code

Revise as follows:

P2906.21 Push-fit joints. Push-fit joints shall be used only on copper-tube-size outside diameter dimensioned CPVC, PEX, PE-RT, and copper tubing. Push-fit joints shall conform to ASSE 1061 and shall be installed in accordance with the manufacturer's instructions.

Reason:
Table P2906.6 lists ASSE 1061 fittings as acceptable to be used with polyethylene of raised temperature (PE-RT) plastic tubing. ASSE 1061 does contain testing requirements for use with PE-RT tubing.

Cost Impact
The code change proposal will not increase or decrease the cost of construction .

This proposal is only a clarification as Table P2906.6 already indicates ASSE 1061 fittings for PE-RT tubing.

Internal ID: 1750

RP12-18

IRC: P2909.1, 44

Proponent: Jeremy Brown, NSF International, representing NSF International (brown@nsf.org)

2018 International Residential Code

Revise as follows:

P2909.1 Design.. Drinking water treatment units shall meet the requirements of NSF42, NSF 44, NSF 53, NSF ~~60~~ 62 or CSA B483.1.

Add new standard(s) follows:

NSF

NSF International
789 N. Dixboro Road
Ann Arbor MI 48105

62-2015:

Drinking Water Distillation Systems

Reason:
The current text of the IRC references an incorrect standard. NSF 60 is Drinking Water Chemicals-Health Effects. This is unrelated to Drinking Water Treatment Units.

The origin of this standard in this code goes back to 2009 when a proposal to add CSA 483.1 also incorrectly added NSF 60. It is beleived that the actual intent was to add NSF 62- Drinking Water Distillation Systems.

NSF 62 is an appropriate drinking water treatment technology and this is the American National Standard for this technology. This standard is already referenced in the International Plumbing Code in the corresponding section 611.1 with the same language.

This standard establishes minimum materials, design and construction, and performance requirements for point-of-use and point-of-entry drinking water distillation systems and the components used in these systems. Distillation systems covered by this standard are designed to reduce specific chemical contaminants from potable drinking water supplies. Systems covered under this standard may also be designed to reduce microbiological contaminants, including bacteria, viruses, and cysts, from potable drinking water supplies.

A copy of NSF 62 was submitted with this code change and may be obtained free of charge by anyone considering this code change proposal by emailing brown@nsf.org.

Cost Impact
The code change proposal will not increase or decrease the cost of construction .

This creates an additional option for water treatment but does not mandate the use of this technology so is cost neutral.

Analysis: The referenced standard, NSF 62-2015, is currently referenced in the 2018 IPC-2015 in a section that is coordinate in subject matter to the proposed revised section.

Internal ID: 144

RP13-18

IRC: P3110 (New), P3110.1 (New), P3110.2 (New), P3110.2.1 (New), P3110.3 (New), P3110.3.1 (New), P3110.3.2 (New), P3110.3.3 (New)

Proponent: Jane Malone, American Association of Radon Scientists and Technologists, representing American Association of Radon Scientists and Technologists, National Policy Director

2018 International Residential Code

Add new text as follows:

SECTION P3110 SOIL GAS VENT PIPING

P3110.1 Scope. The provisions of this section shall govern the materials, construction, and installation of soil gas vent pipe and connectors.

P3110.2 Soil gas vent pipe. A gas-tight pipe of 3-inch [76 mm] nominal size or larger shall be extended from below the slab or crawl space through the interior of the building and exit the roof. The pipe shall be centered in a cylindrical space which is located in the attic below the roof, is not adjacent to an eave or wall, and has a vertical height of not less than 48 inches [122 cm] and diameter of not less than 21 inches [53 cm]. Materials used shall comply with Section P3002.

P3110.2.1 Soil gas vent pipe termination. The vent pipe shall terminate vertically upward not less than 12 inches [305 mm] above the roof in a location not less than 10 feet [3048 mm] away from any window, air intake, or other opening into the conditioned spaces of the building that is less than 2 feet [610 mm] below the exhaust point. The vent pipe shall terminate not less than 10 feet [3048 mm] from window or other opening in adjoining or adjacent buildings.

P3110.3 Soil gas vent pipe connector. A tee fitting or equivalent method shall be installed to secure the soil gas vent pipe to the perforated piping or geotextile matting from which soil gas is collected.

P3110.3.1 Crawl spaces. In a building with a crawl space, a soil gas vent pipe connector shall be installed with not less than 10 feet [3048 mm] of perforated pipe or geotextile matting connected to each of the two horizontal openings of the connector. The connector and pipe or geotextile matting shall be located below a soil gas membrane complying with ASTM Class A, B, or C.

P3110.3.2 Slab-on-grade and basements. In buildings with a basement or slab-on-grade, a soil gas vent pipe connector of 4-inch [102 mm] nominal diameter shall be installed with not less than 4 feet [1219 mm]of perforated pipe or geotextile matting connected to each of the two horizontal openings of the connector.

P3110.3.3 Drain tile systems. Where an interior drain tile system is present, the two horizontal openings of the soil gas vent pipe connector shall be connected to the drain tile system.

Reason:
Chapter 31 governs the piping, tubing and fittings for vents in one- and two-family dwellings. Soil gas vents are commonly installed by plumbers yet there is no information about soil gas vents in Chapter 31 or elsewhere in the plumbing sections of the IRC. Sections 401 through 701 of ANSI AARST CCAH-2013, Reducing Radon in New Construction of One and Two Family Dwellings describe the pipe-related (and other) requirements for soil gas vents. This proposed code change concisely adds the standard's requirements for such vents, which will ensure that plumbers have the correct information within the IRC plumbing chapter on vents. This change does not add a requirement to provide a soil gas vent but rather delivers the specification for how to provide one when a building project requires one.

Bibliography:
[ANSI AARST CCAH-2013, Reducing Radon in New Construction of One and Two Family Dwellings] [AARST Consortium on Radon Standards] [2013] [http://aarst-nrpp.com/wp/america-national-radon-standards/]

Cost Impact
The code change proposal will not increase or decrease the cost of construction .

The provisions are not required for every home. They only apply to homes where the builder or buyer includes soil gas vent pipe.

Internal ID: 2287

RP14-18

IRC: P2701.4, P2717.2, P3005.3.5, P3201.1, P3201.2, P3201.3 (New), P3201.4, P3201.3.1, P3201.5, P3201.6, P3201.7, Chapter 44

Proponent: Ronald George, representing Wavin Ltd. (Ron@Plumb-TechLLC.com)

2018 International Residential Code

Add new text as follows:

P3201.3 Non-liquid seal devices. Each non-liquid seal, drainage sealing device shall conform to ASME A112.18.8 and shall be an alternative to a liquid seal type trap. Such devices shall be installed only on 1-1/4 inch (31.8mm) and 1-1/2 inch (38.1 mm) tubular drains. Where devices conforming to ASME A112.18.8 are installed on the outlet of food waste disposers, the devices shall be installed in the vertical, downward flow orientation. These devices shall be protected from back pressure by one of the same approved venting methods as for a liquid seal trap, in accordance with Section P3101. Non-liquid seal devices shall not be installed on the outlet of a urinal. Where installed, the devices shall be installed only in the vertical downward orientation or in horizontal waste branches in accordance with Section P3005.3. The devices shall be installed in accordance with the manufacturer's instructions and shall be accessible.

Revise as follows:

P3201.1 Design of ~~traps.~~Liquid Seal Traps. Traps relying on a liquid seal shall be of standard design, shall have smooth uniform internal waterways, shall be self-cleaning and shall not have interior partitions except where integral with the fixture. Traps shall be constructed of lead, cast iron, copper or copper alloy or *approved* plastic. Copper or copper-alloy traps shall be not less than No. 20 gage (0.8 mm) thickness. Solid connections, slip joints and couplings shall be permitted to be used on ~~the~~ liquid seal type trap ~~inlet~~inlets, liquid seal type trap ~~outlet~~outlets, or within the liquid seal type trap seal. Slip joints shall be permitted on non-liquid seal devices conforming to Section P3201.3. Traps and other approved devices having slip-joint connections shall comply with Section P2704.1.

P3201.2 ~~Trap seals.~~Liquid seal traps. Each fixture trap with a liquid seal shall have a liquid seal of not less than 2 inches (51 mm) and not more than 4 inches (102 mm).

Exception: Sealing devices not relying on a liquid seal shall conform to the requirements in Section P3201.3.

~~P3201.3~~P3201.4 Liquid Seal Trap setting and protection. ~~Traps~~ Liquid seal traps shall be set level with respect to their water or other liquid seals and shall be protected from freezing. Trap seals shall be protected from siphonage, aspiration or back pressure by an *approved* system of venting (see Section P3101).

Exception: Sealing devices not relying on a liquid seal shall conform to the requirements in P3201.3.

~~P3201.4~~P3201.5 Building traps. Building traps shall be prohibited.

~~P3201.5~~P3201.6 Prohibited trap designs. The following types of traps are prohibited:

1. Bell traps.
2. Separate fixture traps with interior partitions, except those lavatory traps made of plastic, stainless steel or other corrosion-resistant material.
3. “S” -traps.
4. Drum traps.
5. Trap designs with moving parts.

Exception: Non-Liquid seal type devices conforming to ASME A112.18.8 and in accordance with Section P3201.3

~~P3201.6~~P3201.7 Number of fixtures per trap. Each plumbing fixture shall be separately trapped by a water seal ~~trap.~~ trap or a device conforming to the requirements in Section P3201.3. The vertical distance from the fixture outlet to the trap weir of a liquid seal trap or the inlet of a device meeting the requirements of Section P3201.3 shall not exceed 24 inches (610 mm) and the horizontal offset distance of a liquid seal trap shall not exceed 30 inches (762 mm) measured from the centerline of the fixture outlet to the centerline of the inlet of the trap. The height of a clothes washer standpipe above a trap shall conform to Section P2706.1.2. Fixtures shall not be double ~~trapped.~~trapped with liquid seal traps and/or devices covered under section P3201.3.

Exceptions:

1. Fixtures that have integral traps.
2. A single trap or non-liquid seal device shall be permitted to serve two or three like fixtures limited to kitchen sinks, laundry tubs and lavatories. Such fixtures shall be adjacent to each other and located in the same room with a continuous waste arrangement. The trap shall be installed at the center fixture where three fixtures are installed. Common trapped fixture outlets shall be not more than 30 inches (762 mm) apart.
3. Connection of a laundry tray waste line into a standpipe for the automatic clothes-washer drain shall be permitted in accordance with Section P2706.1.2.1.

P3002.3.1 Drainage. Drainage fittings shall have a smooth interior waterway of the same diameter as the piping served. Fittings shall conform to the type of pipe used. Drainage fittings shall not have ledges, shoulders or reductions that can retard or obstruct drainage flow in the piping. Threaded drainage pipe fittings shall be of the recessed drainage type, black or galvanized. Drainage fittings shall be designed to maintain one-fourth unit vertical in 12 units horizontal (2-percent slope) grade. This section shall not be applicable to tubular waste fittings used to convey vertical flow upstream of the trap liquid seal liquid level of a fixture trap or a device conforming to P3201.3.

P3005.2.5 Cleanout size. Cleanouts shall be the same size as the piping served by the cleanout, except cleanouts for piping larger than 4 inches (102 mm) need not be larger than 4 inches (102 mm).

Exceptions:

1. A removable P-trap or non-liquid seal type device conforming to Section P3201.3 with slip- or ground-joint connections can serve as a cleanout for drain piping that is one size larger than the ~~P-trap~~ tubular drain size.
2. Cleanouts located on stacks can be one size smaller than the stack size.
3. The size of cleanouts for cast-iron piping can be in accordance with the referenced standards for cast iron fittings as indicated in Table P3002.3.

P2704.1 Slip joints. Slip-joint connections shall be installed only for tubular waste piping and only between the trap outlet tailpiece of a fixture and traps, within traps, on devices conforming to section P3201.3, andon the connection to between tubular fixture drains and the drainage piping. piping system. Slip-joint connections shall be made with an approved elastomeric sealing gasket. Slip-joint connections shall be accessible. Such access shall provide an opening that is not less than 12 inches (305 mm) in its smallest dimension.

P2717.2 Sink and dishwasher. The combined discharge from a dishwasher and a one- or two-compartment sink, with or without a food-waste disposer, shall be served by a trap or device conforming to section P3201.3 of not less than $1^{1}/_{2}$ inches (38 mm) in outside diameter. The dishwasher discharge pipe or tubing shall rise to the underside of the counter and be fastened or otherwise held in that position before connecting to the head of the food-waste disposer or to a wye fitting in the sink tailpiece.

Add new standard(s) follows:

ASME

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

ASME A112.18.8-2009 (R2014) :

In-Line Sanitary Waste Valves for Plumbing Drainage Systems

Reason:

ASME standard A112.18.8-2009 (Re-affirmed in 2014) titled: "In-Line Sanitary Waste Valves for Plumbing Drainage" was developed for sanitary waste devices for use in lieu of p-traps for applications prone to liquid seal loss from evaporation, siphoning or freezing. They are certified by a third-party testing lab to the testing requirements in the ASME A112.18.8 Standard listed below. The devices are limited to tubular drains in sizes 1-1/4 inch or 1-1/2 inch outside diameter (OD).

This proposal is to add these non-liquid seal devices as an alternative to liquid seal traps for applications where evaporation, siphoning or freezing can be a problem. These devices will not fail from evaporation associated with long periods of non-use as would occur with a water filled p-trap or from negative pressures in the drainage systems that would siphon a p-trap, or from freezing which can crack or damage p-traps and p-trap joints. These devices conform to ASME A112.18.8 and they are non-liquid sealing devices not traps or p-traps. They are an alternative to, and a better means of complying with the requirements of preventing sewer gases from entering a building. They fulfill the same function of a p-trap to not allowing sewer gases to pass into the building. These devices are approved and widely used in Europe and other international markets.

These devices are ideally suited for situations where plumbing fixtures experience only occasional use and can evaporate, like seasonal occupancy dwellings, vacation homes, guest bathrooms, cabins, on bar sinks, in low humidity conditions, or in persistent high temperature conditions. They also offer protection in freezing conditions and where there are limited or confined space conditions where a p-trap can conflict with structural or other building components. Other common uses for this type of device are in recreational vehicles and ships or boats

These devices have performed reliably for many years in millions of installations worldwide. They offer a better, more reliable option to a liquid seal p-trap especially in cases where evaporation, siphoning or freezing conditions exist.

The testing and performance requirements in the Standard for these devices are very stringent. P-Traps do not have a standard and are not tested. The tests for this device meet and exceed the performance capabilities of a p-trap. The tests in the standard include the following:

1. Seal materials shall meet various listed standards
2. Valve inlet/Outlet dimensions
3. Threaded connection dimensions
4. Gas-tight seal tests
5. Minimum flow rate tests for various tubing sizes/fixtures
6. One-way sealing performance tests
7. Airway flow rate tests
8. Thermal cycling Test
9. Long term cyclic fatigue tests
10. Grease/lard test
11. Resistance to cleaning chemicals and solvents test
12. Resistance to household substances and solids tests
13. Drop tests

The scope of the ASME A112.18.8 Standard establishes minimum requirements for materials in the construction of the devices for use as an alternate to tubular p-traps, and prescribes the minimum test requirements for the performance of the valve. In addition, the standard requires the methods of permanent marking and identification of the product. The standard also states that these devices are not intended to be used for urinals or water closets.

Below is an example of the type of valve that complies with the Standard:

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

This code change is for a device that is an option to a p-trap. It is not required and therefore, will not cause an increase in construction. P-traps are still allowed. However, this code change allows for a better performing product as an approved option for areas where evaporation associated with seldom use of a fixture, siphoning or freezing may be an issue.

Analysis: A review of the standard proposed for inclusion in the code, ASME A112.18.8-2009(R2014), with regard to the ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before April 2, 2018.

Internal ID: 887

RP15-18

IRC: TABLE AG101.1

Proponent: Larry Gill, IPEX USA LLC, representing IPEX USA LLC (larry.gill@ipexna.com)

2018 International Residential Code

Revise as follows:

TABLE AG101.1
PLASTIC PIPING STANDARDS FOR VARIOUS APPLICATIONSa, b

APPLICATION	LOCATION	TYPE OF PLASTIC PIPING								
		ABS	CPVC	PE	PE-AL-PE	PE-RT	PEX	PEX-AL-PEX	PP	PVC
Central vacuum	Systempiping	—	—	—	—	—	—	—	—	ASTM F2158
Foundation drainage	Systempiping	ASTM F628	—	ASTM F405	—	—	—	—	—	ASTM D2665 ASTM D2729 ASTM D3034
Geothermal ground loop	Systempiping	—	ASTM D2846 ASTM F441 ASTM F442 ASTM F2855CSA B137.6	ASTM D2239 ASTM D2737 ASTM D3035	ASTM F1282	ASTM F2623 ASTM F2769 CSA B137.18	ASTM F876 CSA B137.5	ASTM F1281	ASTM F2389 CSA B137.11	ASTM D1785 ASTM D2241 CSA B137.3
	Looppiping	—	—	ASTM D2239 ASTM D2737ASTM D3035NSF 358-1	ASTM F1282	ASTM F2623 ASTM F2769 CSA B137.18	ASTM F876 CSA B137.5	—	ASTM F2389 CSA B137.11	—
Gray water	Nonpressure distribution/collection	ASTM F628	—	ASTM D2239 ASTM D2737 ASTM D3035 ASTM F 2306	—	—	—	—	ASTM F2389 CSA B137.11	ASTM D1785 ASTM D2729 ASTM D2949 ASTM D3034ASTM F891ASTM F 1760 CSA B137.3
	Pressure/distribution	—	ASTM D2846 ASTM F441 ASTM F442 ASTM F2855 CSA B137.6	ASTM D2239 ASTM D2737 ASTM D3035	ASTM F1282	ASTM F2623 ASTM F2769 CSA B137.18	ASTM F876 CSA B137.5	ASTM F1281	ASTM F2389 CSA B137.11	ASTM D1785 ASTM D2241 CSA B137.3
Radiant cooling	Loop piping	—	ASTM D2846 ASTM F441 ASTM F442 ASTM F2855	ASTM D2239 ASTM D2737 ASTM D3035	ASTM F1282	ASTM F2623 ASTM F2769 CSA B137.18	ASTM F876 CSA B137.5	ASTM F1281	ASTM F2389 CSA B137.11	—
Radiant heating	Loop piping	—	ASTM D2846 ASTM F441 ASTM F442 ASTM F2855	—	ASTM F1282	ASTM F2623 ASTM F2769 CSA B137.18	ASTM F876 CSA B137.5	ASTM F1281	ASTM F2389 CSA B137.11	—
Rainwater harvesting	Nonpressure/collection	ASTM F628	—	ASTM F 1901	—	—	—	—	ASTM F2389 CSA B137.11	ASTM D1785 ASTM D2729 ASTM D2949 ASTM F891 ASTM F 1760 CSA B137.3
	Pressure/distribution	—	ASTM D2846 ASTM F441 ASTM F442 ASTM F2855 CSA B137.6	ASTM D2239 ASTM D2737 ASTM D3035	ASTM F1282	ASTM F2623 ASTM F2769 CSA B137.18	ASTM F876 CSA B137.5	ASTM F1281	ASTM F2389 CSA B137.11	ASTM D1785 ASTM D2241 CSA B137.3
Radon venting	System piping	ASTM F628	—	—	—	—	—	—	—	ASTM D1785 ASTM F891 ASTM F 1760
Reclaimed water	Main tobuilding service	—	ASTM D2846 ASTM F441 ASTM F442 ASTM F2855 CSA B137.6	ASTM D3035 AWWA C901CSA B137.1	ASTM F1282	ASTM F2623 ASTM F2769 CSA B137.18	ASTM F876 AWWA C904 CSA B137.5	—	ASTM F2389 CSA B137.11	ASTM D1785 ASTM D2241 AWWA C905 CSA B137.3
	Pressure/distribution/irrigation	—	ASTM D2846	ASTM D2239	ASTM F1282	ASTM F2623	ASTM F876	ASTM F1281	ASTM F2389AWWA	ASTM D1785

			ASTM F441 ASTM F442 ASTM F2855 CSA B137.6	ASTM D2737 ASTM D3035		ASTM F2769 CSA B137.18	CSA B137.5		C900 CSA B137.11	ASTM D2241 AWWA C900
Residential fire sprinklers[c]	Sprinklerpiping	—	ASTM F441 ASTM F442 CSA B137.6 UL 1821	—	—	ASTM F2769 CSA B137.18	ASTM F876 CSA B137.5 UL 1821	—	ASTM F2389 CSA B137.11	—
Solar heating	Pressure/distribution	—	ASTM D2846 ASTM F441 ASTM F442 ASTM F2855	—	—	ASTM F2623 ASTM F2769 CSA B137.18	ASTM F876 CSA B137.5	ASTM F1281	ASTM F2389 CSA B137.11	—

a. This table indicates manufacturing standards for plastic piping materials that are suitable for use in the applications indicated. Such applications support green and sustainable building practices. The system designer or the installer of piping shall verify that the piping chosen for an application complies with local codes and the recommendations of the manufacturer of the piping.

b. Fittings applicable for the piping shall be as recommended by the manufacturer of the piping.

c. Piping systems for fire sprinkler applications shall be listed for the application.

Reason:

This change is to add CSA B137.18 to the various applications in Table AG 101.1. CSA B137.18 is already included in the I Codes and is referenced in Chapter 44 - Reference Standards of the 2018 IRC.

Bibliography:

CSA B137.18 Polyethylene of Raised Temperature (PE-RT) Tubing Systems for Pressure Applications

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

This standard is only another option to choose from. More options generally result in a lowering of the costs of construction.

Internal ID: 1045

RP16-18

IRC: Appendix U (New)

Proponent: Ed Osann, representing Natural Resources Defense Council (eosann@nrdc.org)

2018 International Residential Code

Add new text as follows:

APPENDIX U
Water Efficiency

AU101.1 Scope. This appendix shall apply to:

1. New buildings.
2. Additions to existing buildings.
3. Alterations to existing buildings.

SECTION AU102 DEFINITIONS

AU102.1 General. The following words and terms, for purposes of this appendix, shall have the meanings shown herein. Chapter 2 shall be referred to for general definitions.

Add new definition as follows:

AUTOMATIC. Self-acting, operating by its own mechanism when actuated by some impersonal influence, such as a change in current strength, pressure, temperature, or mechanical configuration.

AUTOMATIC IRRIGATION CONTROLLER. A timing device used to remotely control valves that operate an irrigation system.

REGENERATION. The maintenance process that restores a medium in a system so that it can continue to perform its water treatment function.

RUNOFF. Water that is not absorbed by the soil or landscape to which it is applied and flows from the landscape area.

SUBMETER. A meter installed subordinate to a utility service meter.

WATER SOFTENER. A pressurized water treatment device in which hard water is passed through a bed of cation exchange media (either inorganic or synthetic organic) for the purpose of exchanging calcium and magnesium ions for sodium or potassium ions, thus producing a softened water that is more desirable for laundering, bathing, and dishwashing.

AU103 PLUMBING FIXTURES AND FIXTURE FITTINGS

AU103.1 Maximum flow and water consumption. The maximum water consumption flow rates and quantities for plumbing fixtures and fittings shall be in accordance with Table AU103.1.

TABLE AU103.1
MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS[b]

PLUMBING FIXTURE OR FIXTURE FITTING	MAXIMUM FLOW RATE OR QUANTITY
Lavatory faucet	1.5 gpm at 60 psi
Shower head[a]	2.0 gpm at 80 psi
Sink faucet[c]	1.8 gpm at 60 psi
Water closet	1.28 gallons per flushing cycle

For SI: 1 gallon per minute = 3.785 L/m, 1 pound per square inch = 6.895 kPa

a. A handheld 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 have a temporary increase in flow to not exceed 2.2 gpm provided that upon either the user's physical release of the increased flow activation mechanism or the user's closure of the faucet valve, the faucet reverts to the flow indicated in the table.

AU104 WATER SOFTENERS AND TREATMENT DEVICES

AU104.1 Water softeners. Water softeners shall be listed and labeled in accordance with NSF 44 and shall comply with Sections AU104.1.1 through AU104.1.3.

AU104.1.1 Demand-initiated regeneration. Water softeners shall be equipped with demand-initiated regeneration control systems. Such control systems shall automatically initiate the regeneration cycle after determining the depletion, or impending depletion, of softening capacity.

AU104.1.2 Water consumption. Water softeners shall have a maximum water consumption during regeneration of 4 gallons per 1,000 grains of hardness removed as measured in accordance with NSF 44.

AU104.1.3 Salt efficiency. Water softeners shall have a rated salt efficiency of not less than 4,000 grains of total hardness exchange per pound of salt, based on sodium chloride equivalency.

AU104.2 Reverse osmosis water treatment systems. Point-of-use reverse osmosis systems shall be equipped with an automatic shutoff valve that prevents the production of reject water when there is no demand for treated water.

AU105 AUTOMATIC IRRIGATION SYSTEMS

AU105.1 Automatic irrigation controllers. Where installed as part of a permanent landscape irrigation system, irrigation controllers shall regulate irrigation based on weather, climatological, or soil moisture status data. The controller shall have an integrated or separate sensor to suspend irrigation events during rainfall.

AU105.2 Misdirection and runoff prohibited. Automatic irrigation systems shall not direct water onto building exterior surfaces, foundations, exterior paved surfaces, or adjoining lots. Systems shall not generate runoff.

AU105.3 Landscape water measurement. A submeter shall be installed to separately record the volume of all water supplied to an outdoor landscape with an irrigated area of 5,000 square feet or greater served by an automatic irrigation system.

> **Exception:** Where a utility service meter is installed to record the volume of all water supplied to the landscape through a service connection dedicated to irrigation.

Reason:

This proposal adds a short, voluntary appendix to the IRC containing requirements that will enhance the water efficiency of dwellings subject to the code. The language of this appendix is NOT mandatory unless, and to the extent, specifically referenced in the adopting ordinance or regulation of the jurisdiction.

The purpose of the proposal is to offer enhanced water efficiency provisions applicable to one- and two-family homes in code language for consideration by jurisdictions using the IRC. The ICC offers enhanced or "stretch code" provisions for large buildings in the International Green Construction Code (IgCC), but the IgCC does NOT apply to low-rise residential buildings. The ICC also offers "green" building standards for residential buildings of all sizes in ICC 700, the National Green Building Standard. However, ICC 700 is a points-based rating system, NOT code language, and the practices in its chapter on water efficiency are not mandatory. This new appendix will fill this gap, allowing jurisdictions that customarily use the IRC the opportunity to consider enhanced water efficiency requirements in familiar code format.

The proposal is intentionally brief, focusing on three areas of water consumption where enhanced performance criteria are well-known, and that together are responsible for the great majority of single-family residential water use in nearly all jurisdictions -- plumbing products, water softening, and landscape irrigation.

* Plumbing products: Requirements are based on performance levels established by the US EPA WaterSense Program for water closets, lavatory faucets, and showerheads, and by the 2016 California Green Building Standards Code (CalGreen) for kitchen faucets. These provisions are all found in IgCC 2015 as well, in Table 702.1, applicable to

residential occupancies covered by that code.

* Water softeners and treatment devices: These requirements for water use and salt efficiency (an important consideration for maintaining water quality and the ability to beneficially recycle municipal wastewater) were all included in section 704 of IgCC 2015, and are adopted here for applicability to the one- and two-family homes covered by the IRC. Water consumption during regeneration and salt efficiency are considered "elective performance claims" under NSF 44, and must be verified by test procedures laid out in section 711 of that standard. The requirements for demand-initiated regeneration and salt efficiency have been mandatory requirements for all residential water softeners installed in California since 2002.

* Automatic irrigation systems: These requirements are also drawn from the IgCC, where landscape metering requirements are specified in section 701.2.1 and other irrigation system requirements are laid out in section 404.1.2. Although the IgCC requires separate metering for irrigated landscapes of all sizes, a less stringent requirement may be appropriate for single-family residences. This proposal limits the metering requirement to residential landscapes of 5,000 square feet or more, the threshold of applicability for landscape metering contained in the California Code of Regulations,Title 23, Chapter 2.7, also known as the Model Water Efficient Landscape Ordinance (MWELO). MWELO also requires that irrigation controllers in all newly permitted landscape installations in California be either weather-based or soil moisture sensor-based, as required in this proposal. Note that the requirements of section AU105 are only applicable to permanent irrigation systems with automatic controls, and have no applicability to hose-end sprinklers.

Terms that are not otherwise defined in the IRC are included in a definitions section of the appendix. The definitions have been drawn variously from the IgCC, MWELO, the IAPMO Green Plumbing and Mechanical Code Supplement, and NSF 330.

It should be noted that when considering this voluntary appendix, adopting jurisdictions are free to adopt the appendix in its entirety, but may adopt any individual provision of their choosing that they find most relevant to local conditions and most practical for enforcement. Each element of the proposal stands on its own. The scope of the proposal has also been drafted in such a way as to highlight its applicability to project types (new buildings, additions to buildings, and alterations) and allow adopting jurisdictions full latitude to narrow the scope in that regard should they so choose.

Each successive year brings new evidence of the impacts of our changing climate, and significant among these impacts are greater extremes and frequency of both droughts and floods. The hydrological record of the last 100 years has become less useful as a predictor of water supply reliability. Few can doubt that efficient water use will become even more important in the decades ahead than it is today. Residential water use typically constitutes 60 to 65% of all publicly supplied drinking water, and the majority of residential use is found in single-family homes. For all these reasons, the IRC would be made more valuable to jurisdictions throughout the country if it included enhanced water efficiency criteria in clear code language for voluntary adoption.

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US Environmental Protection Agency, WaterSense Program, www.epa.gov/watersense/technical-specifications

Cost Impact

The code change proposal will not increase or decrease the cost of construction .

The proposal offers enhanced water efficiency specifications for voluntary adoption by jurisdictions using the IRC. As such, there is no general impact on users of the IRC.

The content of this voluntary appendix establishes enhanced efficiency criteria for plumbing products, water softeners, and certain landscape irrigation equipment.

Regarding plumbing products, products are widely available from multiple manufacturers. Based on US EPA WaterSense product listings, as of September 2017 there are over 3,100 models of tank-type toilets, over 15,000 models of lavatory faucets, and nearly 6,000 models of showerheads that meet the criteria in this proposal. Although prices for plumbing products vary widely, based on considerations of style, color, and trim, there is no price premium attached to higher water use efficiency per se. See, for example, the staff reports of the California Energy Commission on standards for lavatory faucets and showerheads that found no price premium for products performing at the level proposed in this voluntary appendix.

Regarding water softeners, costs vary widely, but much of this difference is due to capacity, rather than efficiency of performance. The key criteria in this proposal have been statewide requirements for residential water softeners in California since 2002. As such, compliant products are widely available from multiple manufacturers. By way of illustration, as of this writing, the least expensive residential cation exchange water softener now available from Lowes fully complies with all criteria in this proposal (http://pdf.lowes.com/installationguides/090259891214_install.pdf), as does the least expensive cation exchange water softener available from Home Depot (https://www.homedepot.com/b/Kitchen-Water-Filters-Water-Softeners/N-5yc1vZaq3y/Ntk-semanticsearch/Ntt-water+softener?NCNI-5).

Regarding irrigation controllers, prices also vary widely, with a major driver being the number of zones controlled by the controller. Some 800 models of irrigation controllers have been certified to the WaterSense specification for weather-based irrigation controllers, so supply and choice of compliant products are ample. Smart controllers are now required for all newly permitted landscape installations in California, ensuring continued competitive interest in this product area.The prevailing price differential between a timer-based controller and a smart controller meeting the criteria of this proposal has been around $100. But several products are on the market that cut this differential in half, and at least one weather-based irrigation controller is now on the market at a price comparable to a timer-based controller.

When products meet enhanced criteria for water efficiency, costs are typically recouped by savings on water and/or sewer charges over the life of the product. According to the 2016 Water and Wastewater Rate Survey, over the last decade, water charges have annually increased by 5.34 % and wastewater charges have annually increased by 5.98 %, far exceeding the annual inflation rate of 2.07 % for that period. These trends are expected to continue, underscoring the cost-effectiveness of installation of water-efficient products.

Internal ID: 2264
