WATER EFFICIENCY AND SANITATION STANDARD (WE-STAND)

TECHNICAL COMMITTEE MEETING

IAPMO WORLD HEADQUARTERS, ONTARIO, CA.

APRIL 5 – 6, 2016

Water Efficiency and Sanitation Standard (WE-Stand)
Technical Committee Meeting

IAPMO World Headquarters, Ontario, CA.
April 5 - 6, 2016 - 8:00 a.m.

AGENDA

April 5, 2016 - 8:00 a.m.

1. Call to Order
2. Chairman Comments
3. Announcements
4. Self Introductions
5. Review and Approval of Agenda
6. Review and Discussion of Change Proposals to the Water Efficiency and Sanitation Standard (WE-Stand)
7. Adjournment for the day

April 6, 2016 - 8:00 a.m.

1. Call to Order
2. Chairman Comments
3. Announcements
4. Presentation by Mary Ann Dickinson
5. Continuation of Review and Discussion of Change Proposals to the Water Efficiency and Sanitation Standard (WE-Stand)
6. Other business
7. Next scheduled meeting
8. Adjournment

TENTATIVE ORDER OF DISCUSSION
Proposed Changes to the 2017 WE-Stand

The following is the tentative order of discussion on which the proposed changes will be discussed at the WE-Stand Technical Committee Meeting. Proposed changes that are grouped together are those that are separated by lines. Indented proposed changes are those being discussed out of numerical order.

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WE-Stand 2017 – (101.4) Item # 001

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	101.4
Proposed Text:	**101.4 Scope.** The provisions of this standard ~~applies~~ apply to the erection, installation, alteration, repair, relocation, replacement, addition to, use, or maintenance of plumbing and mechanical systems covered by the scope of this standard ~~within this jurisdiction~~.
Problem Statement:	•Grammatical correction to replace 'applies' with 'apply.' •Strike out 'within this jurisdiction' as the context is inconsistent. Throughout the text, the Authority Having Jurisdiction is referred to as a third party whereas in Section 101.4 it is used in the context that the jurisdiction and the standard are one in the same.
Referenced Standards:	

WE-Stand 2017 – (101.4.2) Item # 002

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	101.4.2
Proposed Text:	**101.4.2 Existing Construction.** No provision of this standard shall be deemed to require a change in any portion of a plumbing or mechanical system or any other work regulated by this standard in or on an existing building or lot when such work was installed and is maintained in accordance with law in effect prior to the effective date of this standard, except when any such plumbing or mechanical system is determined by the Authority Having Jurisdiction to be ~~in fact~~ dangerous, unsafe, insanitary, a nuisance or a menace to life, health, or property.
Problem Statement:	•Unnecessary. The Authority Having Jurisdiction should have the ability to determine and make these judgments, with or without the details that define the term 'in fact.'
Referenced Standards:	

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	101.6
Proposed Text:	**101.6 Referenced Codes and Standards.** The codes and standards referenced ~~elsewhere~~ in this standard shall be considered part of the requirements of this standard to the prescribed extent of each such reference.
Problem Statement:	- Not necessary as it assume everything hereafter will be referenced to and doesn't include anything prior to Section 101.6.
Referenced Standards:	

WE-Stand 2017 – (101.6.6) Item # 004

Name:	Ray Mirzaei, Chairman
WE-Stand Task Group:	Swimming Pools and Spas Task Group
Recommendation:	Revise text
Section Number:	101.6.6
Task Group Recommendation:	**101.6.6 Swimming Pool.** The provisions of the swimming pool code shall apply to the erection, installation, alteration, repair, relocation, replacement, addition to, use and maintenance of in-ground swimming pools, in-ground spas, or above-ground swimming pool ~~hot tub systems~~. Where a swimming pool code is not adopted or where the content of the swimming pool code adopted by the jurisdiction is not applicable, then swimming pool code shall mean the Uniform Swimming Pool, Spa & Hot Tub Code (USPSHTC) promulgated by the International Association of Plumbing and Mechanical Officials (IAPMO).
Problem Statement:	Hot tubs are removed from the scope of provisions because they are a factory made appliance. Clarification is made to include both in-ground and above-ground pools.
Referenced Standards:	

WE-Stand 2017 – (203.0) Item # 005

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Revise text
Section Number:	203.0
Task Group Recommendation:	**203.0** ~~**Alternate**~~ **<u>Nonpotable</u> Water Source.** Non-potable source of water that includes but not limited to gray water, on-site treated nonpotable water, rainwater, and reclaimed (recycled) water.
Problem Statement:	Change Alternate to Nonpotable. Alternate seems to be any nonpotable water, the influent and effluent (treated). On-site treated is the effluent treated nonpotable product. Graywater is the influent nonpotable water.
Referenced Standards:	

WE-Stand 2017 – (204.0) Item # 006

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Add text
Section Number:	204.0
Task Group Recommendation:	**204.0** **Blackwater.** Used indoor water discharged into and flowing through a sanitary sewer system.
Problem Statement:	Need to add definition for term mentioned in the document.
Referenced Standards:	

WE-Stand 2017 – (205.0) Item # 007

Name:	Tim Keane
Organization:	Legionella Risk Management, Inc.
Recommendation:	Revise text
Section Number:	205.0
Proposed Text:	**205.0** **Cycles of Concentration for Cooling Towers.** Cycles of concentration represents the increasing amount of minerals in solution that occur through evaporation in proportion to the minerals in solution contained in the original makeup water. Cycles of concentration can be calculated by ~~equals~~ the specific conductance of the water in the cooling tower basin divided by the combined flow weighted average specific conductance of the makeup water(s) to the cooling tower.
Problem Statement:	The present wording is not a definition, it is a calculation. This wording revision adds the definition to the calculation.
Referenced Standards:	

WE-Stand 2017 – (206.0) Item # 008

Name:	Neal Shapiro, Chairman
WE-Stand Task Group:	Stormwater Task Group
Recommendation:	Revise text
Section Number:	206.0
Task Group Recommendation:	**206.0** **Debris Excluder.** A device installed on ~~the~~ a rainwater or stormwater catchment conveyance system to exclude solids. ~~prevent the accumulation of leaves, needles, or other debris in the system~~.
Problem Statement:	This device and equivalent are necessary for both all nonpotable water sources/systems, not just rainwater harvesting systems. Definition should be broadened.
Referenced Standards:	

WE-Stand 2017 – (206.0) Item # 009

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Revise Text
Section Number:	206.0
Task Group Recommendation:	**206.0** **Dry Weather Runoff.** Water that flows along a surface, in a channel or sub-surface including groundwater seepage, and is not associated with a <u>rain event</u> ~~rainwater catchment system or stormwater catchment system~~.
Problem Statement:	Better clarification of definitions. More complete and accurate. No need to mention a catchment system.
Referenced Standards:	

WE-Stand 2017 – (208.0) Item # 010

Name:	Gary Morgan
Organization:	Viega LLC
Recommendation:	Add text
Section Number:	208.0
Proposed Text:	**208.0** **Flow-Through Fitting**: A multiport piping connection that has two primary piping supply connections and one outlet connection with the purpose to supply water (hot or cold) to an end use plumbing fixture. The design of a flow-through fitting allows for non-restricted water to constantly flow through the fitting regardless if there is demand from the end use fixture or not. Flow-through fittings are typically used in order to keep water from cooling or stagnating as is otherwise typical in a traditional branch legs serving individual fixtures. When properly integrated into hot-water recirculation systems the wait time for hot-water is minimized thus saving both water and energy.
Problem Statement:	Add new definition for flow-through fittings.The term "Flow-through fitting" is being introduced in separate code proposals as an addition to section 702.7.1.
Referenced Standards:	

Name:	Tim Keane
Organization:	Legionella Risk Management, Inc.
Recommendation:	Add text
Section Number:	210.0
Proposed Text:	**210.0** **High Use Public Facility Restrooms.** Public lavatory faucets are those intended for the unrestricted use of more than one individual in assembly occupancies, business occupancies, public buildings, transportations facilities, etc.
Problem Statement:	Low use public restroom with low temperature and low flow are a huge risk for Legionella colonization. EPA NAECA provided for information
Referenced Standards:	

WE-Stand 2017 – (214.0) Item # 012

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	214.0
Proposed Text:	**214.0** **Lavatory Faucet**. A faucet that discharges into a lavatory ~~basin~~ in a domestic or commercial installation.
Problem Statement:	Consistency with the definition of ‘Lavatory’ in 214.0 requires the term ‘basin’ to be removed as exclusion of a vessel is otherwise implied.
Referenced Standards:	

WE-Stand 2017 – (214.0, Table 901.1) Item # 013

Name:	Josh Jacobs
Organization:	UL
Recommendation:	Revise text
Section Number:	214.0, Table 901.1
Proposed Text:	**214.0** **Listed (Third-party Certified).** Equipment or materials included in a list published by a listing agency (~~accredited~~ conformity assessment body which has the required standard in their ISO 17065 scope of accreditation) that maintains periodic inspection on current production of listed equipment or materials and whose listing states either that the equipment or material complies with approved standards or has been tested and found suitable for use in a specified manner. ~~[UPC:214.0]~~

Table 901.1
Referenced Standards

STANDARD NUMBER-YEAR	STANDARD TITLE	REFERENCED SECTION
ISO 17065-2012	Conformity assessment -- Requirements for bodies certifying products, processes and services	214.0

(portions of table not shown remain unchanged)

Problem Statement:	In this definition, the verbiage 'accredited conformity assessment body' is used. My concern is that it is never stated what the assessment body is being accredited to or by or gives any direction. ISO 17065-2012 Conformity assessment -- Requirements for bodies certifying products, processes and services is a standard that is being used by reputable certification and assessment organizations around the world to show that they know how to do the third-party assessments that they say they are doing. Many authorities having jurisdictions also are utilizing this as a way to find reputable third-party certification organizations.
Referenced Standards:	http://www.iso.org/iso/catalogue_detail?csnumber=46568

Note: ISO/IEC 17025 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Staff note: An electronic copy will be forthcoming or a hard copy will be available to the WE-Stand Technical Committee for review at the April 4-5, 2016 WE-Stand TC Meeting.

WE-Stand 2017 – (214.0) Item # 014

Name:	Kelsey Jacquard
Organization:	Hunter Industries
Recommendation:	Revise text
Section Number:	214.0
Proposed Text:	**214.0** **Low Flow Emitter.** Low flow irrigation emission device designed to dissipate water pressure and discharge a small uniform flow or trickle of water at a constant flow rate. To be classified as a Low Flow Emitter: drip emitters shall discharge water at less than ~~4 gallons (15 L)~~ 6.3 gallons (24 L) per hour per emitter; micro- spray, micro-jet and misters shall discharge water at a maximum of 30 gallons (113 L) per hour per nozzle.
Problem Statement:	It is recommended to change the maximum flow for drip emitters from 4 GPH to 6.3 GPH to match the ASABE/ICC 802-2014 definition of a drip emitter.
Referenced Standards:	

WE-Stand 2017 – (214.0, Table 901.1) Item # 015

<table>
<tr><td>Name:</td><td>Natalia Larrimer</td></tr>
<tr><td>Organization:</td><td>ANAB</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Recommendation:</td><td>Add text</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Section Number:</td><td>214.0, Table 901.1</td></tr>
<tr><td>Proposed Text:</td><td>214.0

<u>Testing Facilities.</u> <u>Testing laboratories accredited to the requirements of ISO/IEC 17025 - General requirements for the competence of testing and calibration laboratories for the scope of testing required. The accrediting body must be recognized for scope of testing by the Inter-Laboratory Accreditation Cooperation (ILAC).</u>

<table>
<tr><th colspan="3">Table 901.1
Referenced Standards</th></tr>
<tr><th>STANDARD NUMBER-YEAR</th><th>STANDARD TITLE</th><th>REFERENCED SECTION</th></tr>
<tr><td><u>ISO 17025-2005</u></td><td><u>General requirements for the competence of testing and calibration laboratories</u></td><td><u>214.0</u></td></tr>
</table>

(portions of table not shown remain unchanged)</td></tr>
<tr><td>Problem Statement:</td><td>ILAC Signatory Accreditation bodies are evaluated to the internationally accepted criteria specific for international recognition to assess factors relevant to a laboratory's ability to produce precise, accurate test and calibration data. Recognized Accreditation uses criteria and procedures specifically developed to determine technical competence. Specialist technical assessors conduct a thorough evaluation of all factors technical and process that have an impact on the end result. To ensure continued compliance, accredited laboratories are regularly re-examined to verify that they are maintaining standards of operation and technical expertise. These laboratories may also be required to participate in regular proficiency testing programs as an on-going demonstration of their competence. Only recognized oversight such as accreditation could provide assurance that organization indeed meets this specific set of requirements and is technically competent for the scope granted.</td></tr>
<tr><td>Referenced Standards:</td><td>The referenced ISO/IEC 17025 standard is being provided via hard copy as it is subject to copy right laws. ANAB are legally not allowed to distribute any copies. A summary is available under the following link https://www.iso.org/obp/ui/#iso:std:iso-iec:17025:ed-2:v1:en</td></tr>
</table>

Note: ISO/IEC 17025 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Staff note: Paper copy of the ISO 17025 will be available to the WE-Stand Technical Committee for review at the April 4-5, 2016 WE-Stand TC Meeting.

WE-Stand 2017 – (215.0) Item # 016

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	215.0
Proposed Text:	**215.0** **Multi-Occupant Spaces.** Indoor spaces used as a place of congregation for activities such as ~~for~~ presentations and training, including classrooms and conference rooms.
Problem Statement:	• The definition limits the use of the space for only two purposes and excludes usage of the space for similar activities, such a meetings. • The additional verbiage will expand the usage opportunities for the space without encroaching into the general definition of an assembly.
Referenced Standards:	

WE-Stand 2017 – (216.0) Item # 017

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	New text
Section Number:	216.0
Task Group Recommendation:	**216.0** **Nonpotable Treated Water Catchment System.** A system that collects and stores nonpotable treated water for the intended purpose of beneficial use. Also known as Nonpotable Treated Water Harvesting System. Includes but not limited to dry weather runoff, graywater, rainwater and stormwater.
Problem Statement:	Put all nonpotable water sources under one definition instead of having more than one, as right now have one for Rainwater and one for Stormwater.
Referenced Standards:	

WE-Stand 2017 – (216.0) Item # 018

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sourced Task Group
Recommendation:	Add Text
Section Number:	216.0
Task Group Recommendation:	**216.0** **Nonpotable Water.** Water which is not potable, and includes, but is not limited to, dry weather runoff, graywater, rainwater, stormwater, reclaimed water and blackwater.
Problem Statement:	Missing definition for a term in the standard. Note, spelling of nonpotable needs to be consistent throughout document.
Referenced Standards:	

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Add text
Section Number:	217.0
Task Group Recommendation:	**217.0** **Offsite Treated Nonpotable Water.** Nonpotable water, that has been collected, treated, and intended to be used on-site and/or off-site, e.g. public right-of-way, and is suitable for direct beneficial use.
Problem Statement:	To be consistent, need this definition to match the on-site definition. Rainwater and stormwater can be harvested offsite and used offsite or onsite. For example, taking stormwater out of a storm drain line (offsite) under a road, treating and using at a park (onsite).
Referenced Standards:	

WE-Stand 2017 – (217.0) Item # 020

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Revised Text
Section Number:	217 0
Task Group Recommendation:	**217.0** **On-site Treated ~~Non-Potable~~ Nonpotable Water.** ~~Non-potable~~ Nonpotable water, that has been collected, treated, and intend on-site and is suitable for direct beneficial use~~.~~, includes, but is not limited to, graywater, blackwater, rainwater, and stormwater.
Problem Statement:	List the most common examples and which are discussed in Sections 502.0 and 504.0. This definition includes graywater for end uses similar to treated rainwater and stormwater, and reclaimed water. Graywater in section 502.1 is for untreated graywater (or with minimal filtering) and sub-surface irrigation use. Graywater can also be harvested, treated and used as in section 504.1, onsite treated nonpotable. So need to include graywater in the onsite treated nonpotable definition and section 504. Unhyphen Non-potable.
Referenced Standards:	

WE-Stand 2017 – (220.0) Item # 021

Name:	Neal Shapiro
Organization:	City of Santa Monica
Representing:	Office of Sustainability & the Environment
Recommendation:	Revise text
Section Number:	220.0
Proposed Text:	**220.0** **Rainwater.** Natural precipitation that ~~has contacted a rooftop or other~~ lands on a man-made, impervious above ground surface and can be collected on-site for beneficial uses. **Rainwater Catchment System.** A system that collects and stores rainwater for the intended purpose of beneficial use. Also known as Rainw~~W~~ater Harvesting System.
Problem Statement:	Clean up and make more accurate, describe better, these definitions. Make Rainwater and Stormwater more consistent between each since same water resource, precipitation, just varies on where it lands (for some) versus where it flows (more accurate).
Referenced Standards:	

WE-Stand 2017 – (221.0) Item # 022

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Revise text
Section Number:	221.0
Task Group Recommendation:	**221.0** **Storage Tank (graywater, rainwater, stormwater or dry weather runoff).** The central component of the graywater, rainwater, stormwater or dry weather runoff catchment system used for storing water at atmospheric pressure. Also known as a cistern or rain barrel.
Problem Statement:	Graywater can be treated and stored for uses the same as rainwater, stormwater and recycled, when treated beyond the basic graywater water source, which is used only for sub-surface irrigation.
Referenced Standards:	

WE-Stand 2017 – (221.0) Item # 023

Name:	Neal Shapiro, Chairman
WE-Stand Task Group:	Stormwater Task Group
Recommendation:	Revise text
Section Number:	**221.0**
Task Group Recommendation:	**221.0** **Stormwater Catchment System.** A system that collects and stores stormwater for the intended purpose of ~~a~~ beneficial use. Also known as Stormwater Harvesting System.
Problem Statement:	Added language to make this definition consistent with the definition for Rainwater Catchment System.
Referenced Standards:	

Name:	Tim Keane
Organization:	Legionella Risk Management, Inc.
Recommendation:	Add text
Section Number:	402.0
Proposed Text:	**402.0 Plumbing Systems.** **402.1 Plumbing Systems Design.** Plans shall minimize pipe lengths by arranging water using fixtures as close as practical to keep plumbing in interstitial spaces to a minimum as follows: (1) Fixtures in the same room shall be located on the same wall where possible to allow series connections of adjacent components eliminating as many individual drop legs as possible. (2) Fixtures in adjacent rooms shall be located back to back where possible. (renumber remaining sections)
Problem Statement:	Add a new section 402.0 after 401.1 and renumber all following sections accordingly with, for example, water conserving plumbing fixtures and fittings becoming section 403.0, etc. The growing rate of opportunistic pathogen outbreaks in plumbing systems is simple math. When average pipe diameters (a) are constant and the total amount of pipe lengths in a building (b) are constant in most buildings and increasing dramatically in health care facilities due to many more sinks and showers (4b) and the water use (z) is cut drastically by low flow restrictors then the math is clear the age of water stored in the building (c) is multiplied in proportion to the reduction in flow restriction 4X and increase in fixture count 4X in healthcare. This 4X to 16X or greater increase in water aging in a building water system directly impacts disinfectant residuals. This dramatic reduction in flow rates at fixtures directly impact water velocity in piping, and according this dramatic increase in water aging and decrease in water velocity results in dramatic increase in Legionella growth rate potential. Building designers need to locate rooms and fixtures to minimize piping as much as possible. They should also wherever possible use series pipe connections between adjacent fixtures to dramatically impact pipe runs. Plumbing designers alone cannot completely resolve this issue however codes should reinforce the need to this issue to be addressed. Trying to mandate water conservation by solely placing restrictors at the end of the line increases the need for flushing lines to drain to control bacteria growth. one study showed that flushing water at low flows through low flow restrictors required dramatic volumes of water and resulted in marginal impact in bacteria issues. The result of this study was installing high flow 1" solenoid valves for flushing to address bacterial issues caused by water aging.
Referenced Standards:	

WE-Stand 2017 – (402.2) Item # 025

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	402.2
Proposed Text:	**402.2 Water Closets.** No water closet shall have a flush volume exceeding ~~1.6gallons (6.0 L)~~ 1.28 gallons per flush (gpf) (4.8 Lpf). **Exception:** Water closets shall not exceed 1.6 gallons (6.0 Lpf) of water per flush when installed in a remote location at least 30 feet (9144 mm) upstream of the nearest drain line connection or fixture, and where less than 1.5 drainage fixture units (dfu) are upstream of the water closet's drain line connection.
Problem Statement:	Consistency with the Standard's intent and structure obligates a 1.6 gpf water closet be removed from the main body of the text and relegated as an exception.
Referenced Standards:	

WE-Stand 2017 – (402.2 – 402.2.2, Table 402.1, Table 901.1) Item # 026

Name:	John Koeller
Organization:	Koeller and Company
Recommendation:	Revise text
Section Number:	402.2-402.2.2 and Table 402.1, Table 901.1

Proposed Text:

402.2 Water Closets. No water closet shall have a flush volume exceeding ~~1.6 gallons (6.0 L)~~ 1.28 gallons (4.8 Lpf) per flush (gpf).

402.2.1 Gravity, Pressure Assisted and Electro-Hydraulic Tank Type Water Closets. Gravity, pressure assisted, and electro-hydraulic tank type water closets shall have a maximum effective flush volume of not more than 1.28 gallons (4.8 Lpf) of water per flush in accordance with ASME A112.19.2/CSA B45.1 or ASME A112.19.14 and shall also be listed to the EPA WaterSense Tank-Type High Efficiency Toilet Specification. The effective flush volume for dual-flush toilets is defined as the composite, average flush volume of one ~~two~~ reduced flush~~es~~ and one full flush.

402.2.2 Flushometer-Valve Activated Water Closets. Flushometer-valve activated water closets shall have a maximum flush volume of not more than ~~1.6 gallons (6.0 L)~~ 1.28 gallons (4.8 Lpf) of water per flush in accordance with ASME A112.19.2/CSA B45.1 and shall be listed to the EPA WaterSense®Specification for Flushometer-Valve Water Closets.

Table 402.1
MAXIMUM FIXTURE AND FIXTURE FITTINGS FLOW RATES

Water Closets ~~- other than remote locations~~[4]	1.28 gallons/flush
~~Water Closets - remote locations~~[4]	~~1.6 gallons/flush~~

[4] ~~Remote location is where a water closet is located at least 30 feet upstream of the nearest drain line connections or fixtures, and is located where less than 1.5 drainage fixture units are upstream of the water closet's drain line connection.~~

(renumber remaining footnotes)

TABLE 901.1
REFERENCED STANDARDS

STANDARD NUMBER-YEAR	STANDARD TITLE	REFERENCED SECTION
EPA WaterSense 2015	Specification for Flushometer-Valve Water Closets	402.2.2

(portions of tables not shown remain unchanged)

Problem Statement: The advancement of product and building design, the success of dual-flush toilets with a maximum full flush of 1.28 gpf, and the release of a WaterSense specification for labeling flushometer valve/bowl combination water closets makes adjustments to the flush volume requirements of this standard feasible. As proposed, the above revisions make this standard consistent with the provisions of ASHRAE SS189.1.

	Provided for reference: (1) a listing of MaP-tested dual-flush toilets that meet special criteria (including WaterSense and a 1.28 gallon maximum full flush and (2) a listing of flushometer valve/bowl combination water closets with a flush volume of 1.28 gpf or less.
Referenced Standards:	ASME A112.19.2/CSA B45.1; ASME A112.19.14; EPA WaterSense Specification for Flushometer-Valve Water Closets; EPA WaterSense Tank-Type High Efficiency Toilet Specification

Note: ASME A112.19.2/CSA B45.1 and ASME A112.19.14 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Note: EPA WaterSense Specification for Flushometer Valve Water Closets and EPA WaterSense Tank-Type High Efficiency Toilet Specification was not developed via an open process having a published development procedure in accordance with Section 15.2 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (402.2.2) Item # 027

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	402.2.2
Proposed Text:	**402.2.2 Flushometer-Valve Activated Water Closets**. Flushometer-valve activated water closets shall ~~have a maximum flush volume of not more than 1.6gallons (6.0 L) of water per flush in accordance~~ comply with ASME A112.19.2/CSA B45.1.
Problem Statement:	Consistency with the proposed change to Section 402.2, relegating the maximum consumption of 1.6gpf as an exception, obligates the removal of a specified flow rate as it otherwise becomes redundant and unclear.
Referenced Standards:	ASME A112.19.2/CSA B45.1

Note: ASME A112.19.2/CSA B45.1 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (402.3) Item # 028

Name:	John Koeller
Organization:	Koeller and Company
Recommendation:	Revise text
Section Number:	402.3
Proposed Text:	**402.3 Urinals**. Urinals shall have a maximum flush volume of not more than ~~0.5 gallon (1.9 L)~~ 0.25 gallon (0.9 L) of water ~~per flush~~ in accordance with ASME A112.19.2/CSA B45.1 or CSA B45.5/IAPMO Z124. Flushing urinals shall be listed to the EPA WaterSense Flushing Urinal Specification.
Problem Statement:	The reduction of urinal flush volumes for new construction is overdue. While the national product standard remains at 1.6 gpf, the WaterSense specification sets their voluntary maximum at 0.5 gpf. Furthermore, the State of California has set a new maximum at 0.125 gpf. While a reduction to the California threshold might be appropriate for that State, it is recommended that WE-Stand select a threshold below that of the WaterSense maximum, but not as low as California. A maximum of 0.25 gpf (1 quart of water) be selected. In the flushing urinal category as of January 22, 2016 (as illustrated in the attached MaP list of high-efficiency urinals), 132 different product models were offered in the U.S. marketplace, divided as follows: 0.25 gpf - 35 urinal models (of which 32 are WaterSense certified), 7 different brands 0.125 gpf - 97 urinal models (of which 90 are WaterSense certified), 19 different brands Ample product exists, sourced from a large number of manufacturers and brands. Provided for reference: MaP list of high-efficiency urinals and WaterSense specification for flushing urinals
Referenced Standards:	ASME A112.19.2/CSA B45.1 Ceramic Plumbing Fixtures; WaterSense Specification for Flushing Urinals; CSA B45.5/IAPMO Z124

Note: ASME A112.19.2/CSA B45.1 and CSA B45.5/IAPMO Z124 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Note: EPA WaterSense Flushing Urinal Specification was not developed via an open process having a published development procedure in accordance with Section 15.2 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (402.4) Item # 029

Name:	David Purkiss
Organization:	NSF International
Recommendation:	Revise text
Section Number:	402.4
Proposed Text:	**402.4 Residential Kitchen Faucets.** The maximum flow rate of residential kitchen faucets, including auxiliary water filtration system faucets, shall not exceed 1.8 gallons per minute (gpm) (6.8 L/m) at 60 pounds-force per square inch (psi) (414 kPa). Kitchen faucets are permitted to temporarily increase the flow above the maximum rate, but not to exceed 2.2 gpm (8.3 L/m) at 60 psi (414 kPa), and must revert to a maximum flow rate of 1.8 gpm (6.8 L/m) at 60 psi (414 kPa) upon valve closure.
Problem Statement:	CEC has determined that auxiliary water filtration system faucets need to meet the kitchen faucet flow rate performance requirement so this should be stated in this section.
Referenced Standards:	

WE-Stand 2017 – (402.6.1) Item # 030

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	402.6.1
Proposed Text:	**402.6.1 Showerheads.** Showerheads ~~shall comply with the requirements of the Energy Policy Act of 1992, except that the flow rate~~ shall not exceed a flow rate of 2.0 gpm (7.6 L/m) at 80 psi (552 kPa)~~,~~ when listed to ASME A112.18.1/CSA B125.1 and the EPA WaterSense Specification for Showerheads.
Problem Statement:	• The Energy Policy Act does not contain any showerhead requirements not already included within EPA WaterSense, ASME A112.18.1/CSA B125.1 and 2.0gpm at 80psi. • Removal of the comma is a punctuation correction.
Referenced Standards:	ASME A112.18.1/CSA B125.1 EPA WaterSense Specification for Showerheads.

Note: ASME A112.18.1/CSA B125.1 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Note: EPA WaterSense Specification for Showerheads was not developed via an open process having a published development procedure in accordance with Section 15.2 of Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Name:	Michael Cudahy
Organization:	Plastic Pipe and Fittings Association (PPFA)
Recommendation:	Revise text
Section Number:	402.6.1
Proposed Text:	**402.6.1 Showerheads.** Showerheads shall comply with the requirements of the Energy Policy Act of 1992, except when listed to ASME A112.18.1/CSA B125.1 or the EPA WaterSense Specification for Showerheads where ~~that~~ the flow rate shall not exceed 2.0 gpm (7.6 L/m) at 80 psi (552 kPa) ~~when listed to ASME A112.18.1/CSA B125.1 and the EPA WaterSense Specification for Showerheads~~.
Problem Statement:	I'm not sure about the structure of this section and commented to make sure it was discussed. Is the intention to limit all showerheads to 2.0 gpm? Is the intention to limit it only in the case where it's dual listed? I read the original draft as the 2.0 gpm only impacts dual listed showerheads. Should it be all showerheads?
Referenced Standards:	ASME A112.18.1/CSA B125.1. EPA WaterSense Specification for Showerheads

Note: ASME A112.18.1/CSA B125.1 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Note: EPA WaterSense Specification for Showerheads was not developed via an open process having a published development procedure in accordance with Section 15.2 of Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (402.6.2) Item # 032

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	402.6.2
Proposed Text:	**402.6.2 Multiple Showerheads Serving One Shower Compartment.** The total allowable flow rate of water from multiple showerheads flowing at any given time, with or without a diverter, including rain systems, waterfalls, bodysprays, and jets, shall not exceed 2.0 gpm (7.6 L/m) per shower compartment, where the floor area of the shower compartment is less than 1800 square inches (1.161 m^2). For each increment of 1800 square inches (1.161 m^2) of floor area thereafter or part thereof, additional showerheads are allowed, provided the total flow rate of water from all flowing devices shall not exceed 2.0 gpm (7.6 L/m) for each such increment. **Exceptions:** (1) Gang showers in non-residential occupancies. Singular showerheads or multiple shower outlets serving one showering position in gang showers shall not have more than 2.0 gpm (7.6 L/m) total flow. (2) Where provided, shower compartments required for persons with disabilities in accordance with Table 901.1 shall not have more than 4.0 gpm (15.0 L/m) total flow, where one outlet is the hand shower. ~~The hand shower shall have a control with a nonpositive shutoff feature.~~
Problem Statement:	It is redundant and unnecessary to require specific product accessibility features, such as nonpositive shutoff, in this standard because appropriate accessibility requirements will be adopted by the local Authority Having Jurisdiction.
Referenced Standards:	

WE-Stand 2017 – (402.6.3) Item # 033

Name:	Matt Sigler
Organization:	PMI
Recommendation:	Revise text
Section Number:	402.6.3
Proposed Text:	**402.6.3 Bath and Shower Diverters.** Tub spout bath and shower diverters, while operating in the shower mode, shall perform ~~with zero leakage~~ in accordance with ASME A112.18.1/CSA B125.1.
Problem Statement:	As written, this code section does nothing to prevent unnecessary leakages of a diverter. If a diverter is going to leak, it will occur over the lifetime use of the diverter and not during the installation when inspected by the AHJ. What is important is that the diverter meet the performance requirements of ASME A112.18.1/CSA B125.1 which are already addressed in Section 5.3.6.1 of the standard. The methods for testing the rate of leakage are intended to be conducted in a laboratory while conducting product testing, and not in the field where the accuracy of such testing can be jeopardized. It should be pointed out that a project was opened by the ASME A112.18.1/CSA B125.1 Standard Committee back in January 2014, as requested by the original proponent of the text in the WE-Stand, to address the maximum rate of leakage from diverters. As of June 2015, no proposal has been submitted by the proponent for consideration by the committee. Therefore, until such requirements are revised first by the ASME A112.18.1/CSA B125.1 Standard Committee, they have no business being addressed separately in an installation code or standard such as the 2017 WE-Stand.
Referenced Standards:	ASME A112.18.1/CSA B125.1

Note: ASME A112.18.1/CSA B125.1 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (402.6.4.1) Item # 034

Name:	Matt Sigler
Organization:	PMI
Recommendation:	Delete text
Section Number:	402.6.4.1
Proposed Text:	**~~402.6.4.1~~** ~~Control valves for showers and tubshower combinations shall be tagged, labeled, or marked with the manufacturer's minimum rated flow and such marking shall be visible after installation.~~
Problem Statement:	Marking requirements are already addressed in the applicable product standards (ex: ASSE 1016/ASME A112.1016/CSA B125.16 - Section V) and do not belong in the code. Therefore, such provisions should be vetted first through the appropriate standard development committee. The proposed language was rejected by the UPC Technical Committee, because the proponent failed to provide any data or evidence that any such markings would improve upon the safety provisions already addressed within the code. .Such requirements for tags, labels, and markings are unnecessary as such info is generally available on the manufacturer's website for a consumer to reference. .Markings on escutcheons or other trim components are not possible in all applications as these parts are used on a multitude of different products. Based on research conducted by manufacturers, a great majority of consumers want a minimal number of markings on escutcheons or other trim components. Which means that any such temporary tag, label, or marking will most likely be removed by the consumer before a new showerhead is installed. .What does "shall be visible after installation" mean? Does that mean after the control valve is installed or after the finishing trim of the shower is installed? .How will such a tag, label, or marking be uniformly enforced in the field? What exactly should be stated on the tag, label, or marking? What size is the text? Who will install? Where should it be installed?
Referenced Standards:	

WE-Stand 2017 – (403.8.1) Item # 035

Name:	Michael Cudahy
Organization:	Plastic Pipe and Fittings Association (PPFA)
Recommendation:	Revise text
Section Number:	403.8.1
Proposed Text:	**403.8.1 Durability.** All components expected to contact excreta or leachate shall be constructed of corrosion-resistant material such as stainless steel or durable polymers (ABS, PVC ~~Schedule 40~~, ~~P~~polypropylene, ~~H~~high-density polyethylene, ~~F~~fiber-reinforced polyester, or material of equivalent durability). Concrete in contact with excreta or leachate shall meet requirements of Section 403.8.2.
Problem Statement:	Schedule 40 is a sizing, not a material, and the names should not be capitalized.
Referenced Standards:	

WE-Stand 2017 – (403.8.4.1.2) Item # 036

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	403.8.4.1.2
Proposed Text:	**403.8.4.1.2 Overflow.** Where storage tank overflows are installed they shall be connected to the plumbing drainage system, or be emptied by a licensed hauler as required by local regulations, and at intervals specified in the owner's manual.
Problem Statement:	Rational: This code should make net-zero water buildings (The Living Building Challenge) possible to be installed legally in California. Buildings such as the Bullitt Center in Seattle, that employ composting toilets and reuse greywater, do not generate blackwater and are thus able to reuse all the greywater on-site. The leachate from the composting toilet is pumped out and is not connected to a plumbing drainage system.
Referenced Standards:	

WE-Stand 2017 – (403.8.4.1.2.1) Item # 037

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	403.8.4.1.2.1
Proposed Text:	**403.8.4.1.2.1 Backwater Valve.** Storage tank overflows, when subject to backflow, shall be provided with a backwater valve ~~or check valve~~ at the point of connection to the plumbing drainage system ~~when connected to a public sewer system~~. The backwater valve shall be accessible for inspections and maintenance.
Problem Statement:	Rational: Not all tanks will be subject to backflow. Tanks that are subject to backflow and connected to any drainage system (public sewer or private septic system) should be protected.
Referenced Standards:	

WE-Stand 2017 – (403.9.11.3.1) Item # 038

Name:	Laura Allen
Organization:	Greywater action
Recommendation:	Revise text
Section Number:	403.9.11.3.1
Proposed Text:	**403.9.11.3.1 Backwater Valve.** Storage tank overflows subject to backflow shall be provided with a backwater valve ~~or check valve~~ at the point of connection to the plumbing drainage system when connected to a public sewer system or on-site wastewater system. The backwater valve shall be accessible for inspections and maintenance.
Problem Statement:	Rational: There could be situations where the overflow is not subject to backflow, and so it should be clarified that a backwater valve only needed when there could be backflow. Since backwater valves can be opened, and check valves can't, it seems like backwater valves should be used instead of check valves.
Referenced Standards:	

WE-Stand 2017 – (404.2, Table 901.1) Item # 039

Name:	Josh Jacobs
Organization:	UL
Recommendation:	Add text
Section Number:	404.2, Table 901.1
Proposed Text:	**404.2 Clothes Washers.** Residential clothes washers shall be in accordance with the Energy Star program requirements. Commercial clothes washers shall be in accordance with Energy Star program requirements, where such requirements exist. Residential and residential style commercial use clothes washers shall be listed to UL 7003.

TABLE 901.1
REFERENCED STANDARDS

STANDARD NUMBER-YEAR	STANDARD TITLE	REFERENCED SECTION
UL 7003-2016	Sustainability Standard for Household Clothes Washers	404.2

(portions of table not shown remain unchanged)

Problem Statement:	While energy conservation is an important part of the triple bottom line, it is not the only one. As this standard strives to ensure we not only conserve water but our water systems and products that utilize water are sustainable in nature, we should be looking more and more for multi-attribute environmental standards. A multi-attribute environmental standard treats individual products very much the way that the USGBC's LEED Rating System treats buildings, but looking at products as a complete picture of their environmental impact from production, use phase, and end of life. Much the way that section 406.4 has listed a multi-attribute environmental standard for drinking water treatment systems, we should also do the same where other products have these standards as well. UL 7003 is a multi-attribute environmental standard for household clothes washers and fits this need perfectly.
Referenced Standards:	UL-7003-2016

Note: UL-7003-2016 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (406.1) Item # 040

Name:	David Purkiss
Organization:	NSF International
Recommendation:	Delete text
Section Number:	406.1
Proposed Text:	**406.1 Water Softeners.** ~~Actuation of regeneration of w~~Water softeners shall be listed to NSF 44. Water softeners shall have a rated salt efficiency exceeding 3400 grains (gr) (0.2200 kg) of total hardness exchange per pound (lb) (0.5 kg) of salt, based on sodium chloride (NaCl) equivalency, and shall not generate more than 4 gallons (15.1 L) of water per 1000 grains (0.0647 kg) of hardness removed during the service cylce.
Problem Statement:	The first sentence does not make sense. NSF/ANSI 44 applies to water softeners as a whole not just the single function of regeneration. So we are suggesting deleting "Actuation of regeneration of..." Also it should be noted that the requirement in this section goes above and beyond the current requirements of NSF/ANSI 44 so it is unclear how conformance would be demonstrated. The specific requirement regarding efficiency requirements should be added to NSF/ANSI 44 as a minimum requirement.
Referenced Standards:	NSF 44

Note: NSF 44 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Name:	Kent Sovocool, Chairman
WE-Stand Task Group:	Commercial Food Service Task Group
Recommendation:	Revise text and add new text
Section Number:	406.3-406.3.1
Task Group Recommendation:	**406.3 Point-of-Use Reverse Osmosis Water Treatment Systems.** Reverse osmosis water treatment systems ~~installed in residential occupancies~~ shall be equipped with automatic shutoff valves to prevent discharge when there is no call for producing treated water. Reverse osmosis water treatment systems shall be listed to meet NSF 58. Reverse osmosis water treatment systems shall be in accordance with the efficiency requirements in Section 406.3.1. **406.3.1 System Efficiency**. Where a minimum of 50 percent of reject water is not collected and reused, the reject water shall not exceed: (1) 70 percent of the supply water for systems producing not more than 100 gallons (380 L) of treated water per day. (2) 60 percent of the supply water for systems producing more than 100 gallons (380 L) of treated water per day and not more than 1 000 gallons (3 800 L) of treated water per day. (3) 50 percent of the supply water for systems producing more than 1 000 gallons (3 800 L) of treated water per day and not more than 10 000 gallons (38 000 L) of treated water per day. (4) 30 percent of the supply water for systems producing more than 10 000 gallons (38 000 L) of treated water per day.
Problem Statement:	Strikeout residential occupancies and develop an efficiency threshold for RO systems. Efficiency threshold would be: Rejects less than 7 gallons per 10 gallons for less than 100 gals/day; More than 100 gals/day, rejects less than 6 out of 10 gals. Require a Minimum 70% threshold and 60% threshold for larger systems of 100 gals or more.
Referenced Standards:	NSF 58

Note: NSF 58 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (406.4) Item # 042

Name:	David Purkiss
Organization:	NSF International
Recommendation:	Delete text
Section Number:	406.4
Proposed Text:	**~~406.4 Drinking Water Treatment Systems.~~** ~~Drinking water treatment systems shall be listed to WQA/ASPE S-803.~~
Problem Statement:	WQA/ASPE S-803 only covers carbon filters which would eliminate the use of water softeners and ROs as listed in Section 406. Also this standard does not establish any water efficiency requirements. Therefore this reference should be deleted
Referenced Standards:	

Name:	Kent Sovocool, Chairman
WE-Stand Task Group:	Commercial Food Service Task Group
Recommendation:	Add text
Section Number:	407.1.5.1
Task Group Recommendation:	**407.1.5 Dipper Well Faucets.** Where dipper wells with a permanent water supply are installed, the water supply to a dipper well shall have a shutoff valve and flow control. The flow of water into a dipper well shall be limited by at least one of the following methods: (1) **Maximum Continuous Flow.** Water flow shall not exceed the water capacity of the dipper well in one minute at supply pressure of 60 psi (414 kPa), and the maximum flow shall not exceed 0.2 gpm (0.8 L/m) at a supply pressure of 60 psi (414 kPa). The water capacity of a dipper well shall be the maximum amount of water that the fixture can hold before water flows into the drain. (2) **Metered or Sensor Activated Flow.** The volume of water dispensed into a dipper well in each activation cycle of a self closing fixture fitting shall not exceed the water capacity of the dipper well, and the maximum flow shall not exceed 0.2 gpm (0.8 L/m) at a supply pressure of 60 psi (414 kPa). **407.1.5.1 Dipper Well Alternatives**. Where approved by the Authority Having Jurisdiction, reduced water dipper wells and dipper wells without a permanent water supply shall be permitted to be used in lieu of dipper well faucets with a permanent water supply.
Problem Statement:	Until recently, there was only two technologies - the dipper well and washing scoops in a dishwasher or by hand in a sink. Now we have several other technologies that appear to be viable. However, local health departments still have only the dipper well on their books. For example, the Taylor Freezer (they make soft serve ice cream equipment) markets the Lolsberg scoop shower http://www.taylornewengland.com/wp-content/uploads/2011/10/viluca-lolsberg-scoopshower-flyer.pdf. It works great, but they report that health departments often say that only dipper wells are allowed. We do NOT have code authority over the many local health departments, but by listing such devices in our standards somehow, we may be able to push getting changes down the road.
Referenced Standards:	

WE-Stand 2017 – (407.1.6) Item # 044

Name:	Michael Cudahy
Organization:	Plastic Pipe and Fittings Association (PPFA)
Recommendation:	Revise text
Section Number:	407.1.6
Proposed Text:	**407.1.6 Food Waste Devices.** Where <u>installed,</u> food waste devices ~~exist they~~ shall be ~~installed~~ in accordance with Section 407.1.6.1 through Section 407.1.6.5.
Problem Statement:	The document has a number of sections where editorially, "where installed" should be added, this is one of them. IAPMO staff can probably best hunt them down.
Referenced Standards:	

WE-Stand 2017 – (407.1.7) Item # 045

Name:	Kent Sovocool, Chairman
WE-Stand Task Group:	Commercial Food Service Task Group
Recommendation:	Add text
Section Number:	407.1.7
Task Group Recommendation:	**407.1.7 Tempering Water**. Tempering water shall not be used for discharge waste exceeding 140°F (60ºC) from combination ovens of 40 pans or less, commercial food steamers of 12 pans or less, commercial dishwashers, and ware washers. **Exception:** Building drainage pipe and fittings receiving wastewater exceeding 140°F (60ºC) shall be designed for the higher temperature to prevent damage to the drainage system and persons that may come in contact with the drainage system.
Problem Statement:	The proposed text clearly states what types of equipment are exempt from the need for tempering water. 12 pans and 40 pans translates to one pint and one quart of hot water accordingly.
Referenced Standards:	

WE-Stand 2017 – (408.1) Item # 046

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	408.1
Proposed Text:	**408.1 General.** Where installed, leak detection and control devices shall comply with IAPMO IGC115. ~~Note: Leak detection and control devices help protect property from water damage and also conserve water by shutting off the flow when leaks are detected.~~
Problem Statement:	Unnecessary. This is analogous to having a note under water closets that states 1.28gpf water closets save more water than 1.6gpf water closets.
Referenced Standards:	IGC 115

Note: IAPMO Guide Criteria (IGC) 115 publication was not developed via an open process having a published development procedure in accordance with Section 15.2 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (409.1) Item # 047

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Revise Text
Section Number:	409.1
Task Group Recommendation:	**409.1 Use of ~~Alternate~~ <u>Nonpotable</u> Water Source for Special Water Features.** Special water features such as ponds and water fountains shall be provided with ~~reclaimed (recycled)~~ nonpotable water~~, rainwater, or on-site treated non-potable water~~ where the source and capacity is available on the premises and by the Authority Having Jurisdiction.
Problem Statement:	Change Alternate Water Sources to Nonpotable Water Sources. Reduce the use of many similar terms.
Referenced Standards:	

WE-Stand 2017 – (410.1) Item # 048

Name:	Shabbir Rawalpindiwala, Chairman
WE-Stand Task Group:	Premise Water Supply Systems Task Group
Recommendation:	Revise text
Section Number:	410.1
Task Group Recommendation:	**410.0 Meters.** **410.1 Required.** A water meter shall be required for each building site connected to a public water system, including municipally supplied reclaimed (recycled) water. In other than single-family houses, a dedicated meter shall be installed in accordance to Table 410.1 and shall be connected to the building management system in order to alert the building operator of any change in water consumption in any system.
Problem Statement:	The proposed new language approaches the problem of water leakage by requiring a management alert system to detect change in water consumption.
Referenced Standards:	

WE-Stand 2017 – (414.1) Item # 049

Name:	Brent Mecham
Organization:	Irrigation Association
Recommendation:	Revise text
Section Number:	414.1
Proposed Text:	**414.0 Landscape Irrigation Systems.** **414.1 General.** Where landscape irrigation systems are installed, they shall ~~use low application irrigation methods and~~ comply with Sections 41~~3~~4.2 through 41~~3~~4.13. Requirements ~~limiting the amount or type of plant material used in landscapes~~ regarding landscape design including plant selection shall be established by the Authority Having Jurisdiction. ~~**Exception**: Plants grown for food production.~~
Problem Statement:	Simplify the charging statement and correct section numbers to be those in the following section which has been numbered 414.0
Referenced Standards:	

Name:	Ron Wolfarth
Organization:	Rain Bird Corporation
Recommendation:	Revise text
Section Number:	414.1
Proposed Text:	**414.1 General.** Where landscape irrigation systems are installed, they shall ~~use low application irrigation methods and~~ comply with Sections 41~~3~~4.2 through 41~~3~~4.13. Requirements limiting the amount or type of plant material used in landscapes shall be established by the Authority Having Jurisdiction. **Exception:** Plants grown for food production.
Problem Statement:	Problem 1: Sprinklers with 'lower' precipitation (application) rates tend to be less efficient because they tend to produce a higher portion of small water droplets that are more easily blown off-target by slight wind and tend to more easily evaporate before hitting the ground. These smaller water droplets have less mass. Light wind easily moves these water droplets off target. The smaller surface to mass ratio of the small water droplets exposes more surface area to the air greatly increasing evaporative water losses. Substantiation for Problem 1: The reason a Precipitation Rate limit is proposed is to reduce runoff waste. Runoff is the problem, not high Precipitation Rates. Precipitation rate limits are not the best way or even a good way to reduce or eliminate runoff waste. Irrigation systems with 1 inch per hour Precipitation Rates apply water at a rate that far exceeds the Infiltration Rate of all non-manufactured soils. Therefore, runoff is not eliminated. Runoff will simply start a short time later compared to an irrigation system with, say, a 2.0 inch per hour Precipitation Rate. Cycle run times must be reduced in order to eliminate runoff and precipitation rate limits alone do not address this. It is a faulty notion that prohibiting higher Precipitation Rate (but perhaps highly efficient) sprinklers will conserve water. There are many, significant negative consequences to limiting precipitation rates. A) Wind Drift and Evaporation: Wind Drift and Evaporation are shown to be increased when using sprinklers with lower Precipitation Rates which tend to generate a greater proportion of smaller water droplets. The Science: In a study[1] conducted by University of Arizona and summarized in a White Paper by Randy Montgomery[2] and in a presentation by Randy Montgomery at the Irrigation Association Trade Show and Conference in 2013[3], it is shown that two spray sprinklers had very different performance in outdoor wind conditions despite having very similar performance in outdoor zero wind conditions. The more efficient sprinkler with a Precipitation Rate of 1.6 inches per hour applied 20% more of its water to the target area in a 5 mph wind compared to the sprinkler with a Precipitation Rate of 1.0 inch per hour. More Science: A study conducted by California State Polytechnic University, Pomona[4] found that 76 - 83% of runoff is due to wind, even at wind speeds of 0 - 5 mph. This study was performed with (low precipitation rate) multi-stream, multi-trajectory nozzles and (high precipitation rate) spray nozzles. B) Extended Run Times: Low Precipitation Rate systems will extend the schedule run time needed to apply the budgeted amount of water. This causes more of the irrigation to happen during worsening wind conditions. For example, in Los Angeles and San Diego, the ideal time to irrigate is between 5:00 and 6:00 AM when wind speed is approximately 1 - 2 mph.[5] The average daily wind speed in those areas is 5 mph or higher[6], the speed at which the low Precipitation Rate sprinkler in the University of Arizona study applied only about 63% of its water to the target area. The lower the Precipitation Rate limit imposed, the more irrigation will happen during windier, inefficient times. C) Restrictions on solutions for

	large turf areas: Many of the highly efficient, larger area turf sprinklers used to irrigate parks, schools, sports fields and golf courses would be eliminated from use. Many have Precipitation Rates higher than 1.0 inch per hour, especially when used in part circle operation. These rotors are the most efficient means of irrigating these spaces. Sprinklers in golf course playing surfaces would often have to be full-circle sprinklers located near the edge of the playing surface in order to provide adequate water to the turf. This would cause excessive overspray onto non-playing surfaces where it has less beneficial use. There is existing, affordable control technology on the market today from several manufacturers that eliminates runoff waste. A) The most effective solution to eliminating runoff waste is to break irrigation run times into short cycles that stop before runoff begins, pausing irrigation to allow water to soak in and then repeating the pattern until the irrigation requirement is met. There are products on the market today that accomplish this with no user intervention or change in user behavior. Section 414.5 of this proposed addresses the requirements for these control systems. B) The Science: The study conducted at California State Polytechnic University, Pomona[4] showed that using short cycles and soak times resulted in reducing runoff to about 0.25% of total water applied when using high and low precipitation rate sprinklers. In other words, 99.75% of the water applied did not runoff regardless of the sprinklers' Precipitation Rate when proper Irrigation Management was employed. This can be accomplished automatically with no user intervention or change in behavior. The low precipitation rate sprinklers used in the study were multi-stream, multi-trajectory nozzles and conventional, spray heads. Automation with Available Products: Irrigation controllers on the market today from several manufacturers allow the user to limit cycle time to eliminate runoff. The only expertise required is during the installation and set-up time. This level of expertise is reasonable to expect. Products can be chosen that require no change in end-user behavior. Conclusions: 1) Lower Precipitation Rates will only delay the start of runoff and not eliminate it because no soil aside from manufactured putting greens and manufactured sports fields can absorb water at the rate of 1.0 inch per hour. 2) Imposing Precipitation Rate limits ignores the very significant water waste due to Wind Drift and Evaporation losses that tend to increase as Precipitation Rate is lowered. 3) Even low Precipitation Rate sprinklers require management via the controller to eliminate runoff due to the infiltration rate of the soil, so why deny irrigators the right to use the most efficient irrigation solutions possible? The benefits of a Precipitation Rate limit are greatly over-shadowed by the negative consequences. 4) Irrigation Management strategies have been shown in university research to completely eliminate runoff regardless of the Precipitation Rate of the sprinklers used. 5) Products on the market today make the employment of Irrigation Management strategies that completely eliminate runoff easy for the end-user and require only reasonable expertise on the part of the installer. The proposed standard requires a "Smart Controller." Adding a requirement that it allow the user to set a maximum cycle time per zone as suggested above would solve the problem of runoff. 6) Science supports these conclusions. 7) Do not settle for a partial, weak, ineffective measure to only reduce runoff while harming irrigation water efficiency. Provided for reference: Notes: [1] Assessment of Application Efficiency and Uniformity of Fixed Spray and Multi-Stream Report Apr 2013 Brown Gilbert [2] Wind Effects on Sprinkler Irrigation Performance Manuscript -Randy Montgomery [3] Lets take it outside - Randy Montgomery IA 2013 Presentation [4] Effect of Nozzles and Cycle and Soak Scheduling on Landscape Irrigation Efficiency-Kumar-Vis [5] https://weatherspark.com [6] http://www.ncdc.noaa.gov/sites/default/files/attachments/wind1996.pdf
Referenced Standards:	

Name:	Brent Mecham, Chairman
WE-Stand Task Group:	Landscape Irrigation Task Group
Recommendation:	Add text
Section Number:	414.2-414.3
Task Group Recommendation:	**414.2 Landscape Irrigation Design.** A landscape irrigation design plan shall be required for commercial properties and residential properties exceeding 5 000 square feet (465 m^2) of landscape area. The irrigation plan shall be provided with the following: (1) Display of landscape areas and plant materials. (2) Irrigation zones based on plant hydrozones. (3) An estimated volume of water (in gallons) to meet plant requirements for each month of the growing season. (4) An irrigation schedule for the peak demand month including days of irrigation and run time for each irrigation zone. (5) Location of sprinklers, valves, piping, sensors, and equipment. Additional design criteria can be found in the ASIC/IA Landscape Irrigation Best Management Practices. **414.3 Record**. Prior to final acceptance of an irrigation system, a record of as-built plans including the location of sprinklers, valves, piping, sensors and equipment shall be provided to the owner. (Renumber remaining sections)
Problem Statement:	Having a formalized irrigation plan will facilitate a more efficient irrigation system when all of the appropriate equipment is identified and located for installation and thus greatly facilitates the inspection of the irrigation system after installation to assure the system has been installed as per design. ASIC/IA Landscape Irrigation Best Management Practices provided for review.
Referenced Standards:	

WE-Stand 2017 – (414.4) Item # 052

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Revise text
Section Number:	414.4
Task Group Recommendation:	**414.4 Use of ~~Alternate~~ <u>Nonpotable</u> Water Sources for Landscape Irrigation.** Where available by pre-existing treatment, storage or distribution network, and where approved by the Authority Having Jurisdiction, alternative water source(s) complying with Chapter 5 shall be utilized for landscape irrigation. Where adequate capacity and volumes of pre-existing alternative water sources are available, the irrigation system shall be designed to use minimum of 75 percent of alternative water for the annual irrigation demand before supplemental potable water is used.
Problem Statement:	Change Alternate Water Sources to Nonpotable Water Sources. Reduce the use of many similar terms.
Referenced Standards:	

WE-Stand 2017 – (414.4.1) Item # 053

Name:	Brent Mecham, Chairman
WE-Stand Task Group:	Landscape Irrigation Task Group
Recommendation:	Revise text
Section Number:	414.4.1
Task Group Recommendation:	414.4~~.1~~ **Master Valve.** Where a continuously pressurized ~~alternate~~ water source~~s~~ supply~~y~~ies an existing irrigation system, a master valve shall be installed at the point where the ~~alternate~~ water source~~s~~ supply piping connects to the ~~existing~~ irrigation system downstream of the backflow preventer where required. (renumber remaining sections)
Problem Statement:	Renumber Section 414.4.1 as Section 414.4 and renumber remaining sections. This makes the master valve a requirement for all irrigation systems that are supplied by continuously pressurized sources such as municipally supplied potable or reclaimed water and not only those with alternate water sources. This is not a requirement if the system requires a pump station.
Referenced Standards:	

WE-Stand 2017 – (414.5 – 414.5.7) Item # 054

Name:	Brent Mecham
Organization:	Irrigation Association
Recommendation:	Revise text
Section Number:	414.5-414.5.7
Proposed Text:	**414.5 Irrigation Control Systems.** Where installed as part of a landscape irrigation system, irrigation control systems shall: **414.5.1** Automatically adjust the irrigation schedule to respond to plant water needs determined by weather or soil moisture conditions. **414.5.2** Utilize on-site sensors to inhibit or suspend irrigation when adequate soil moisture is present or during ~~a~~ rainfall or freezing conditions. (sections 414.5.3 through 414.5.6 remain unchanged) **414.5.7** The site specific settings of the irrigation control system ~~affecting the irrigation and~~ shall be posted at the control system location. The posted data, where applicable to the settings of the controller, shall include: (1) Precipitation rate for each zone. (2) Plant evapotranspiration coefficients for each zone. (3) Soil type and ~~absorption~~ basic intake rate ~~for each zone~~. (4) Rain sensor settings. (5) Soil moisture setting. (6) Peak demand schedule including run times for each zone and the number of cycles to mitigate runoff and monthly adjustments or percentage change from peak demand schedule.
Problem Statement:	Minor edits to add clarity to existing language.
Referenced Standards:	

Name:	Brent Mecham
Organization:	Irrigation Association
Recommendation:	Delete text
Section Number:	414.9-414.10
Proposed Text:	~~**414.9 Narrow or Irregularly Shaped Landscape Areas**. Narrow or irregularly shaped landscape areas, less than 4 feet (1219 mm) in any direction across any opposing boundaries shall not be irrigated by any irrigation emission device except low flow emitters.~~ ~~**414.10 Sloped Areas.** Where soil surface rises more than 1 foot (305 mm) per 4 feet (1219 mm) of length, the irrigation zone system average precipitation rate shall not exceed 0.75 inches (19 mm) per hour as verified through either of the following methods:~~ ~~(a) manufacturer documentation that the precipitation rate for the installed sprinkler head does not exceed 0.75 inches (19 mm) per hour where the sprinkler heads are installed no closer than the specified radius and where the water pressure of the irrigation system is no greater than the manufacturer's recommendations.~~ ~~(b) catch can testing in accordance with the requirements of the Authority Having Jurisdiction and where emitted water volume is measured with a minimum of 6 catchment containers at random places within the irrigation zone for a minimum of 15 minutes to determine the average precipitation rate, expressed as inches per hour.~~ (renumber remaining sections)
Problem Statement:	Section 414.8 System Performance Requirements covers these two sections by stating the performance requirement that water is not allowed to runoff out of the irrigation zone. The irrigation designer should be allowed to determine the best way to provide irrigation to meet the plant water demand and coupled with an appropriately programmed WaterSense labeled controller these requirements are not needed.
Referenced Standards:	

Name:	Ron Wolfarth
Organization:	Rain Bird Corporation
Recommendation:	Revise text
Section Number:	414.9
Proposed Text:	**414.9 Narrow or Irregularly Shaped Landscape Areas.** Narrow or irregularly shaped landscape areas, less than 4 feet (1219 mm) in any direction across any opposing boundaries shall not be irrigated by any irrigation emission device except sub-surface or low flow emitters.
Problem Statement:	The purpose of the restriction on the type of irrigation emitter used in narrow and irregularly shaped landscape areas is to reduce or eliminate over-spray and runoff. Sub-surface irrigation emitters accomplish this purpose regardless of their flow rate. Requiring that sub-surface irrigation emitters also have low flow rates is an unnecessary restriction that makes no contribution to water efficiency.
Referenced Standards:	

WE-Stand 2017 – (414.10) Item # 057

Name:	Kelsey Jacquard
Organization:	Hunter Industries
Recommendation:	Revise text
Section Number:	414.10
Proposed Text:	**414.10 Sloped Areas.** Where soil surface rises more than 1 foot (305 mm) per 4 feet (1219 mm) of length, the irrigation zone system shall not allow irrigation water to run out of the irrigation zone. ~~average precipitation rate shall not exceed 0.75 inches (19 mm) per hour as verified through either of the following methods.~~ ~~(a) manufacturer documentation that the precipitation rate for the installed sprinkler head does not exceed 0.75 inches (19 mm) per hour where the sprinkler heads are installed no closer than the specified radius and where the water pressure of the irrigation system is no greater than the manufacturer's recommendations.~~ ~~(b) catch can testing in accordance with the requirements of the Authority Having Jurisdiction and where emitted water volume is measured with a minimum of 6 catchment containers at random places within the irrigation zone for a minimum of 15 minutes to determine the average precipitation rate, expressed as inches per hour.~~
Problem Statement:	It is recommended to eliminate the precipitation rate requirement and instead require the absence of any runoff through proper scheduling. Drip products can have a precipitation rate greater than 0.75 in/hr or even 1.0 in/hr depending on the emitter spacing and emitter flow.
Referenced Standards:	

Name:	Ronald Wolfarth
Organization:	Rain Bird Corporation
Recommendation:	Delete text
Section Number:	414.10
Proposed Text:	**~~414.10~~ ~~Sloped Areas.~~** ~~Where soil surface rises more than 1 foot (305 mm) per 4 feet (1219 mm) of length, the irrigation zone system average precipitation rate shall not exceed 0.75 inches (19 mm) per hour as verified through either of the following methods:~~ ~~(a) manufacturer documentation that the precipitation rate for the installed sprinkler head does not exceed 0.75 inches (19 mm) per hour where the sprinkler heads are installed no closer than the specified radius and where the water pressure of the irrigation system is no greater than the manufacturer's recommendations.~~ ~~(b) catch can testing in accordance with the requirements of the Authority Having Jurisdiction and where emitted water volume is measured with a minimum of 6 catchment containers at random places within the irrigation zone for a minimum of 15 minutes to determine the average precipitation rate, expressed as inches per hour.~~
Problem Statement:	Problem 1: Sprinklers with 'lower' precipitation (application) rates tend to be less efficient because they tend to produce a higher portion of small water droplets that are more easily blown off-target by slight wind and tend to more easily evaporate before hitting the ground. These smaller water droplets have less mass. Light wind easily moves these water droplets off target. The smaller surface to mass ratio of the small water droplets exposes more surface area to the air greatly increasing evaporative water losses. Substantiation for Problem 1: The reason a Precipitation Rate limit is proposed is to reduce runoff waste. Runoff is the problem, not high Precipitation Rates. Precipitation rate limits are not the best way or even a good way to reduce or eliminate runoff waste. Irrigation systems with 1 inch per hour Precipitation Rates apply water at a rate that far exceeds the Infiltration Rate of all non-manufactured soils. Therefore, runoff is not eliminated. Runoff will simply start a short time later compared to an irrigation system with, say, a 2.0 inch per hour Precipitation Rate. Cycle run times must be reduced in order to eliminate runoff and precipitation rate limits alone do not address this. It is a faulty notion that prohibiting higher Precipitation Rate (but perhaps highly efficient) sprinklers will conserve water. There are many, significant negative consequences to limiting precipitation rates. A) Wind Drift and Evaporation: Wind Drift and Evaporation are shown to be increased when using sprinklers with lower Precipitation Rates which tend to generate a greater proportion of smaller water droplets. The Science: In a study[1] conducted by University of Arizona and summarized in a White Paper by Randy Montgomery[2] and in a presentation by Randy Montgomery at the Irrigation Association Trade Show and Conference in 2013[3], it is shown that two spray sprinklers had very different performance in outdoor wind conditions despite having very similar performance in outdoor zero wind conditions. The more efficient sprinkler with a Precipitation Rate of 1.6 inches per hour applied 20% more of its water to the target area in a 5 mph wind compared to the sprinkler with a Precipitation Rate of 1.0 inch per hour. More Science: A study conducted by California State Polytechnic University, Pomona[4] found that 76 - 83% of runoff is due to wind, even at wind speeds of 0 - 5 mph. This study was performed with (low precipitation rate) multi-stream, multi-trajectory nozzles and (high precipitation rate) spray nozzles. B) Extended Run Times: Low Precipitation Rate systems will extend the schedule run time needed to apply the budgeted amount of water. This causes more of the irrigation to happen during worsening wind conditions. For example, in Los Angeles and San Diego,

	the ideal time to irrigate is between 5:00 and 6:00 AM when wind speed is approximately 1 - 2 mph.[5] The average daily wind speed in those areas is 5 mph or higher[6], the speed at which the low Precipitation Rate sprinkler in the University of Arizona study applied only about 63% of its water to the target area. The lower the Precipitation Rate limit imposed, the more irrigation will happen during windier, inefficient times. C) Restrictions on solutions for large turf areas: Many of the highly efficient, larger area turf sprinklers used to irrigate parks, schools, sports fields and golf courses would be eliminated from use. Many have Precipitation Rates higher than 1.0 inch per hour, especially when used in part circle operation. These rotors are the most efficient means of irrigating these spaces. Sprinklers in golf course playing surfaces would often have to be full-circle sprinklers located near the edge of the playing surface in order to provide adequate water to the turf. This would cause excessive overspray onto non-playing surfaces where it has less beneficial use. There is existing, affordable control technology on the market today from several manufacturers that eliminates runoff waste. A) The most effective solution to eliminating runoff waste is to break irrigation run times into short cycles that stop before runoff begins, pausing irrigation to allow water to soak in and then repeating the pattern until the irrigation requirement is met. There are products on the market today that accomplish this with no user intervention or change in user behavior. Section 414.5 of this proposed addresses the requirements for these control systems. B) The Science: The study conducted at California State Polytechnic University, Pomona[4] showed that using short cycles and soak times resulted in reducing runoff to about 0.25% of total water applied when using high and low precipitation rate sprinklers. In other words, 99.75% of the water applied did not runoff regardless of the sprinklers' Precipitation Rate when proper Irrigation Management was employed. This can be accomplished automatically with no user intervention or change in behavior. The low precipitation rate sprinklers used in the study were multi-stream, multi-trajectory nozzles and conventional, spray heads. Automation with Available Products: Irrigation controllers on the market today from several manufacturers allow the user to limit cycle time to eliminate runoff. The only expertise required is during the installation and set-up time. This level of expertise is reasonable to expect. Products can be chosen that require no change in end-user behavior. Conclusions: 1) Lower Precipitation Rates will only delay the start of runoff and not eliminate it because no soil aside from manufactured putting greens and manufactured sports fields can absorb water at the rate of 1.0 inch per hour. 2) Imposing Precipitation Rate limits ignores the very significant water waste due to Wind Drift and Evaporation losses that tend to increase as Precipitation Rate is lowered. 3) Even low Precipitation Rate sprinklers require management via the controller to eliminate runoff due to the infiltration rate of the soil, so why deny irrigators the right to use the most efficient irrigation solutions possible? The benefits of a Precipitation Rate limit are greatly over-shadowed by the negative consequences. 4) Irrigation Management strategies have been shown in university research to completely eliminate runoff regardless of the Precipitation Rate of the sprinklers used. 5) Products on the market today make the employment of Irrigation Management strategies that completely eliminate runoff easy for the end-user and require only reasonable expertise on the part of the installer. The proposed standard requires a "Smart Controller." Adding a requirement that it allow the user to set a maximum cycle time per zone as suggested above would solve the problem of runoff. 6) Science supports these conclusions. 7) Do not settle for a partial, weak, ineffective measure to only reduce runoff while harming irrigation water efficiency. Provided for reference: Notes: [1] Assessment of Application Efficiency and Uniformity of Fixed Spray and Multi-Stream Report Apr 2013 Brown Gilbert [2] Wind Effects on Sprinkler Irrigation Performance Manuscript -Randy Montgomery [3] Lets take it outside - Randy Montgomery IA 2013 Presentation [4] Effect of Nozzles and Cycle and Soak Scheduling on Landscape Irrigation Efficiency-Kumar-Vis [5] https://weatherspark.com

	[6] http://www.ncdc.noaa.gov/sites/default/files/attachments/wind1996.pdf
Referenced Standards:	

WE-Stand 2017 – (414.11) Item # 059

Name:	Kelsey Jacquard
Organization:	Hunter Industries
Recommendation:	Delete text
Section Number:	414.11
Proposed Text:	~~**414.11 Sprinkler Head Installations.** All installed sprinkler heads shall be low precipitation rate sprinkler heads~~. (renumber remaining sections)
Problem Statement:	California has already adopted water restricting measures that base landscape irrigation design on water use requirements and efficiencies instead of product precipitation rates. The landscape irrigation requirements of the WEStand Document restrict irrigation product choices and irrigation designs based on a maximum precipitation rate to eliminate runoff when proper scheduling has a larger effect. We recommend that the industry be consistent in the requirements for landscape irrigation. Reference documents provided: Model Water Efficient Landscape Ordinance Ramesh Kumar and Eudell Vis, May 2009, Effect of Rotary Nozzles and Cycle and Soak Scheduling on Landscape Irrigation Efficiency
Referenced Standards:	

WE-Stand 2017 – (414.11, 414.11.3) Item # 060

Name:	Brent Mecham
Organization:	Irrigation Association
Recommendation:	Revise text
Section Number:	414.11, 414.11.3
Proposed Text:	**414.11 Sprinkler Head Installations.** All installed sprinkler heads shall ~~be low precipitation rate sprinkler heads~~ comply with ASABE/ICC 802. (414.11.1-414.11.2 remain unchanged) **414.11.3 Pop-up Type Sprinkler Heads.** Where pop-up type sprinkler heads are installed, the sprinkler heads shall pop-up to a height above vegetation level and of not less than 4 inches (102 mm) above the soil level when emitting water. ~~Sprinkler heads shall comply with the requirements of standard ASABE/ICC 802 2014.~~
Problem Statement:	List the applicable standard at the beginning of the section rather than at the end like an afterthought. Strike the wording of low precipitation rate sprinklers heads because the arbitrary precipitation rate in the definitions has no scientific justification. Scheduling and management are what improves water use efficiency. Referenced standard is already within the document and has been previously reviewed by IAPMO.
Referenced Standards:	ASABE/ICC 802

Note: ASABE/ICC 802 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Name:	Ron Wolfarth
Organization:	Rain Bird Corporation
Recommendation:	Revise text
Section Number:	414.11
Proposed Text:	**414.11 Sprinkler Head Installations.** All installed sprinkler heads shall ~~be low precipitation rate sprinkler heads~~ comply with Section 414.11.1 through Section 414.11.3.”
Problem Statement:	Problem 1: Sprinklers with 'lower' precipitation (application) rates tend to be less efficient because they tend to produce a higher portion of small water droplets that are more easily blown off-target by slight wind and tend to more easily evaporate before hitting the ground. These smaller water droplets have less mass. Light wind easily moves these water droplets off target. The smaller surface to mass ratio of the small water droplets exposes more surface area to the air greatly increasing evaporative water losses. Substantiation for Problem 1: The reason a Precipitation Rate limit is proposed is to reduce runoff waste. Runoff is the problem, not high Precipitation Rates. Precipitation rate limits are not the best way or even a good way to reduce or eliminate runoff waste. Irrigation systems with 1 inch per hour Precipitation Rates apply water at a rate that far exceeds the Infiltration Rate of all non-manufactured soils. Therefore, runoff is not eliminated. Runoff will simply start a short time later compared to an irrigation system with, say, a 2.0 inch per hour Precipitation Rate. Cycle run times must be reduced in order to eliminate runoff and precipitation rate limits alone do not address this. It is a faulty notion that prohibiting higher Precipitation Rate (but perhaps highly efficient) sprinklers will conserve water. There are many, significant negative consequences to limiting precipitation rates. A) Wind Drift and Evaporation: Wind Drift and Evaporation are shown to be increased when using sprinklers with lower Precipitation Rates which tend to generate a greater proportion of smaller water droplets. The Science: In a study[1] conducted by University of Arizona and summarized in a White Paper by Randy Montgomery[2] and in a presentation by Randy Montgomery at the Irrigation Association Trade Show and Conference in 2013[3], it is shown that two spray sprinklers had very different performance in outdoor wind conditions despite having very similar performance in outdoor zero wind conditions. The more efficient sprinkler with a Precipitation Rate of 1.6 inches per hour applied 20% more of its water to the target area in a 5 mph wind compared to the sprinkler with a Precipitation Rate of 1.0 inch per hour. More Science: A study conducted by California State Polytechnic University, Pomona[4] found that 76 - 83% of runoff is due to wind, even at wind speeds of 0 - 5 mph. This study was performed with (low precipitation rate) multi-stream, multi-trajectory nozzles and (high precipitation rate) spray nozzles. B) Extended Run Times: Low Precipitation Rate systems will extend the schedule run time needed to apply the budgeted amount of water. This causes more of the irrigation to happen during worsening wind conditions. For example, in Los Angeles and San Diego, the ideal time to irrigate is between 5:00 and 6:00 AM when wind speed is approximately 1 - 2 mph.[5] The average daily wind speed in those areas is 5 mph or higher[6], the speed at which the low Precipitation Rate sprinkler in the University of Arizona study applied only about 63% of its water to the target area. The lower the Precipitation Rate limit imposed, the more irrigation will happen during windier, inefficient times. C) Restrictions on solutions for large turf areas: Many of the highly efficient, larger area turf sprinklers used to irrigate parks, schools, sports fields and golf courses would be eliminated from use. Many have Precipitation Rates higher than 1.0 inch per hour, especially when used in part circle operation. These rotors are the most efficient means of irrigating these spaces. Sprinklers in

	golf course playing surfaces would often have to be full-circle sprinklers located near the edge of the playing surface in order to provide adequate water to the turf. This would cause excessive overspray onto non-playing surfaces where it has less beneficial use. There is existing, affordable control technology on the market today from several manufacturers that eliminates runoff waste. A) The most effective solution to eliminating runoff waste is to break irrigation run times into short cycles that stop before runoff begins, pausing irrigation to allow water to soak in and then repeating the pattern until the irrigation requirement is met. There are products on the market today that accomplish this with no user intervention or change in user behavior. Section 414.5 of this proposed addresses the requirements for these control systems. B) The Science: The study conducted at California State Polytechnic University, Pomona[4] showed that using short cycles and soak times resulted in reducing runoff to about 0.25% of total water applied when using high and low precipitation rate sprinklers. In other words, 99.75% of the water applied did not runoff regardless of the sprinklers' Precipitation Rate when proper Irrigation Management was employed. This can be accomplished automatically with no user intervention or change in behavior. The low precipitation rate sprinklers used in the study were multi-stream, multi-trajectory nozzles and conventional, spray heads. Automation with Available Products: Irrigation controllers on the market today from several manufacturers allow the user to limit cycle time to eliminate runoff. The only expertise required is during the installation and set-up time. This level of expertise is reasonable to expect. Products can be chosen that require no change in end-user behavior. Conclusions: 1) Lower Precipitation Rates will only delay the start of runoff and not eliminate it because no soil aside from manufactured putting greens and manufactured sports fields can absorb water at the rate of 1.0 inch per hour. 2) Imposing Precipitation Rate limits ignores the very significant water waste due to Wind Drift and Evaporation losses that tend to increase as Precipitation Rate is lowered. 3) Even low Precipitation Rate sprinklers require management via the controller to eliminate runoff due to the infiltration rate of the soil, so why deny irrigators the right to use the most efficient irrigation solutions possible? The benefits of a Precipitation Rate limit are greatly over-shadowed by the negative consequences. 4) Irrigation Management strategies have been shown in university research to completely eliminate runoff regardless of the Precipitation Rate of the sprinklers used. 5) Products on the market today make the employment of Irrigation Management strategies that completely eliminate runoff easy for the end-user and require only reasonable expertise on the part of the installer. The proposed standard requires a "Smart Controller." Adding a requirement that it allow the user to set a maximum cycle time per zone as suggested above would solve the problem of runoff. 6) Science supports these conclusions. 7) Do not settle for a partial, weak, ineffective measure to only reduce runoff while harming irrigation water efficiency. Provided for reference: Notes: [1] Assessment of Application Efficiency and Uniformity of Fixed Spray and Multi-Stream Report Apr 2013 Brown Gilbert [2] Wind Effects on Sprinkler Irrigation Performance Manuscript -Randy Montgomery [3] Lets take it outside - Randy Montgomery IA 2013 Presentation [4] Effect of Nozzles and Cycle and Soak Scheduling on Landscape Irrigation Efficiency-Kumar-Vis [5] https://weatherspark.com [6] http://www.ncdc.noaa.gov/sites/default/files/attachments/wind1996.pdf
Referenced Standards:	

WE-Stand 2017 – (414.11.1) Item # 062

Name:	Kelsey Jacquard
Organization:	Hunter Industries
Recommendation:	Revise text
Section Number:	414.11.1
Proposed Text:	**414.11.1 Sprinkler Heads in Common Irrigation Zones.** Sprinkler heads installed in irrigation zones served by a common valve shall be limited to applying water to plants with similar irrigation needs~~, and shall have matched precipitation rates (identical inches of water application per hour as rated or tested, plus or minus 5 percent)~~.
Problem Statement:	It is recommended to remove the requirement of matched precipitation rate since it would be limiting to irrigation designs. Otherwise, please clarify the requirement of matched precipitation. Is the precipitation rate of the zone checked after installation using catch devices, or is it based on manufacturer data? Also, a tolerance of plus or minus 5% is very tight. A product with an application rate of .4 in/hr would be allowed a range of 0.38 - 0.42 in/hr, which may be difficult to measure and maintain.
Referenced Standards:	

WE-Stand 2017 – (414.11.1) Item # 063

Name:	Ron Wolfarth
Organization:	Rain Bird Corporation
Recommendation:	Revise text
Section Number:	414.11.1
Proposed Text:	**414.11.1 Sprinkler Heads in Common Irrigation Zones.** Sprinkler heads installed in irrigation zones served by a common valve shall be limited to applying water to plants with similar irrigation needs, and shall have matched precipitation rates (identical inches of water application per hour as rated or tested, plus or minus ~~5~~20 percent).
Problem Statement:	The state of the art in plastic molding injection, manufacturing assembly, and in the measurement of sprinkler performance is not adequate to achieve performance within the stated range.
Referenced Standards:	

WE-Stand 2017 – (414.11.3) Item # 064

Name:	Kelsey Jacquard
Organization:	Hunter Industries
Recommendation:	Delete text
Section Number:	414.11.3
Proposed Text:	**414.11.3 Pop-up Type Sprinkler Heads.** Where pop-up type sprinkler heads are installed, the sprinkler heads shall pop-up to a height above vegetation level ~~and of not less than 4 inches (102 mm) above the soil level when emitting water~~. Sprinkler heads shall comply with the requirements of standard ASABE/ICC 802-2014
Problem Statement:	It is recommended for the sprinkler heads to clear the vegetation without setting a height limit. Vegetation can vary in height, and products exist for all ranges.
Referenced Standards:	ASABE/ICC 802

Note: ASABE/ICC 802 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (414.12) Item # 065

Name:	Kelsey Jacquard
Organization:	Hunter Industries
Recommendation:	Revise text
Section Number:	414.12
Proposed Text:	**414.12 Irrigation Zone Performance Criteria.** Irrigation zones shall be designed and installed to ensure that no irrigation water runs out of the irrigation zone. ~~the average precipitation rate of the sprinkler heads over the irrigated area does not exceed 1.0 inch per hour as verified through either of the following methods:~~ ~~(a) manufacturer's documentation that the precipitation rate for the installed sprinkler head does not exceed 1.0 inches per hour where the sprinkler heads are installed no closer that the specified radius and where the water pressure of the irrigation system is no greater than the manufacturer's recommendations.~~ ~~(b) catch can testing in accordance with the requirements of the Authority Having Jurisdiction and where emitted water volume is measured with a minimum of 6 catchment containers at random places within the irrigation zone for a minimum of 15 minutes to determine the average precipitation rate, expressed as inches per hour.~~
Problem Statement:	It is recommended to eliminate the precipitation rate requirement and instead require the absence of any runoff through proper scheduling. Allowing the use of any sprinkler with the requirement of no runoff allows irrigation designers to design the best system for the landscape while promoting cycle and soak scheduling. Provided for reference: MWELO Ramesh Kumar and Eudell Vis, May 2009, Effect of Rotary Nozzles and Cycle and Soak Scheduling on Landscape Irrigation Efficiency.
Referenced Standards:	

Name:	Brent Mecham
Organization:	Irrigation Association
Recommendation:	Revise text
Section Number:	414.12
Proposed Text:	**414.12 Irrigation ~~Zone~~ System Performance ~~Criteria~~ Inspection.** The irrigation system shall be inspected to ensure the installation complies with the irrigation design and the equipment is properly adjusted and functioning correctly. Where required by the Authority Having Jurisdiction, sprinkler performance tests shall be conducted following the Irrigation Association Auditing Guidelines by a certified auditor that meets the requirements established by US EPA WaterSense Program for certifying organizations. Reports shall be submitted to the owner and Authority Having Jurisdiction where required. All items that need to be fixed and adjusted shall be completed by the installation contractor prior to acceptance. ~~Irrigation zones shall be designed and installed to ensure the average precipitation rate of the sprinkler heads over the irrigated area does not exceed 1.0 inch per hour as verified through either of the following methods:~~ ~~(a) manufacturer's documentation that the precipitation rate for the installed sprinkler head does not exceed 1.0 inches per hour where the sprinkler heads are installed no closer that the specified radius and where the water pressure of the irrigation system is no greater than the manufacturer's recommendations.~~ ~~(b) catch can testing in accordance with the requirements of the Authority Having Jurisdiction and where emitted water volume is measured with a minimum of 6 catchment containers at random places within the irrigation zone for a minimum of 15 minutes to determine the average precipitation rate, expressed as inches per hour~~
Problem Statement:	One of the most useful practices to ensure efficient irrigation is to have it inspected upon completion to verify that all of the proper components are in place and working properly. This is a benefit to the owner of the property and the information can then be shared with maintenance personnel. The Irrigation Association Recommended Audit Guidelines are attached.
Referenced Standards:	Irrigation Association Recommended Audit Guidelines-2009; US EPA WaterSense Professional Certification Program Labeling System

Note: Irrigation Association Recommended Audit Guidelines was not developed via an open process having a published development procedure in accordance with Section 15.2 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Note: EPA WaterSense Professional Certification Program Labeling System was not developed via an open process having a published development procedure in accordance with Section 15.2 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Name:	Ron Wolfarth
Organization:	Rain Bird Corporation
Recommendation:	Delete text
Section Number:	414.12
Proposed Text:	**~~414.12~~** **~~Irrigation Zone Performance Criteria.~~** ~~Irrigation zones shall be designed and installed to ensure the average precipitation rate of the sprinkler heads over the irrigated area does not exceed 1.0 inch per hour as verified through either of the following methods:~~ ~~(a) manufacturer's documentation that the precipitation rate for the installed sprinkler head does not exceed 1.0 inches per hour where the sprinkler heads are installed no closer that the specified radius and where the water pressure of the irrigation system is no greater than the manufacturer's recommendations.~~ ~~(b) catch can testing in accordance with the requirements of the Authority Having Jurisdiction and where emitted water volume is measured with a minimum of 6 catchment containers at random places within the irrigation zone for a minimum of 15 minutes to determine the average precipitation rate, expressed as inches per hour.~~ (renumber remaining sections)
Problem Statement:	Problem 1: Sprinklers with 'lower' precipitation (application) rates tend to be less efficient because they tend to produce a higher portion of small water droplets that are more easily blown off-target by slight wind and tend to more easily evaporate before hitting the ground. These smaller water droplets have less mass. Light wind easily moves these water droplets off target. The smaller surface to mass ratio of the small water droplets exposes more surface area to the air greatly increasing evaporative water losses. Substantiation for Problem 1: The reason a Precipitation Rate limit is proposed is to reduce runoff waste. Runoff is the problem, not high Precipitation Rates. Precipitation rate limits are not the best way or even a good way to reduce or eliminate runoff waste. Irrigation systems with 1 inch per hour Precipitation Rates apply water at a rate that far exceeds the Infiltration Rate of all non-manufactured soils. Therefore, runoff is not eliminated. Runoff will simply start a short time later compared to an irrigation system with, say, a 2.0 inch per hour Precipitation Rate. Cycle run times must be reduced in order to eliminate runoff and precipitation rate limits alone do not address this. It is a faulty notion that prohibiting higher Precipitation Rate (but perhaps highly efficient) sprinklers will conserve water. There are many, significant negative consequences to limiting precipitation rates. A) Wind Drift and Evaporation: Wind Drift and Evaporation are shown to be increased when using sprinklers with lower Precipitation Rates which tend to generate a greater proportion of smaller water droplets. The Science: In a study[1] conducted by University of Arizona and summarized in a White Paper by Randy Montgomery[2] and in a presentation by Randy Montgomery at the Irrigation Association Trade Show and Conference in 2013[3], it is shown that two spray sprinklers had very different performance in outdoor wind conditions despite having very similar performance in outdoor zero wind conditions. The more efficient sprinkler with a Precipitation Rate of 1.6 inches per hour applied 20% more of its water to the target area in a 5 mph wind compared to the sprinkler with a Precipitation Rate of 1.0 inch per hour. More Science: A study conducted by California State Polytechnic University, Pomona[4] found that 76 - 83% of runoff is due to wind, even at wind speeds of 0 - 5 mph. This study was performed with (low precipitation rate) multi-stream, multi-trajectory nozzles and (high precipitation rate) spray nozzles. B) Extended Run Times: Low Precipitation Rate systems will extend the schedule

run time needed to apply the budgeted amount of water. This causes more of the irrigation to happen during worsening wind conditions. For example, in Los Angeles and San Diego, the ideal time to irrigate is between 5:00 and 6:00 AM when wind speed is approximately 1 - 2 mph.[5] The average daily wind speed in those areas is 5 mph or higher[6], the speed at which the low Precipitation Rate sprinkler in the University of Arizona study applied only about 63% of its water to the target area. The lower the Precipitation Rate limit imposed, the more irrigation will happen during windier, inefficient times. C) Restrictions on solutions for large turf areas: Many of the highly efficient, larger area turf sprinklers used to irrigate parks, schools, sports fields and golf courses would be eliminated from use. Many have Precipitation Rates higher than 1.0 inch per hour, especially when used in part circle operation. These rotors are the most efficient means of irrigating these spaces. Sprinklers in golf course playing surfaces would often have to be full-circle sprinklers located near the edge of the playing surface in order to provide adequate water to the turf. This would cause excessive overspray onto non-playing surfaces where it has less beneficial use. There is existing, affordable control technology on the market today from several manufacturers that eliminates runoff waste. A) The most effective solution to eliminating runoff waste is to break irrigation run times into short cycles that stop before runoff begins, pausing irrigation to allow water to soak in and then repeating the pattern until the irrigation requirement is met. There are products on the market today that accomplish this with no user intervention or change in user behavior. Section 414.5 of this proposed addresses the requirements for these control systems. B) The Science: The study conducted at California State Polytechnic University, Pomona[4] showed that using short cycles and soak times resulted in reducing runoff to about 0.25% of total water applied when using high and low precipitation rate sprinklers. In other words, 99.75% of the water applied did not runoff regardless of the sprinklers' Precipitation Rate when proper Irrigation Management was employed. This can be accomplished automatically with no user intervention or change in behavior. The low precipitation rate sprinklers used in the study were multi-stream, multi-trajectory nozzles and conventional, spray heads. Automation with Available Products: Irrigation controllers on the market today from several manufacturers allow the user to limit cycle time to eliminate runoff. The only expertise required is during the installation and set-up time. This level of expertise is reasonable to expect. Products can be chosen that require no change in end-user behavior. Conclusions: 1) Lower Precipitation Rates will only delay the start of runoff and not eliminate it because no soil aside from manufactured putting greens and manufactured sports fields can absorb water at the rate of 1.0 inch per hour. 2) Imposing Precipitation Rate limits ignores the very significant water waste due to Wind Drift and Evaporation losses that tend to increase as Precipitation Rate is lowered. 3) Even low Precipitation Rate sprinklers require management via the controller to eliminate runoff due to the infiltration rate of the soil, so why deny irrigators the right to use the most efficient irrigation solutions possible? The benefits of a Precipitation Rate limit are greatly over-shadowed by the negative consequences. 4) Irrigation Management strategies have been shown in university research to completely eliminate runoff regardless of the Precipitation Rate of the sprinklers used. 5) Products on the market today make the employment of Irrigation Management strategies that completely eliminate runoff easy for the end-user and require only reasonable expertise on the part of the installer. The proposed standard requires a "Smart Controller." Adding a requirement that it allow the user to set a maximum cycle time per zone as suggested above would solve the problem of runoff. 6) Science supports these conclusions. 7) Do not settle for a partial, weak, ineffective measure to only reduce runoff while harming irrigation water efficiency.

Provided for reference:
Notes: [1] Assessment of Application Efficiency and Uniformity of Fixed Spray and Multi-Stream Report Apr 2013 Brown Gilbert
[2] Wind Effects on Sprinkler Irrigation Performance Manuscript -Randy Montgomery
[3] Lets take it outside - Randy Montgomery IA 2013 Presentation

	[4] Effect of Nozzles and Cycle and Soak Scheduling on Landscape Irrigation Efficiency-Kumar-Vis [5] https://weatherspark.com [6] http://www.ncdc.noaa.gov/sites/default/files/attachments/wind1996.pdf
Referenced Standards:	

Name:	Brent Mecham, Chairman
WE-Stand Task Group:	Landscape Irrigation Task Group
Recommendation:	Revise text
Section Number:	414.12
Task Group Recommendation:	**414.12 ~~Irrigation Zone Performance Criteria.~~ Irrigation System Inspection and Performance Check.** ~~Irrigation zones shall be designed and installed to ensure the average precipitation rate of the sprinkler heads over the irrigated area does not exceed 1.0 inch per hour as verified through either of the following methods:~~ ~~(a) manufacturer's documentation that the precipitation rate for the installed sprinkler head does not exceed 1.0 inches per hour where the sprinkler heads are installed no closer that the specified radius and where the water pressure of the irrigation system is no greater than the manufacturer's recommendations.~~ ~~(b) catch can testing in accordance with the requirements of the Authority Having Jurisdiction and where emitted water volume is measured with a minimum of 6 catchment containers at random places within the irrigation zone for a minimum of 15 minutes to determine the average precipitation rate, expressed as inches per hour~~ The irrigation system shall be inspected by the Authority Having Jurisdiction or by an independent third party having credentials in accordance with the US EPA WaterSense program. The performance check shall determine compliance with the irrigation design by verifying the following: (1) Sprinklers shall be installed as specified with proper spacing and required nozzle. (2) Sprinklers shall be activated and visually inspected that they cover areas without causing overspray or runoff. (3) Valves shall be installed as specified. (4) Drip irrigation systems shall have the proper valve, pressure regulation, filtering device, location of flush valves, and that the installed emitters comply with the irrigation plan. (5) Control system shall be installed as specified and includes a US EPA WaterSense labeled controller and all sensors are installed and verified for proper operation. (6) The peak demand irrigation schedule shall be posted near the controller or the scheduling parameters for the controller are listed for each station including cycle and soak times. (7) Record drawings of the irrigation system shall be completed and are used for the irrigation inspection. (8) A report of the inspection shall be provided at a minimum to the property owner or management company identifying problems and what corrective actions are required.
Problem Statement:	Inspecting the installed irrigation system will provide a way to verify that the appropriate equipment has been installed as per design and in case there is not a design, it at least allows for the visual inspection of the equipment installed to make sure it is operating correctly and applying water where it is intended to avoid runoff or overspray.
Referenced Standards:	EPA WaterSense Professional Certification Program https://www3.epa.gov/watersense/outdoor/cert_programs.html

Note: US EPA WaterSense Professional Certification Program was not developed via an open process having a published development procedure in accordance with Section 15.2 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (414.13) Item # 069

Name:	Brent Mecham
Organization:	Irrigation Association
Recommendation:	Relocate and Revise text
Section Number:	414.13 relocating to 414.1.1
Proposed Text:	~~**414.1.13**~~ **414.1.1** ~~**Qualifications.**~~ **Irrigation Design and Installation.** The Authority Having Jurisdiction shall have the authority to require landscape irrigation contractors, installers, or designers to demonstrate competency. The system shall be designed and record drawings showing changes during installation shall be made available for the owner and for any required inspections. Where required by the Authority Having Jurisdiction, the contractor, installer, or designer shall be licensed, certified, or both to perform such work.
Problem Statement:	Propose moving this subsection forward into the section to emphasize the use of irrigation professionals and the expectation that an irrigation plan and record drawings by the installation contractor are important, but subject to the requirements of the AHJ.
Referenced Standards:	

Name:	Brent Mecham, Chairman
WE-Stand Task Group:	Landscape Irrigation Task Group
Recommendation:	Add text
Section Number:	414.X
Task Group Recommendation:	**414.X Irrigation Flow Sensing System.** On commercial landscape irrigation systems, an irrigation flow sensing system shall be installed that shall interface with the control system to suspend irrigation for abnormal flow conditions. If equipped with totalizer capabilities, the irrigation flow sensing system shall also function as a meter for irrigation water.
Problem Statement:	An irrigation flow sensing system in combination with a controller can suspend the irrigation system or irrigation zone when there are flows that are considered abnormal such as a missing nozzle, broken sprinkler or broken pipe. If the flow sensor is equipped with a totalizer then it can also function as a meter for irrigation water.
Referenced Standards:	

Name:	Ray Mirzaei, Chairman
WE-Stand Task Group:	Swimming Pools and Spas Task Group
Recommendation:	Revise text
Section Number:	417.0
Task Group Recommendation:	**417.0 In-ground Swimming Pools, In-ground Spas, and Above-ground Swimming Pools ~~Hot Tubs~~.**
Problem Statement:	Revising the heading to correspond with the proposed change of scope in Section 101.6.6.
Referenced Standards:	

WE-Stand 2017 – (417.1) Item # 072

Name:	Ray Mirzaei, Chairman
WE-Stand Task Group:	Swimming Pools and Spas Task Group
Recommendation:	Revise text
Section Number:	417.1
Task Group Recommendation:	**417.1 Practices.** The following sections outline common practices for reducing energy consumption in regards to in-ground swimming pools, in-ground spas, and above-ground swimming pools ~~hot tub equipment~~. **Exception**: Seasonal and storable pools, portable electric spas, and residential exercise spas (also known as swim spas).
Problem Statement:	Practices are revised to correspond with the proposed change of scope in Section 101.6.6. As an exception, Portable Electric Spa and exercise spas are regulated with a significantly more stringent requirements of APSP-14 and CEC as they are factory engineered and manufactured appliances and are vastly more energy efficient and have totally different characteristics than in-ground Pool & Spa and Above Ground Pools.
Referenced Standards:	

WE-Stand 2017 – (417.2) Item # 073

Name:	Ray Mirzaei, Chairman
WE-Stand Task Group:	Swimming Pools and Spas Task Group
Recommendation:	Revise text
Section Number:	417.2
Task Group Recommendation:	**417.2 On and Off Switch.** Pool~~,~~ and in-ground spa~~, and hot tub~~ heaters shall be equipped with a readily accessible on and off switch to allow shutting off the heater without adjusting the thermostat setting. Pool heaters fired by natural gas or propane gas shall not have continuously burning pilot lights. ~~[ASHRAE 90.1:7.4.5.1].~~
Problem Statement:	Amending 417.2 to correspond with the amended proposed scope in Section 106.6 and to include propane gas.
Referenced Standards:	

<table>
<tr><td>Name:</td><td>Ray Mirzaei, Chairman</td></tr>
<tr><td>WE-Stand Task Group:</td><td>Swimming Pools and Spas Task Group</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Recommendation:</td><td>Revise text</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Section Number:</td><td>417.3</td></tr>
<tr><td>Task Group Recommendation:</td><td>417.3 Covers. Heated pools and in-ground permanently installed spas~~, and portable spas~~ shall be provided with a vapor retardant cover. The cover shall not prevent collection of rain water and shall provide for accumulation of precipitation and dilution of total dissolved solid and extension of the life of pool and spa water.
Exception: Where more than 70 percent of the energy for heating, computed over an operating season, is from site recovered energy such as from a heat pump or solar energy source.</td></tr>
<tr><td>Problem Statement:</td><td>
a. Unlike landscape, pools collect and store rain water.
b. Collection of rain water dilute concentration of Total Dissolved Solids (TDS) , extend the life pool water and reduce the frequency for draining pool water.
c. Contiguous precipitation in 2015 was 34", around 25% Pool Water in average can be renewed by collection of rainfall
<table>
<tr><th>PERIOD</th><th>PRECIP</th><th>20TH CENTURY AVERAGE</th><th>DEPARTURE</th><th>RANK</th><th>WETTEST/ DRIEST SINCE</th><th>RECORD</th></tr>
<tr><td rowspan="2">Jan - Dec 2015 Year-to-Date</td><td rowspan="2">34.47" (875.54 mm)</td><td rowspan="2">29.94" (760.48 mm)</td><td rowspan="2">4.53" (115.06 mm)</td><td>119th Driest</td><td>Driest since: 2014</td><td>1910</td></tr>
<tr><td>3rd Wettest</td><td>Wettest since: 1983</td><td>1973</td></tr>
</table>
https://www.ncdc.noaa.gov/temp-and-precip/climatological-rankings/index.php?periods%5B%5D=ytd&parameter=pcp&state=110&div=0&month=12&year=2015&asof=on#ranks-form
</td></tr>
<tr><td>Referenced Standards:</td><td></td></tr>
</table>

WE-Stand 2017 – (417.4) Item # 075

Name:	Ray Mirzaei, Chairman
WE-Stand Task Group:	Swimming Pools and Spas Task Group
Recommendation:	Revise text
Section Number:	417.4
Task Group Recommendation:	**417.4 Time Switches.** Time switches shall be installed on in-ground swimming pool~~,~~ and in-ground spa~~, and hot tub~~ heaters and pumps. **Exceptions:** (1) Where public health standards require 24-hour pump operation. (2) Where pumps are required to operate solar and waste heat recovery pool heating systems. ~~[ASHRAE 90.1:7.4.5.3]~~
Problem Statement:	Amend 417.4 to correspond with the proposed amended scope in Section 101.6.6.
Referenced Standards:	

WE-Stand 2017 – (417.5) Item # 076

Name:	Ray Mirzaei, Chairman
WE-Stand Task Group:	Swimming Pools and Spas Task Group
Recommendation:	Add text
Section Number:	417.5
Task Group Recommendation:	**417.5 Pool Pumps and Replacement Pool Pump Motors.** Pool pumps and replacement pool pump motors shall meet requirements of APSP-15.
Problem Statement:	APSP-15 is a standard reducing energy use through more efficient pumps and limiting the size and performance of those pumps based on pool size.
Referenced Standards:	APSP-15

Note: APSP 15 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Name:	Ray Mirzaei, Chairman
WE-Stand Task Group:	Swimming Pools and Spas Task Group
Recommendation:	Add text
Section Number:	417.6
Task Group Recommendation:	**417.6 Filter Backwash.** Where Sand Filters or DE Filter are used and when the pressure gauge reading is 8 psi (0.55-0.69 bar) higher than the starting pressure, the filter backwash shall perform until water with no visible particle emerges from the filter backwash port. Pool gray water shall be used for performing backwash in order to slow down the buildup of total dissolved solids and extend the life of pool water. Timers shall not be used for performing backwash at residential pools.
Problem Statement:	Backwash: -Reduces required filtration time thus reduces pool pump consumption of electricity -Improves water circulation, Prevent water stagnations, improve skimming of leaves and contaminants. -Use of gray pool water for backwash help with necessary renewal of pool water a, reduction of Total Dissolved Solids and extend the life of pool water. -Performing back wash at 8 psi pressure differential ensure proper backwash and prevent unnecessary/ premature backwashes. Use of timers must be avoided to prevent unnecessary backwashes.
Referenced Standards:	

WE-Stand 2017 – (417.7) Item # 078

Name:	Ray Mirzaei, Chairman
WE-Stand Task Group:	Swimming Pools and Spas Task Group
Recommendation:	Add text
Section Number:	417.7
Task Group Recommendation:	**417.7 Filter Cartridge Cleaning.** Where cartridge filters are used and when the pressure gauge reading is 8 psi (0.55-0.69 bar) higher than the starting pressure, the filter cartridge cleaning shall perform. Use of tap water for cleaning cartridge filters shall be permitted. Filter manufacturer recommendations for cleaning and periodic replacement of cartridge element shall be followed to avoid excessive water usage for cleaning.
Problem Statement:	Filter manufacturer's recommendation for cleaning cartridge elements is required to prevent excess use of potable water for filter cartridge cleaning (i.e. instruction for soaking cartridges in detergent, muriatic acid, etc. when necessary to reduce usage of tap water).
Referenced Standards:	

Name:	Ray Mirzaei, Chairman
WE-Stand Task Group:	Swimming Pools and Spas Task Group
Recommendation:	Add text
Section Number:	417.8
Task Group Recommendation:	**417.8 Pool Water Chemistry.** Pool water chemistry shall be maintained according to local jurisdiction requirements.
Problem Statement:	Maintaining pool water chemistry reduces algae, the amount of required filtration and backwash, and extends the life of the water and saves energy. Every jurisdiction may have different requirements for sanitization.
Referenced Standards:	

WE-Stand 2017 – (417.9) Item # 080

Name:	Ray Mirzaei, Chairman
WE-Stand Task Group:	Swimming Pools and Spas Task Group
Recommendation:	Add text
Section Number:	417.9
Task Group Recommendation:	**417.9 Leaks.** In-ground swimming pools, in-ground spas and above-ground swimming pools shall not leak, be tested annually for leakage, and have results documented by the pool owner or operator.
Problem Statement:	Sometimes pool and associated plumbing develop leakage over time. There are proven manual and electronic leakage detection method available that can detect the leakage.
Referenced Standards:	

Name:	Ray Mirzaei, Chairman
WE-Stand Task Group:	Swimming Pools and Spas Task Group
Recommendation:	Add text
Section Number:	417.10
Task Group Recommendation:	**417.10 Reduction of Splash Out.** Water levels in in-ground pools and in-ground spas shall be maintained at the center of skimmer opening or lower level.
Problem Statement:	Keeping the pool water at a lower level reduces splash out.
Referenced Standards:	

Name:	Shabbir Rawalpindiwala, Chairman
WE-Stand Task Group:	Premise Water Supply Systems Task Group
Recommendation:	Add text
Section Number:	418.0-418.1
Task Group Recommendation:	**418.0 Normally Closed Water Supply Pipes.** **418.1 Required Shutoff Valves.** A normally closed crossover water supply pipe or bypass shall have a shutoff valve with an adjacent upstream drain at both ends of the pipe to allow the flushing of the normally closed pipe to a drain prior to use within the building. Where a normally closed secondary building supply is used in lieu of the primary building supply, both the primary and secondary building supply shall have a shutoff valve with an adjacent upstream drain at the building point of entry to allow the flushing of the normally closed pipe to a drain prior to use within the building. Each valve shall have an affixed sign with the words: "Caution: Flush this pipe to a drain for ____ minutes before opening this valve".
Problem Statement:	See Attachment
Referenced Standards:	

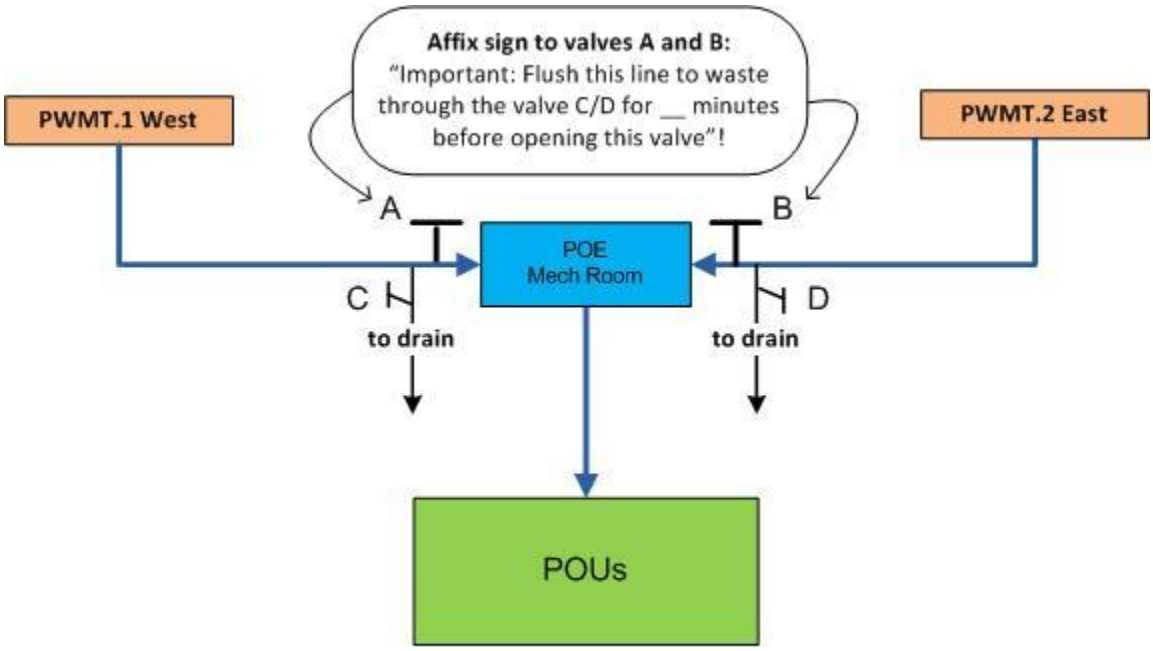
January 30, 2016

To: Shabbir Rawalpindiwala for Premise Water Supply Systems Task Group
From: Matt Freije
Re: Two code recommendations for commercial buildings

1. Valves for flushing backup water feeds

Lines from a public water main tap (PWMT) to a building point of entry (POE) that are opened only when the primary feed is down for repair can harbor a large volume of stagnant water that may become contaminated with bacteria and debris. It is crucial to ensure that potentially contaminated water in the backup feeds is not distributed through a building. If all feeds are not kept open, backup lines should be flushed to waste before each use.

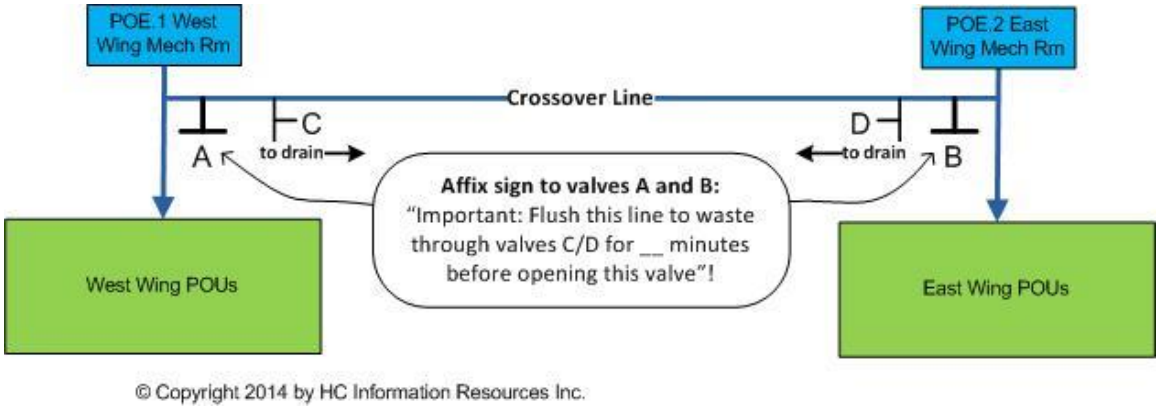
To allow for such flushing, an additional valve on a line piped to a drain should be installed as far downstream on the line as possible—ideally just upstream of the shutoff valve.



2. Valves for flushing crossover lines

Although lines connecting one domestic water system to another (crossover lines) can be beneficial in allowing either system to supply the other when one is down for maintenance, the water in crossover lines becomes stagnant if the design does not allow enough flow through it. This presents two problems: First, during normal use of the system, stagnant water in the crossover line can be drawn into the domestic water system whenever pressure changes occur. Second, when the crossover line is opened to feed one system from the other, potentially contaminated water that has been sitting in it for weeks or months gets distributed to faucets and other fixtures.

To allow a crossover line to be isolated and flushed to waste periodically and before each use, shut-off valves should be installed at each end, instead of just one shut-off valve on the line, with another valve on a line piped to a drain just downstream of the shut-off valves.



Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Revise text
Section Number:	Chapter 5 Title
Task Group Recommendation:	**CHAPTER 5 ~~ALTERNATE~~ NONPOTABLE WATER SOURCES FOR NON-POTABLE AND POTABLE APPLICATIONS**
Problem Statement:	Combine Chapter 6 with Chapter 5, putting all nonpotable water sources under one chapter, to be consistent and uniform. Shouldn't have different terms, definitions for the same water source. E.g. alternate and nonpotable.
Referenced Standards:	

WE-Stand 2017 – (501.1) Item # 084

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Revise text
Section Number:	501.1
Task Group Recommendation:	**501.1 Scope.** The provisions of this chapter shall apply to the construction, alteration, and repair of ~~alternate~~ nonpotable water source systems for non-potable and potable applications.
Problem Statement:	Combine Chapter 6 with Chapter 5, putting all nonpotable water sources under one chapter, to be consistent and uniform. Shouldn't have different terms, definitions for the same water source.
Referenced Standards:	

WE-Stand 2017 – (501.1.1) Item # 085

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Revise text
Section Number:	501.1.1
Task Group Recommendation:	**501.1.1 Allowable Use of ~~Alternate~~ Nonpotable Water.** Where approved or required by the Authority Having Jurisdiction~~, alternate~~ nonpotable water sources (reclaimed (recycled) water, gray-water, stormwater, ~~and~~ onsite and offsite treated non-potable water) used in lieu of potable water shall be in accordance with the provisions of this chapter.
Problem Statement:	Shouldn't have different terms, definitions for the same water source. E.g. alternate and nonpotable. Rainwater and stormwater can be harvested offsite and used offsite or onsite.
Referenced Standards:	

WE-Stand 2017 – (501.2) Item # 086

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	501.2
Proposed Text:	**501.2 System Design.** Alternative water source systems shall be designed in accordance with this chapter by a licensed contractor or designer, ~~person registered or licensed to perform plumbing design work or~~ who demonstrates competency to design the alternate water source system as required by the Authority Having Jurisdiction. Components, piping, and fittings used in any alternate water source system shall be listed.
Problem Statement:	Rational: These systems are often designed by engineers, or landscape contractors, or architects. Plumbing contractors are less knowledge about the irrigation portion of the system and so should not be called out as a preferred designer.
Referenced Standards:	

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	501.3
Proposed Text:	**501.3 Permit.** It shall be unlawful for any person to construct, install, alter, or cause to be constructed, installed, or altered any alternative water source system in a building or on a premise without first obtaining a permit to do such work from the Authority Having Jurisdiction. **Exception:** A construction permit shall not be required for a clothes washer only system meeting the requirements of Section 501.3.1
Problem Statement:	Clothes washer only systems that do not alter the existing plumbing (and follow basic health and safety guidelines) are extremely low risk and should be allowed to be installed with no permit. California has had great success with this code and there are many incentive programs across the state for the clothes washer graywater system due to its permit-exempt status. Chapter 16 from the CPC is provided for reference.
Referenced Standards:	

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Add text
Section Number:	501.3.1
Proposed Text:	**501.3.1 Clothes Washer System.** A clothes washer system in compliance with all of the following is exempt from the construction permit specified in Section 501.3 and may be installed or altered without a construction permit: (1) Where required, notification has been provided to the enforcing agency regarding the proposed location and installation of a gray water irrigation or disposal system. (2) The design shall allow the user to direct the flow to the irrigation or disposal field or the building sewer. The direction control of the gray water shall be clearly labeled and readily accessible to the user. (3) The installation, change, alteration, or repair of the system does not include a potable water connection or a pump and does not affect other building, plumbing, electrical, or mechanical components including structural features, egress, fire-life safety, sanitation, potable water supply piping, or accessibility. The pump in a clothes washer shall not be considered part of the gray water system. (4) The gray water shall be contained on the site where it is generated. (5) Gray water shall be directed to and contained within an irrigation or disposal field. (6) Ponding or runoff is prohibited and shall be considered a nuisance. (7) Gray water shall be permitted to be released above the ground surface provided at least 2 inches (51 mm) of mulch, rock, or soil, or a solid shield covers the release point. Other methods which provide equivalent separation are also acceptable. (8) Gray water systems shall be designed to minimize contact with humans and domestic pets. (9) Water used to wash diapers or similarly soiled or infectious garments shall not be used and shall be diverted to the building sewer. (10) Gray water shall not contain hazardous chemicals derived from activities such as cleaning car parts, washing greasy or oily rags, or disposing of waste solutions from home photo labs or similar hobbyist or home occupational activities. (11) Exemption from construction permit requirements of this code shall not be deemed to grant authorization for any gray water system to be installed in a manner that violates other provisions of this code or any other laws or ordinances of the Authority Having Jurisdiction. (12) An operation and maintenance manual shall be provided to the owner. Directions shall indicate that the manual is to remain with the building throughout the life of the system and upon change of ownership or occupancy. (13) Gray water discharge from a clothes washer system through a standpipe shall be properly trapped in accordance with the plumbing code.
Problem Statement:	Clothes washer only systems that do not alter the existing plumbing (and follow basic health and safety guidelines) are extremely low risk and should be allowed to be installed with no permit. California has had great success with this code and there are many incentive programs across the state for the clothes washer graywater system due to its permit-exempt status. Chapter 16 from the CPC is provided for reference.
Referenced Standards:	

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	501.5
Proposed Text:	**501.5 Maintenance and Inspection.** Alternate water source systems and components shall be inspected and maintained in accordance with ~~Section 501.5.1 through Section 501.5.3.~~ the manufacturer's recommendations , as required by the Enforcing Agency or both.
Problem Statement:	Rational: There are many different system components that will potentially be used in a system and so any generic maintenance chart will be potentially erroneous and could add unnecessary required maintenance. Requiring systems to be maintained and inspected in accordance with the manufacturer is a simple and more effective way to achieve the same goal of having well maintained systems.
Referenced Standards:	

WE-Stand 2017 – (Table 501.5) Item # 090

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Delete text
Section Number:	Table 501.5
Proposed Text:	~~**Table 501.5 Minimum Alternate Water Source Testing, Inspection, and Maintenance Frequency**~~ delete the table in its entirety
Problem Statement:	There are many different system components that will potentially be used in a system and so any generic maintenance chart will be potentially erroneous and could add unnecessary required maintenance. Requiring systems to be maintained and inspected in accordance with the manufacturer is a simple and more effective way to achieve the same goal of having well maintained systems.
Referenced Standards:	

WE-Stand 2017 – (501.5.1) Item # 091

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Delete text
Section Number:	501.5.1
Proposed Text:	~~**501.5.1 Frequency.** Alternate water source systems and components shall be inspected and maintained in accordance with Table 501.5 unless more frequent inspection and maintenance is required by the manufacturer.~~ (renumber remaining sections)
Problem Statement:	This section is unnecessary. The frequency of maintenance should be done in accordance with the manufactures recommendations.
Referenced Standards:	

WE-Stand 2017 – (501.5.2) Item # 092

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Delete text
Section Number:	501.5.2
Proposed Text:	~~**501.5.2 Maintenance Log**. A maintenance log for gray water and on-site treated non-potable water systems is required to have a permit in accordance with Section 501.3 and shall be maintained by the property owner and be available for inspection. The property owner or designated appointee shall ensure that a record of testing, inspection and maintenance as required by Table 501.5 is maintained in the log. The log will indicate the frequency of inspection and maintenance for each system.~~ (renumber remaining sections)
Problem Statement:	Rational: This is an onerous requirement and there is no similar requirements for other comparable systems (drinking water wells, septic systems, hot tubs, swimming pools, etc.)
Referenced Standards:	

WE-Stand 2017 – (501.6) Item # 093

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	501.6
Proposed Text:	**501.6 Operation and Maintenance Manual.** An operation and maintenance manual for gray water and on-site treated water systems required to have a permit in accordance with Section 501.3 shall be supplied to the building owner by the system designer. The operating and maintenance manual shall include the following: (1) ~~Detailed d~~Diagram of the entire system and the location of system components. (2) (remaining text unchanged) (3) Details on maintaining the required water quality~~ as determined by the Authority Having Jurisdiction.~~ for on-site non potable water systems. (4) – (6) (remaining text unchanged) (7) Directions to the owner or occupant that the manual shall remain with the building throughout the life the structure.
Problem Statement:	(1) The diagram of the entire system is a "site plan" which is not a detailed drawing, rather a drawing that shows all the components and their locations. Each component may have it's own detailed cut-sheets, but this is not the place to include that level of detail. (3) It should be clarified that the water quality is addressed in this code. (7) This addition should be added so the system owner knows they must pass on the O&M manual to future owners.
Referenced Standards:	

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	501.7
Proposed Text:	**501.7 Minimum Water Quality Requirements.** The minimum water quality for alternate water source systems shall meet the applicable water quality requirements for the intended application as determined by the Authority Having Jurisdiction. In the absence of water quality requirements for on-site treated non-potable gray~~gray~~water and reclaimed (recycled) water systems, ~~the EPA/625/R-04/108 contains recommended water reuse guidelines to assist regulatory agencies develop, revise, or expand alternate water source water quality standards.~~ the requirements of NSF 350 shall apply.
Problem Statement:	This would be consistent with California's non-potable reuse standards and would make it easier for projects to permit NSF 350 certified systems. Since most jurisdictions do not have the time, resources, or technical expertise to develop their own standards, the result of not including an outside standard like NSF 350 will result in more difficulty in permitting these systems.
Referenced Standards:	NSF-350 2011

Note: NSF 350 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (501.7, 504.10.2) Item # 095

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Revise text
Section Number:	501.7 and 504.10.2
Task Group Recommendation:	**501.7 Minimum Water Quality Requirements.** The minimum water quality for ~~alternate~~ nonpotable water source systems shall meet the applicable water quality requirements for the intended application as determined by the Authority Having Jurisdiction. In the absence of water quality requirements for on-site and offsite treated non-potable water ~~and reclaimed (recycled)~~ water systems, the EPA/625/R-04/108 contains recommended water reuse guidelines to assist regulatory agencies develop, revise, or expand alternate water source water quality standard. On-site and offsite treated non-potable water supplied to toilets or urinals or for other uses in which it is sprayed or exposed shall be disinfected. Acceptable disinfection methods shall include chlorination, ultraviolet sterilization, ozone, or other methods as approved by the Authority Having Jurisdiction. The minimum water quality for on-site treated non-potable water systems shall meet the applicable water quality requirements for the intended applications as determined by the Authority Having Jurisdiction. The minimum water quality for harvested dry weather runoff, graywater, rainwater, and stormwater shall meet the applicable water quality requirements for the intended applications as determined by the Authority Having Jurisdiction. In the absence of water quality requirements determined by the Authority Having Jurisdiction, the minimum treatment and water quality shall also comply with Table 501.7. **Exception:** Water treatment is not required for gray water used for subsurface irrigation. **TABLE ~~602.9.4~~ 501.7** **MINIMUM WATER QUALITY** (portions of table not shown remain unchanged) **~~504.10.2 Minimum Water Quality.~~** ~~On-site treated non-potable water supplied to toilets or urinals or for other uses in which it is sprayed or exposed shall be disinfected. Acceptable disinfection methods shall include chlorination, ultraviolet sterilization, ozone, or other methods as approved by the Authority Having Jurisdiction. The minimum water quality for on-site treated non-potable water systems shall meet the applicable water quality requirements for the intended applications as determined by the Authority Having Jurisdiction.~~
Problem Statement:	Move 504.10.2 into 501.7 and consolidate. Ensure that rainwater minimum water quality is now covered in Chapter 5. Why have different water quality requirements, standards for the same end uses of non-potable water. Should be uniform end use water quality requirements. The influent water quality can vary, and the treatment system designed to deal with different influent, but the effluent will and should be the same for all non-potable, like NSF350. Consistent and uniform water quality requirements. Combining Chapter 6 into Chapter 5, the same end uses for onsite treated nonpotable have one table of water quality standards. Move Table 602.9.4 into 501.7. However, with recycled water, probably need to stick with

	those specific standards for wastewater reuse. So this recommendation would be for rainwater and stormwater.
Referenced Standards:	EPA/625/R-04/108

Note: The EPA/625/R-04/108 does not meet the requirements for a mandatory reference standard in accordance with Section 15.2 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	501.8
Proposed Text:	**501.8 Material Compatibility.** Alternate water source systems shall be constructed of materials that are compatible with the type of pipe and pipe fitting materials, water treatment, and water conditions in the system.
Problem Statement:	• Clarification of the term ‘fitting’ as it is not included in CHAPTER 2: DEFINITIONS. • Clarification of the term ‘fitting’ so that it does not imply synonymy with faucet materials.
Referenced Standards:	

WE-Stand 2017 – (501.10) Item # 097

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	501.10
Proposed Text:	**501.10 Commercial, Industrial, and Institutional Restroom Signs.** A sign shall be installed in all restrooms in commercial, industrial, and institutional occupancies using reclaimed (recycled) water and on-site treated water for water closets, urinals, or both. ~~Each sign shall contain 1/2 inch (12.7 mm) letters of a highly visible color on a contrasting background.~~ The location of the sign(s) shall be such that the sign(s) shall be visible to all users. The location of the sign(s) shall be approved by the Authority Having Jurisdiction and shall contain the following text: TO CONSERVE WATER, THIS BUILDING USES *_____* TO FLUSH TOILETS AND URINALS.
Problem Statement:	Rational: The size of the letters may differ depending on how close or far away the sign is. Having such a specific requirement seems unnecessarily rigid here.
Referenced Standards:	

WE-Stand 2017 – (501.11) Item # 098

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	501.11
Proposed Text:	**501.11 Inspection and Testing**. Alternate water source systems shall be inspected and tested in accordance with Section 501.11.1 and Section 501.11.2. **Exception**: Non-pressurized graywater or on-site non potable water systems without any connection to a pressurized water system.
Problem Statement:	Rational: Non-pressurized systems without any connection to a pressurized water systems would not require inspection for cross-connection nor inspection for testing potable water piping.
Referenced Standards:	

WE-Stand 2017 – (501.11.2.2) Item # 099

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	501.11.2.2
Proposed Text:	**501.11.2.2 Cross-Connection Test.** The procedure for determining cross-connection shall be followed by the applicant in the presence of the Authority Having Jurisdiction ~~and other authorities having jurisdiction~~ to determine whether a cross-connection has occurred as follows:
Problem Statement:	• It is implied that throughout this standard, the Authority Having Jurisdiction may include subsequent authorities having jurisdiction depending on the application. • If 'and other authorities having jurisdiction' is desired to be left in the text, it should also be used throughout the rest of this standard for consistency.
Referenced Standards:	

Staff Note: Similar language is found in: 501.11.2.1, 504.5, 602.5, 602.11.2.1, 602.11.2.2

WE-Stand 2017 – (502.1.2 – 502.1.2.3) Item # 100

Name:	Edward Saltzberg
Organization:	Edward Saltzberg & Associates
Recommendation:	Add text
Section Number:	502.1.2-502.1.2.3
Proposed Text:	**502.1.2 Required.** Every newly constructed single family dwelling shall have the waste piping from all fixtures allowed on a gray water system per the Code. The separate piping system shall be piped to outside the building and terminate with an approved drainage gray water diverter per Section 502.2.3 before connecting to the drainage system from non-gray water fixtures. **Exception** – Existing single-family dwellings and any residence built on soil that will not support percolation. **502.1.2.1 Diverter.** The diverter shall be connected and installed in the open position to the building sewer. The gray water diversion port shall remain capped off until a gray water irrigation/reuse system is installed. **502.1.2.2 Access.** The diverter and sewer connection shall be readily accessible for connection, inspection, maintenance, and servicing. **502.1.2.3 Regulatory.** Gray water reuse and irrigation system components shall meet local, and state code and regulatory requirements.
Problem Statement:	Justification: The document has made great strides in saving energy in new buildings. Codes have made provisions for future solar panels and instantaneous water heaters all to save energy. However, while the Codes address water flows from fixtures, it does not address the water savings that can accrue from capturing the waste water from fixtures allowed on the gray water system. The installation of a total gray water system in a single family dwelling would save each dwelling considerable water, far more water than the low flow shower heads and conversion to ultra-low flow toilets save. The State of California and many other locations are facing a long term drought and we need to conserve water. Total gray water systems cannot be installed unless the waste piping from all the fixtures allowed on a gray water system are piped together to outside the building initially as part of the original dwelling construction. It would be cost prohibitive to try to implement a total gray water system for all the allowed fixtures after the building is built, especially if the house is a slab on ground construction. There is a direct relationship between water use and energy use. Much of the use of energy in the State is for moving water. If each new single family dwelling had an approved gray water system installed, considerable water to each dwelling would be saved so that their water bills would be reduced and their sewer surcharge bills would also be reduced. Furthermore, the water utilities would be delivering less water and sewage treatment plants would be treating less sewage thereby saving considerable energy. Furthermore, this might even negate the requirement for agencies to enlarge their water systems and increase their sewage treatment plants.
Referenced Standards:	

WE-Stand 2017 – (502.2.1) Item # 101

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	502.2.1
Proposed Text:	**502.2.1 Discharge.** Gray water diverted away from a sewer or private sewage disposal system, shall discharge to a subsurface irrigation or subsoil irrigation system, or ~~shall discharge~~ to a mulch basin ~~for single family and multi-family dwellings~~. Gray water shall not be used to irrigate root crops or food crops intended for human consumption that come in contact with soil.
Problem Statement:	Rational: Mulch basis are very effective at preventing pooling and runoff of graywater and should be allowed to be used in any suitable location regardless of whether it's single family or multi-family. There are commercial-scale much basins systems functioning well in California and to disallow it for no good reason doesn't make sense.
Referenced Standards:	

WE-Stand 2017 – (502.2.3) Item # 102

Name:	Edward Saltzberg
Organization:	Edward Saltzberg & Associates
Recommendation:	Revise text
Section Number:	502.2.3
Proposed Text:	**502.2.3 Diversion.** The gray water system shall connect to the sanitary drainage system downstream of fixture traps and vent connections through ~~a~~ an approved gray water diverter valve. The gray water diverter shall comply with IAPMO PS 59 and be installed in an accessible location and clearly indicate the direction of flow.
Problem Statement:	To clarify matters.
Referenced Standards:	IAPMO PS 59

Note: IAPMO PS 59 does not meet the requirements for a mandatory reference standard in accordance with Section 15.2 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (502.2.3) Item # 103

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	502.2.3
Proposed Text:	**502.2.3 Diversion**. The gray water system shall connect to the sanitary drainage system downstream of fixture traps and vent connections through an approved ~~gray water~~ diverter valve. The ~~gray water~~ diverter shall ~~comply with IAPMO PS 59 and~~ be installed in an accessible location and clearly indicate the direction of flow. **Exception:** A clothes washer system in compliance with section 501.3.1.
Problem Statement:	Rational: There is only one valve that is listed with IAPMO's PS 59 standard. The valve is newly on the market, costs 10 times more than the other valves, and is not suitable for many situations. Requiring this particular valve to be used will double the cost of simple greywater systems and create additional installation challenges, and thus will discourage legal installations. This valve should be an option for installers who wish to use it, but no code should be written in such a way this valve by default becomes the only option. The other valves that are currently used (Jandy and Pentair 3-way valves) cost $50 and require a 7" section of straight pipe to be removed for installation, and they have been used without problems for decades. The GreenSmart valve (the only approved "graywater valve") costs $500 and requires about 16" of straight section of pipe. In a retrofit situation without a lot of room to alter the drain, the need of 16" of straight pipe to install the valve will require major plumbing alteration, which is greatly increase the cost of the system. Other issues with the valve are: This valve has a 2" inlet and outlet, but the graywater outlet is 1.5" which is undersized for a shower drain. This valve relies on one ball valve that blocks off the sewer/septic side, so if the user doesn't switch to the sewer on a frequent basis a ball of sludge will build up, creating a blockage. Additionally, I've used this valve and the 4th time it was engaged the motor never stopped spinning. Since this was in a classroom situation we noticed and directed the valve the other direction, which fixed the problem. However, if this valve had been installed and was in operation the user would never have known the valve was spinning endlessly, all the graywater would have been wasted to the sewer, and the motor would have burned up. The valve is so new and has so many drawbacks compared to the other diverter valves that have been used, that writing the code in such a way to require it is highly problematic and would be a huge disservice to water conservation in the US.
Referenced Standards:	

WE-Stand 2017 – (502.3) Item # 104

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	502.3
Proposed Text:	**502.3 Connections to Potable and Reclaimed (Recycled) Water Systems.** Gray water systems shall have no unprotected direct connection to any potable water supply, on-site treated non-potable water supply, or reclaimed (recycled) water systems. Potable, on-site treated non-potable, rainwater or reclaimed (recycled) water is permitted to be used as makeup water for a non-pressurized storage tank provided the connection is protected by an airgap, reduced-pressure principle backflow preventer, or other device which prevents backflow in accordance with the plumbing code.
Problem Statement:	Rational: This section should be consistent with the rest of the sections of this code. These edits create that consistency and allow for different protected options in accordance with the plumbing code.
Referenced Standards:	

WE-Stand 2017 – (502.7) Item # 105

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	502.7
Proposed Text:	**502.7 Drawings and Specifications.** The Authority Having Jurisdiction shall be permitted to require any or all of the following information to be included with or in the plot plan before a permit is issued for a gray water system, or at any time during the construction thereof:
Problem Statement:	Rational: Depending on the level of complexity of the system not all of these requirements would be necessary. Changing "shall" to "may" will give the AHJ flexibility to require any or all of these items, as fits the specific system and situation.
Referenced Standards:	

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	502.8.1
Proposed Text:	**502.8.1 Single Family Dwellings and Multi- Family Dwellings.** The gray water discharge for single family and multi-family dwellings shall be calculated by water use records, calculations of local daily per person interior water use, or the following procedure: (1) The number of occupants of each dwelling unit shall be calculated as follows: First Bedroom 2 occupants Each additional bedroom 1 occupant (2) The estimated gray water flows of each occupant shall be calculated as follows: ~~Showers, bathtubs and lavatories~~ ~~25 gallons (95 L) per day/ occupant~~ ~~Laundry~~ ~~15 gallons (57 L) per day/ occupant~~ **With no water-efficient fixtures:** Shower/bath 13 gallons (49 L) per day/occupant Lavatory sink 7 gallons (26 L) per day/occupant Washing machine 15 gallons (57 L) per day/occupant **With water-efficient fixtures:** Shower/bath 10 gallons (38 L) per day/occupant Lavatory sink 5 gallons (19 L) per day/occupant Washing machine 10 gallons (38 L) per day/occupant (3) The total number of occupants shall be multiplied by the applicable estimated gray water discharge as provided above and the type of fixtures connected to the gray water system. Note: If a system designer calculates the home produces more graywater than estimated by this chart, the system should be designed for the highest estimate of gallons per day.
Problem Statement:	Rational: The numbers in this standard are from the original CA graywater code which is almost 20 years old (25 gpd for showers/lav and 15 gpd for washers). Many homes have upgraded to water efficient fixtures, and the water efficiency requirements of this same standard would cause homes to generate much lower flows than in this estimate. The code should accurately reflect the current average gallons per day per occupant. Additionally the bathroom sink should have a separate number since many systems do not include it. Graywater systems should not have to be designed for fixtures that are not connected to the system. The numbers I'm suggesting come from LEED estimates (3 minute usage per person per day from the lavatory sink with either a 2.2 gpm or 1.5 gpm), Residential End Uses of Water (Denver, CO : AWWA Resource Foundation, 1999); and Handbook of Water Use and Conservation, Amy Vickers (WaterPlow Press, 2012).
Referenced Standards:	

WE-Stand 2017 – (502.9.1) Item # 107

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	502.9.1
Proposed Text:	**502.9.1 Surge Tanks.** Where installed, surge tanks shall comply with the following: (1) – (4) Text unchanged (5) Where possible, ~~Each~~ surge tanks shall have an overflow drain. The overflow drains shall have permanent connections to the building drain or building sewer, upstream of septic tanks, if any. The overflow drain shall not be equipped with a shutoff valve. (6) – (7) Text unchanged (8) ~~If~~ Where a surge tank is installed underground, the system shall be designed so that where possible, the tank overflow will gravity drain to the existing sewer line or septic tank. When subject to backflow ~~T~~the tank shall be protected ~~against sewer line backflow~~ by a backwater valve installed in accordance with the plumbing code. (9) – (10) Text unchanged
Problem Statement:	Rational: Sewage ejection tanks don't have this requirement. If tanks containing sewage can be installed legally without overflow to sewer why shouldn't greywater tanks also be allowed?
Referenced Standards:	

WE-Stand 2017 – (502.9.2) Item # 108

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	502.9.2.
Proposed Text:	**502.9.2 Gray Water Pipe and Fitting Material.** Aboveground and underground building drainage and vent pipe and fittings for gray water systems shall comply with the requirements for aboveground and underground sanitary building drainage and vent pipe and fittings in the plumbing code. ~~These materials shall extend not less than 2 feet (610 mm) outside the building.~~
Problem Statement:	Rational: Some systems pumped the greywater through irrigation tubing from inside the building envelope or very nearby. These systems wouldn't use drainage piping 2 feet outside the building.
Referenced Standards:	

WE-Stand 2017 – (502.9.7) Item # 109

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	502.9.7
Proposed Text:	**502.9.7 Backwater Valve.** A backwater valve shall be installed on all gray water drain connections to the sanitary drain or sewer that are subject to backflow.
Problem Statement:	Rational: Not all drains are subject to backflow and won't require a backwater valve, for example, a retrofit installation of a shower graywater line that comes from a second story shower and runs on the exterior of the house. The diversion can happen outside higher than any potential backflow point and would not require a backwater valve.
Referenced Standards:	

WE-Stand 2017 – (Table 502.10) Item # 110

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	Table 502.10

Proposed Text:

TABLE 502.10
DESIGN OF SIX TYPICAL SOILS

TYPE OF SOIL	MINIMUM SQUARE FEET OF IRRIGATION AREA PER 100 GALLONS OF ESTIMATED GRAY WATER DISCHARGE PER DAY	MAXIMUM ABSORPTION CAPACITY IN GALLONS PER SQUARE FOOT OF IRRIGATION/LEACHING AREA FOR A 24-HOUR PERIOD
~~Coarse sand or gravel~~	~~20~~	~~5.0~~
Sand	25	4.0
~~Fine sand~~	~~25~~	~~4.0~~
Sandy loam	40	2.5
Loam	50	2
Clay loam	63	1.6
Sandy clay	60	1.7
Clay	100	1
~~Clay with considerable sand or gravel~~	~~90~~	~~1.1~~
~~Clay with small amounts of sand or gravel~~	~~120~~	~~0.8~~

Problem Statement:	The soil types in this chart are not "typical" and are not even consistent with Table 502.11.1 Subsurface Irrigation Design Criteria for Six Typical Soils. These six soil types should be used in this table.
Referenced Standards:	

WE-Stand 2017 – (502.10.3) Item # 111

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	502.10.3
Proposed Text:	**502.10.3 Groundwater Level.** No excavation for an irrigation field, disposal field, or mulch basin shall extend within 3 feet (914 mm) vertical of the highest known seasonal groundwater level, nor to a depth where gray water contaminates the groundwater or surface water. ~~The applicant shall supply evidence of ground water depth to the satisfaction of the Authority Having Jurisdiction.~~ **Exceptions**: The absence of groundwater in a test hole 3 vertical feet (915 mm) below the deepest irrigation or disposal point shall be sufficient to satisfy this section unless seasonal high groundwater levels have been documented to rise within this area.
Problem Statement:	Rational: Supplying evidence of groundwater depth to the satisfaction of the AHJ is an unreasonable requirement. In areas with deep groundwater it would costs tens of thousands of dollars to "prove" where groundwater was (they would have to drill until hitting the water table). The language I'm suggesting is from Chapter 16 of the California Plumbing Code and it prevents local regulators from preventing any systems being installed because it's too costly to prove where groundwater is. It's not hard or expensive to prove where groundwater isn't- you just have to dig a hole. Chapter 16 of the CPC provided for reference.
Referenced Standards:	

WE-Stand 2017 – (502.11.1.1) Item # 112

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Delete text
Section Number:	502.11.1.1
Proposed Text:	~~**502.11.1.1 Minimum Depth.** Supply piping, including drip feeders, shall be not less than 2 inches (51 mm) below finished grade and covered with mulch or soil.~~ Renumber remaining sections
Problem Statement:	Rational: Supply piping may come from a locations where the pipe runs under the building, along a wall, where it is impossible to make it below grade. The supply piping doesn't release any greywater so there is no health reason for it to be buried. The outlets ARE required to be covered to prevent contact.
Referenced Standards:	

WE-Stand 2017 – (502.11.1.2) Item # 113

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	502.11.1.2
Proposed Text:	**502.11.1.2 Filter.** ~~Not less than 140 mesh (115 micron) filter with a capacity of 25 gallons per minute (gpm) (1.58 L/s), or equivalent shall be installed.~~ Where a filter backwash is installed, the backwash and flush discharge shall discharge into the building sewer or private sewage disposal system. Filter backwash and flush water shall not be used for any purpose.
Problem Statement:	Rational: The specific type of filter installed will be contingent on the type of emitters and outlets used. It doesn't make sense to regulate the size or flow of the filter.
Referenced Standards:	

WE-Stand 2017 – (502.11.1.3) Item # 114

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	502.11.1.3
Proposed Text:	**502.11.1.3 Emitter Size.** Emitters shall be installed in accordance with the manufacturer's installation instructions. ~~Emitters shall have a flow path of not less than 1200 microns (μ) (1200 μm) and shall not have a coefficient of manufacturing variation (Cv) exceeding 7 percent. Irrigation system design shall be such that emitter flow variation shall not exceed 10 percent.~~
Problem Statement:	Rational: There many types of emitters and being so specific in this code could limit possibilities and potential future innovations. The intent behind this section would be to prevent too much greywater from being discharged in one location which could cause pooling or runoff. Pooling and runoff are already protected against in several other locations in the code.
Referenced Standards:	

WE-Stand 2017 – (502.11.1.5) Item # 115

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Delete text
Section Number:	502.11.1.5
Proposed Text:	~~**502.11.1.5 Controls.** The system design shall provide user controls, such as valves, switches, timers, and other controllers, to rotate the distribution of gray water between irrigation zones.~~ Renumber remaining section
Problem Statement:	Rational: Not all systems have different irrigation zones. If a system is designed with multiple irrigation zones it will obviously have a way to rotate the distribution of graywater, otherwise the designer would not have installed multiple zones.
Referenced Standards:	

WE-Stand 2017 – (502.11.1.6) Item # 116

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	502.11.1.6
Proposed Text:	**502.11.1.6 Maximum Pressure.** Where pressure at the discharge side of the pump exceeds 20 pounds- force per square inch (psi) (138 kPa), a pressure- reducing valve able to maintain downstream pressure no greater than the maximum operating pressure of the installed tubing, emitters, or other components ~~not exceeding 20 psi (138 kPa)~~ shall be installed down- stream from the pump and before any emission device.
Problem Statement:	Rational: This codes should not be so specific and should allow for a range of graywater system components so long as they function as designed. My edit will ensure the pressure isn't greater than the tubing, emitters, or other components can handle, which is the intent of this section, without being unnecessarily prescriptive.
Referenced Standards:	

WE-Stand 2017 – (502.11.2.1) Item # 117

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Delete text
Section Number:	502.11.2.1
Proposed Text:	~~**502.11.2.1 Single Family and Multi-Family Dwellings**. The gray water discharge to a mulch basin is limited to single family and multi-family dwellings.~~ (Renumber remaining sections)
Problem Statement:	Rational: Using a mulch basin is a method of filtering and distributing graywater subsurface. It is an affordable and simple method to increase absorption in the soil, decrease soil compaction, and provide surge capacity. If a designer/installers wants to use this method it should not matter what type of building the water is coming from. The amount of flow and types of plants that will be irrigated will determine if this method is preferable over others. Evergreen Lodge near Yosemite, CA is a great example of mulch basin irrigation being used in a commercial application. They have 40 cabins, a commercial laundry, and staff showers and laundry all on greywater with mulch basins.
Referenced Standards:	

WE-Stand 2017 – (502.11.2.3) Item # 118

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Delete text
Section Number:	502.11.2.3
Proposed Text:	~~**502.11.2.3 Minimum Depth**. Gray water supply piping, including drip feeders, shall be a minimum 2 inches (51 mm) below finished grade and covered with mulch.~~ (renumber remaining sections)
Problem Statement:	Rational: Supply piping may come from a locations where the pipe runs under the building, or along a wall where it is impossible to locate them below grade. The supply piping doesn't release any graywater so there is no health reason for it to be buried. In contrast the outlets ARE required to be covered to prevent contact.
Referenced Standards:	

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Revise text
Section Number:	503.0
Task Group Recommendation:	**503.0 ~~Reclaimed (Recycled)~~ Offsite Treated Nonpotable Water Systems.**
Problem Statement:	To be consistent with Section 504.0 Onsite Treated Nonpotable Water Systems, since this source water is being harvested and treated offsite, treated and conveyed for onsite use. Closes the gap on harvesting a large potential water resource flowing in our storm drains and sanitary sewers. Adds consistency in the document related to onsite and offsite water resources, both harvesting and using.
Referenced Standards:	

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Revise text
Section Number:	503.1
Task Group Recommendation:	**503.1 General**: The provisions of this section shall apply to the installation, construction, alteration, and repair of reclaimed (recycled) water and stormwater systems intended to supply uses such as water closets, urinals, trap primers for floor drains and floor sinks, aboveground and subsurface irrigation, industrial or commercial cooling or air conditioning and other uses approved by the Authority Having Jurisdiction.
Problem Statement:	This section shall apply to offsite produced recycled water and treated stormwater. Wherever reclaimed (recycled) appears, will need to change to Offsite Treated Nonpotable Water, which is defined in Section 200, definitions. Or can break out into 2 sub-sections, one for reclaimed, and one for stormwater. Internally within 503.0, nothing changes in terms of Reclaimed water protocols, standards. This is a name change for the section, and the addition of stormwater as an alternate water source from offsite treatment, just like Reclaimed water.
Referenced Standards:	

WE-Stand 2017 – (503.5) Item # 121

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	503.5
Proposed Text:	**503.5 Initial Cross-Connection Test.** A cross-connection test is required in accordance with Section 501.11.2. Before the building is occupied or the system is activated, the installer shall perform the initial cross-connection test in the presence of the Authority Having Jurisdiction ~~and other authorities having jurisdiction~~. The test shall be ruled successful by the Authority Having Jurisdiction before final approval is granted.
Problem Statement:	• It is implied that throughout this standard, the Authority Having Jurisdiction may include subsequent authorities having jurisdiction depending on the application. • If 'and other authorities having jurisdiction' is desired to be left in the text, it should also be used throughout the rest of this standard for consistency. • If 'and other authorities having jurisdiction' is desired to be left in the text, it must be added to the last sentence for consistency: The test shall be ruled successful by the Authority Having Jurisdiction and other authorities having jurisdiction before final approval is granted.
Referenced Standards:	

Staff Note: Similar language is found in 501.11.2.1, 501.11.2.2, 602.5, 602.11.2.1, 602.11.2.2

WE-Stand 2017 – (504.1) Item # 122

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Revise text
Section Number:	504.1
Task Group Recommendation:	**504.1 General.** The provisions of this section shall apply to the installation, construction, alteration, and repair of on-site treated non-potable water systems intended to supply uses such as water closets, urinals, trap primers for floor drains and floor sinks, above and below ground irrigation, and other uses approved by the Authority Having Jurisdiction. Additional design criteria can be found in ARCSA/ASPE/ANSI 63 and ARCSA/ASPE/ANSI 78.
Problem Statement:	To be consistent, as 63 is mentioned in old Chapter 6, now is in Chapter 5, but need to add the other ASPE/ANSI standard for stormwater.
Referenced Standards:	ARCSA/ASPE 63 and ARCSA/ASPE 78

Note: ARCSA/ASPE 63 and ARCSA/ASPE 78 meet the requirements for mandatory referenced standards in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Add text
Section Number:	505.0
Task Group Recommendation:	**505.0 Onsite Treated Nonpotable Water for Potable Water Systems.**
Problem Statement:	Create a new section for the additional treatment of nonpotable water to a potable level, for potable purposes. For extreme situations, e.g. off the municipal water grid; in rural areas; frequent contaminated public water system, this option becomes available to a party with the resources and interest to go this route, to become more sustainable and self-sufficient. IAPMO should be all inclusive, and not restrictive. Promote all water harvesting and use options. And let the market decide. Will require including higher regulations associated with public/community drinking water systems, safe water drinking act/code/standards. Add Sections from ARCSA/ASPE/ANSI 78 Standard, section on Potable Use. New section must follow all legal regulations, laws on using potable water.
Referenced Standards:	

Name:	Neal Shapiro, Chairman
WE-Stand Task Group:	Rainwater Catchment Systems Task Group
Recommendation:	Move text
Section Number:	505.0
Task Group Recommendation:	Delete Chapter 6 in its entirety and move to new Section 505.0. **<u>505.0 Nonpotable Rainwater Catchment Systems.</u>** **~~601.0 General.~~** **~~6~~<u>5</u>01~~5~~<u>5</u>.1 Scope.** The provisions of this ~~chapter~~ <u>section</u> shall apply to the construction, alteration, and repair of non-potable rainwater catchment systems. (Renumber remaining sections of Chapter 6 accordingly)
Problem Statement:	More consistent and logical to have all nonpotable water sources in one chapter, not separated, as the guidelines, standards and end uses are the same or very similar.
Referenced Standards:	

WE-Stand 2017 – (601.0) Item # 125

Name:	Jon Gray, Chairman
WE-Stand Task Group:	Alternate Water Sources Task Group
Recommendation:	Revise text
Section Number:	601.0
Task Group Recommendation:	Move Chapter 6 into Chapter 5, under section 504.0, either as a sub-section, stand alone, or combined with the other onsite treated nonpotable water sources of 504.0.
Problem Statement:	Rainwater of Chapter 6 is a nonpotable water source, it is an alternate water source and does not need to be in a separate chapter. It is collected onsite, like the waters of 504.0, treated and used onsite. This change makes the document internally and externally consistent and uniform.
Referenced Standards:	

WE-Stand 2017 – (Chapter 6, 601.1, 603.0 – 608.0, Tables 603.4.1, 606.2.1, 606.2.3) Item # 126

Name:	Josh Jacobs
Organization:	UL
Recommendation:	Revise text
Section Number:	601.1, 603.0-608.0, Tables 603.4.1, 606.2.1, 606.2.3
Proposed Text:	**CHAPTER 6** **~~NONPOTABLE~~ RAINWATER CATCHMENT SYSTEMS** **601.1 Scope.** The provisions of this chapter shall apply to the construction, alteration, and repair of ~~non-potable~~ rainwater catchment systems. **603.0 Potable Rainwater Catchment Systems.** **603.1 System Design.** Potable rainwater catchment systems complying with this appendix shall be designed by a person registered, licensed, or deemed competent by the Authority Having Jurisdiction to perform potable rainwater catchment system design work. **603.2 Permit.** It shall be unlawful for any person to construct, install, or alter, or cause to be constructed, installed, or altered any potable rainwater catchment systems in a building or on a premise without first obtaining a permit to do such work from the Authority Having Jurisdiction. **603.2.1 Plumbing Plan Submission.** No permit for any rainwater catchment system requiring a permit shall be issued until complete plumbing plans, with appropriate data satisfactory to the Authority Having Jurisdiction, have been submitted and approved. No changes or connections shall be made to either the rainfall catchment or the potable water system within any site containing a rainwater catchment water system without approval by the Authority Having Jurisdiction. **603.2.2 System Changes.** No changes or connections shall be made to either the rainwater catchment system or the potable water system within any site containing a rainwater catchment system requiring a permit without approval by the Authority Having Jurisdiction. **603.3 Product and Material Approval.** **603.3.1 Component Identification.** System components shall be properly identified as to the manufacturer. **603.3.2 Plumbing Materials and Systems.** Pipe, pipe fittings, traps, fixtures, material, and devices used in a potable rainwater system shall be listed or labeled (third-party certified) by a listing agency (accredited conformity assessment body) and shall comply with the approved applicable recognized standards referenced in this standard and the plumbing code, and shall be free from defects. Unless otherwise provided for in this standard, all materials, fixtures, or devices used or entering into the construction of plumbing systems, or parts thereof, shall be submitted to the Authority Having Jurisdiction for approval. [UPC:301.2] **603.4 Maintenance and Inspection.** Potable rainwater catchment systems and components shall be inspected and maintained in accordance with Section 603.4.1 through Section 603.4.3. **603.4.1 Frequency.** Potable rainwater catchment systems and components shall be inspected and maintained in accordance with Table 603.4.1 unless more frequent inspection and maintenance is required by the manufacturer. **603.4.2 Maintenance Log.** A maintenance log for potable rainwater catchment systems shall be maintained by the property owner and be available for inspection. The property owner or designated appointee shall ensure that a record of testing, inspection and maintenance as required by Table 603.4.1 is maintained in the log. The log will indicate

	the frequency of inspection, and maintenance for each system. A record of the required water quality tests shall be retained for not less than 2 years. **603.4.3 Maintenance Responsibility.** The required maintenance and inspection of potable rainwater catchment systems shall be the responsibility of the property owner, unless otherwise required by the Authority Having Jurisdiction. **603.5 Operation and Maintenance Manual.** An operation and maintenance manual for potable rainwater catchment systems shall be supplied to the building owner by the system designer. The operating and maintenance manual shall include the following: (1) Detailed diagram of the entire system and the location of all system components. (2) Instructions on operating and maintaining the system. (3) Details on maintaining the required water quality as determined by the Authority Having Jurisdiction. (4) Details on deactivating the system for maintenance, repair, or other purposes. (5) Applicable testing, inspection and maintenance frequencies as required by Table 603.4.1. (6) A method of contacting the manufacturer(s). **603.6 Minimum Water Quality Requirements.** The minimum water quality for all potable rainwater catchment systems shall meet the applicable water quality requirements as determined by the Authority Having Jurisdiction. In the absence of water quality requirements, the guidelines EPA/625/R-04/108 contains recommended water reuse guidelines to assist regulatory agencies develop, revise, or expand alternate water source water quality standards. **603.7 Material Compatibility.** In addition to the requirements of this appendix, potable rainwater catchment systems shall be constructed of materials that are compatible with the type of pipe and fitting materials and water conditions in the system. **603.8 System Controls.** Controls for pumps, valves, and other devices that contain mercury that come in contact with the water supply are prohibited. **604.0 Connection.** **604.1 General.** No water piping supplied by a potable rainwater catchment system shall be connected to any other source of supply without the approval of the Authority Having Jurisdiction, Health Department or other department having jurisdiction. [UPC:602.4] **604.2 Connections to Public or Private Potable Water Systems.** Potable rainwater catchment systems shall have no direct connection to any public or private potable water supply or alternate water source system. Potable water from a public or private potable water system shall be permitted to be used as makeup water to the rainwater storage tank provided the public or private potable water supply connection is protected by an airgap or reduced-pressure principle backflow preventer in accordance with the plumbing code. **604.3 Backflow Prevention.** The potable rainwater catchment system shall be protected against backflow in accordance with the plumbing code. **605.0 Potable Rainfall Catchment System Materials.** **605.1 Collections Surfaces.** The collection surface for potable applications shall be constructed of a hard, impervious material and shall be approved for potable water use. Roof coatings, paints, and liners shall comply with NSF Protocol P151. **605.1.1 Prohibited.** Roof paints and coatings with lead, chromium, or zinc are prohibited. Wood roofing material and lead flashing are prohibited. **605.2 Rainwater Catchment System Drainage Materials.** Gutters and downspouts used in rainwater catchment drainage systems shall comply with NSF Protocol P151, and leaders and conductors shall be listed to NSF 61.

605.3 Storage Tanks. Rainwater storage shall be in accordance with Section 606.5.

605.4 Water Supply and Distribution Materials. Potable rainwater supply and distribution materials shall be in accordance with the requirements of the plumbing code for potable water supply and distribution systems.

606.0 Design and Installation.

606.1 Collection Surfaces. Rainwater shall be collected from roof or other cleanable aboveground surfaces specifically designed for rainwater catchment. Rainwater catchment system shall not collect rainwater from:

(1) Vehicular parking surfaces.

(2) Surface water runoff.

(3) Bodies of standing water.

606.1.1 Prohibited Discharges. Overflows, condensate, and bleed-off pipes from roof-mounted equipment and appliances shall not discharge onto roof surfaces that are intended to collect rainwater.

606.2 Minimum Water Quality. Upon initial system startup, the quality of the water for the intended applications shall be verified at the point(s) of use, as determined by the Authority Having Jurisdiction in accordance with Section 606.2.1 and Section 606.2.2. Water quality maintenance shall be according to Section 606.2.3.

606.2.1 Private Potable Water System. In the absence of water quality requirements determined by the Authority Having Jurisdiction, the minimum water quality for a private potable water system at the point of use shall comply with Table 606.2.1.

606.2.2 Public Use Occupancies. The minimum water quality for a potable water system for public use occupancies at the point of use and testing procedures shall comply with the Environmental Protection Agency (EPA) Safe Drinking Water Act for a public water system.

606.2.3 Maintenance. Normal system maintenance shall require system testing every 3 months in accordance with Table 606.2.3. Upon failure of the fecal coliform test, system shall be re-commissioned involving cleaning, and retesting in accordance with section 606.2.

606.3 Water Quality Devices and Equipment. Devices and equipment used to treat rainwater to maintain the minimum water quality requirements determined by the Authority Having Jurisdiction shall be listed or labeled (third-party certified) by a listing agency (accredited conformity assessment body) and approved for the intended application.

606.3.1 Filtration Devices. Potable water filters shall comply with NSF 53 and shall be installed in accordance with manufacturer's instructions.

606.3.2 Disinfection Devices. Chlorination, ozone, and ultraviolet or other disinfection methods shall be approved by an Authority Having Jurisdiction, or the product shall be listed according to a microbiological reduction performance standard for drinking water used to treat harvested rainwater to meet the required water quality permitted. The disinfection devices and systems shall be installed in accordance with the manufacturer's installation instructions and the conditions of listing. Disinfection devices and systems shall be located downstream of the water storage tank.

606.3.3 Filtration and Disinfection Systems. Filtration and disinfection systems shall be located after the water storage tank. Where a chlorination system is installed, it shall be installed upstream of filtration systems. Where ultraviolet disinfection system is installed, a filter not greater than 5 microns (5 µm) shall be installed upstream of the disinfection system.

606.4 Overhanging Tree Branches and Vegetation. Tree branches and vegetation shall not be located over the roof or other aboveground rainwater collection surface. Where existing tree branch and vegetation growth extends over the rainwater collection surface, it shall be removed as required in Section 603.4.

606.5 Rainwater Storage Tanks. Rainwater storage tanks shall be installed in accordance with Section 606.5.1 through Section 606.5.7.

606.5.1 Construction. Rainwater storage tanks shall be constructed of solid, durable materials not subject to excessive corrosion or decay and shall be watertight. Storage tanks or storage tank liners and coatings shall be listed to NSF 61 and approved by the Authority Having Jurisdiction for potable water applications, provided such tanks comply with approved applicable standards.

606.5.2 Location. Rainwater storage tanks shall be installed above or below grade.

606.5.2.1 Above Grade. Above grade storage tanks shall be of an opaque material, approved for aboveground use in direct sunlight, or shall be shielded from direct sunlight. Tanks shall be installed in an accessible location to allow for inspection and cleaning. The tank shall be installed on a foundation or platform that is constructed to accommodate all loads in accordance with the building code.

606.5.2.2 Below Grade. Rainwater storage tanks installed below grade shall be structurally designed to withstand all anticipated earth or other loads. Holding tank covers shall be capable of supporting an earth load of not less than 300 pounds per square foot (lb/ft^2) (1465 kg/m^2) when the tank is designed for underground installation. Below grade rainwater tanks installed underground shall be provided with manholes. The manhole opening shall be a minimum diameter of 20 inches (508 mm) and located not less than 4 inches (102 mm) above the surrounding grade. The surrounding grade shall be sloped away from the manhole. Underground tanks shall be ballasted, anchored, or otherwise secured, to prevent the tank from floating out of the ground when empty. The combined weight of the tank and hold down system should meet or exceed the buoyancy force of the tank.

606.5.3 Drainage and Overflow. Rainwater storage tanks shall be provided with a means of draining and cleaning. The overflow drain shall not be equipped with a shutoff valve. The overflow outlet shall discharge as required by the plumbing code for storm drainage systems. Where discharging to the storm drainage system, the overflow drain shall be protected from backflow of the storm drainage system by a backwater valve or other approved method.

606.5.3.1 Overflow Outlet Size. The overflow outlet shall be sized to accommodate the flow of the rainwater entering the tank and not less than the aggregate cross-sectional area of the inflow pipes.

606.5.4 Opening and Access Protection.

606.5.4.1 Animals and Insects. Rainwater tank openings to the atmosphere shall be protected to prevent the entrance of insects, birds, or rodents into the tank.

606.5.4.2 Human Access. Rainwater tank access openings exceeding 12 inches (305 mm) in diameter shall be secured to prevent tampering and unintended entry by either a lockable device or other approved method.

606.5.4.3 Exposure to Sunlight. Rainwater tank openings shall not be exposed to direct sunlight.

606.5.5 Inlets. A device or arrangement of fittings shall be installed at the inlet of the tank to prevent rainwater from disturbing sediment as it enters the tank.

606.5.6 Primary Tank Outlets. The primary tank outlet shall be located not less than 4 inches (102 mm) above the bottom of the tank, or shall be provided with floating inlet to draw water from the cistern just below the water surface.

606.5.7 Storage Tank Venting. Where venting by means of drainage or overflow piping is not provided or is considered insufficient, a vent shall be installed on each tank. The vent shall extend from the top of the tank and terminate a minimum of 6 inches (152 mm) above grade and shall be a minimum of 1 ½" (38 mm) in diameter. The vent terminal shall be directed downward and covered with a 3/32 inch (2.4 mm) mesh screen to prevent the entry of vermin and insects.

606.6 Pumps. Pumps serving rainwater catchment systems shall be listed for potable water use. Pumps supplying water to water closets, urinals, and trap primers shall be capable of delivering not less than 15 pounds-force per square inch (psi) (103 kPa) residual pressure at the highest and most remote outlet served. Where the water pressure in the rainwater supply system within the building exceeds 80 psi (552 kPa), a pressure reducing valve reducing the pressure to 80 psi (552 kPa) or less to water outlets in the building shall be installed in accordance with the plumbing code.

606.7 Roof Drains. Primary and secondary roof drains, conductors, leaders, overflows, and gutters shall be designed and installed as required by the plumbing code.

606.8 Freeze Protection. Tanks and piping installed in locations subject to freezing shall be provided with an adequate means of freeze protection.

606.9 Roof Washer or Pre-Filtration System. Collected rainwater shall pass through a roof washer or pre-filtration system before the water enters the rainwater storage tank. Roof washer systems shall comply with Section 606.9.1 through Section 606.9.4.

606.9.1 Size. The roof washer shall be sized to direct a sufficient volume of rainwater containing debris that has accumulated on the collection surface away from the storage tank. The ARCSA/ASPE 63 Standard contains additional guidance on acceptable methods of sizing roof washers.

606.9.2 Debris Screen. The inlet to the roof washer shall be provided with a debris screen or other approved means that protects the roof washer from the intrusion of debris and vermin. Where the debris screen is installed, the debris screen shall be corrosion resistant and shall have openings no larger than ½ of an inch (12.7 mm).

606.9.3 Drain Discharge. Water drained from the roof washer or pre-filter shall be diverted away from the storage tank and discharged to a disposal area that does not cause property damage or erosion. Roof washer drainage shall not drain over a public way.

606.9.4 Automatic Drain. Roof washing systems shall be provided with an automatic means of self draining between rain events.

606.10 Roof Gutters. Gutters shall maintain a minimum slope and be sized in accordance with the plumbing code.

606.11 Drains, Conductors, and Leaders. The design and size of rainwater drains, conductors, and leaders shall be in accordance with the plumbing code.

606.12 Size of Potable Water Piping. Potable rainwater system distribution piping shall be sized in accordance with the plumbing code for sizing potable water piping.

607.0 Cleaning.

607.1 General. The interior surfaces of tanks and equipment shall be clean before they are put into service.

608.0 Supply System Inspection and Test. Rainwater catchment systems shall be inspected and tested in accordance with the applicable provisions of the plumbing code for testing of potable water and storm drainage systems. Storage tanks shall be filled with water to the overflow opening for a period of 24 hours and during inspection or by other means as approved by the Authority Having Jurisdiction. All seams and joints shall be exposed during inspection and checked for water tightness.

Table 603.4.1
Minimum Potable Rainwater Catchment System
Testing, Inspection and Maintenance Frequency

Description	Minimum Frequency

Inspect and clean filters and screens, and replace (if necessary)	Every 3 months
Inspect and verify that disinfection, filters and water quality treatment devices and systems are operational. Perform any water quality tests as required by the Authority Having Jurisdiction.	In accordance with the manufacturer's instructions, and the Authority Having Jurisdiction.
Perform applicable water quality tests to verify compliance with Section 606.2.	Every 3-months
Perform a water quality test for E. Coli, Total Coliform, and Heterotrophic bacteria. For a system where 25 different people consume water from the system over a 60 day period, a water quality test for cryptosporidium shall also be performed.	After initial installation and every 12 months thereafter, or as directed by the Authority Having Jurisdiction.
Inspect and clear debris from rainwater gutters, downspouts, and roof washers.	Every 6 months
Inspect and clear debris from roof or other aboveground rainwater collection surface.	Every 6 months
Remove tree branches and vegetation overhanging roof or other aboveground rainwater collection surface.	As needed
Inspect pumps and verify operation.	After initial installation and every 12 months thereafter.
Inspect valves and verify operation.	After initial installation and every 12 months thereafter.
Inspect pressure tanks and verify operation.	After initial installation and every 12 months thereafter.
Clear debris and inspect storage tanks, locking devices, and verify operation.	After initial installation and every 12 months thereafter.
Inspect caution labels and marking.	After initial installation and every 12 months thereafter.

TABLE 606.2.1
MINIMUM WATER QUALITY

Escherichia coli (fecal coliform):	Non-detectable
Protozoan Cysts:	Non-detectable
Viruses:	Non-detectable
Turbidity:	<0.3 NTU

TABLE 606.2.3
MINIMUM SYSTEM MAINTENANCE REQUIREMENTS

Escherichia coli (fecal coliform):	Non-detectable
Turbidity:	<0.3 NTU

(Delete Appendix A in its entirety)

Problem Statement:	Insert text currently in Appendix A from A101.2 – A106.0. With the issues of severe drought in many areas of not only North America, but the globe, why would we restrict this standards requirements for rainwater catchment systems to only nonpotable ones in the required part of the standard? A good point to start the discussion is currently listed in Appendix A, why not move it into the body of the standard and start the discussion around potable rainwater catchment - its positive impacts and potential issues.
Referenced Standards:	NSF 53; EPA/625/R-04/108; NSF Protocol P151, NSF 61

Note: NSF 53 and NSF 61 meet the requirements for mandatory referenced standards in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Note: EPA/625/R-01/108 and NSF Protocol P151 was not developed via an open process having a published development procedure in accordance with Section 15.2 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	601.2
Proposed Text:	**601.2 System Design.** Rainwater catchment systems shall be designed in accordance with this chapter by a person registered, ~~or~~ licensed, or deemed competent ~~to perform plumbing design work or who demonstrates competency~~ to design rainwater catchment systems as required by the Authority Having Jurisdiction. Components, piping, and fittings used in any rainwater catchment systems shall be listed. **Exceptions:** (1) A person registered or licensed to perform plumbing design work is not required to design rainwater catchment systems used for irrigation with a maximum storage capacity of 5 000 ~~360~~ gallons (~~1363~~ 18 927 L) where the tank is supported directly upon grade and the ratio of height to width (or diameter) does not exceed 2 to 1. (2) A person registered or licensed to perform plumbing design work is not required to design rainwater catchment systems for single family dwellings where all outlets, piping, and system components are located on the exterior of the building.
Problem Statement:	Rational: The specific skills needed to install most non-potable rainwater catchment systems for irrigation are predominately landscape irrigation (the irrigation system) or roofing (if gutters are altered) type of work, not plumbing work. Landscape contractors install a lot more rainwater catchment systems than do plumbing contractors. This requirement in 601.2 should be general to allow for the local experts from whatever field to be able to install the systems. The language I'm suggesting is consistent with the potable rainwater catchment system appendix from this code. Rational: 360 gallons is very small, this water would be used up in a less than week to irrigate a 1,000 square foot lawn during the summer. There is no real difference in the complexity or design of a 360 gallon system versus a 5,000 gallons system, so long as the tank is stable on a stable foundation. By using the 5,000 gallons number this code would be consistent with most existing codes for water storage- no permit is needed so long as the tank is under 5,000 gallons. This would also be consistent with California's rainwater code. Chapter 17 of the CA Plumbing Code provided for reference.
Referenced Standards:	

WE-Stand 2017 – (601.3) Item # 128

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	601.3
Proposed Text:	**601.3 Permit.** It shall be unlawful for any person to construct, install, alter, or cause to be constructed, installed, or altered any rainwater catchment system in a building or on a premises without first obtaining a permit to do such work from the Authority Having Jurisdiction. Exceptions: (1) A permit is not required for exterior rainwater catchment systems used for outdoor drip and subsurface irrigation with a maximum storage capacity of 5 000 ~~360~~ gallons (~~1363~~ 18 927 L) where the tank is supported directly upon grade and the ratio of height to width (or diameter) does not exceed 2 to 1 and it does not require electrical power or a make-up water supply connection. (2) A plumbing permit is not required for rainwater catchment systems for single family dwellings where all outlets, piping, and system components are located on the exterior of the building. This does not exempt the need for permits if required for electrical connections, tank supports, or enclosures.
Problem Statement:	Rational: Exempting permits from systems with the tanks smaller than 5,000 gallons would be consistent with most codes for water storage tanks as well as California's rainwater code. If the tank is stable, upon grade, and doesn't require power or make-up water it is a very safe and low-risk system and thus should not require permits. Chapter 17 of the CPC supplied for reference.
Referenced Standards:	

WE-Stand 2017 – (601.5.2) Item # 129

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Delete text
Section Number:	601.5.2
Proposed Text:	~~**601.5.2 Maintenance Log.** A maintenance log for rainwater catchment systems is required to have a permit in accordance with Section 601.3 and shall be maintained by the property owner and be available for inspection. The property owner or designated appointee shall ensure that a record of testing, inspection and maintenance as require by Table 601.5 is maintained in the log. The log will indicate the frequency of inspection and maintenance for each system.~~ (renumber remaining sections)
Problem Statement:	Rational: This is an onerous requirement. There is no evidence a maintenance log is needed and this would only encourage unpermitted systems. There are no similar requirements for other home systems, that could have many more potential health risks, for example drinking water wells, septic systems, swimming pools, or hot tubs.
Referenced Standards:	

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	601.7
Proposed Text:	**601.7 Minimum Water Quality Requirements.** The minimum water quality for rainwater catchment systems shall meet the applicable water quality requirements for the intended application as determined by the Authority Having Jurisdiction. Water quality for non-potable rainwater catchment systems shall comply with Section 605.9.4. **Exceptions:** (1) Water treatment is not required for rainwater catchment systems used for spray ~~aboveground~~ irrigation with a maximum storage capacity of 360 gallons (1363 L). (2) Water treatment is not required for rainwater catchment systems used for non-spray ~~subsurface or drip~~ irrigation.
Problem Statement:	Rational: This should specify spray irrigation to avoid confusion from regulators that may interpret drip irrigation as requiring treatment, even though it says below that drip does not require treatment- it is a form of above ground irrigation.
Referenced Standards:	

WE-Stand 2017 – (602.4) Item # 131

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	602.4
Proposed Text:	**602.4 Connections to Potable or Reclaimed (Recycled) Water Systems.** Rainwater catchment systems shall have no unprotected direct connection to any potable water supply or alternate water source system. Potable or reclaimed (recycled) water shall be permitted to be used as makeup water for a rainwater catchment system provided the potable or reclaimed (recycled) water supply connection is protected by an airgap or reduced-pressure principle backflow preventer in accordance with the plumbing code.
Problem Statement:	Rational: In other sections of this code reduced pressure principal devices are allows. It should be clarified throughout the code that unprotected direct connections are not allowed.
Referenced Standards:	

WE-Stand 2017 – (602.7.4.1) Item # 132

Name:	Neal Shapiro, Chairman
WE-Stand Task Group:	Rainwater Catchment Systems Task Group
Recommendation:	Add text
Section Number:	602.7.4.1
Task Group Recommendation:	**602.7.4.1 Prohibited Material**. The use of algaecide treated bitumen shingles and any other similar materials, which are capable of killing beneficial biofilm and causing slime pit in storage tanks, as a collection surface shall be prohibited for nonpotable and potable beneficial uses.
Problem Statement:	Prohibit harvesting, impermeable surfaces involved in nonpotable water systems to prevent harm to beneficial biofilms and other microbiological systems.
Referenced Standards:	

WE-Stand 2017 – (602.9.2) Item # 133

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	602.9.2
Proposed Text:	**602.9.2 Deactivation and Drainage for Cross-connection Test.** Where any portion of a rainwater catchment system is installed within a building, ~~T~~the rainwater catchment system and the potable water system within the building shall be provided with the required appurtenances (e.g., valves, air or vacuum relief valves, etc.) to allow for deactivation or drainage as required for cross-connection test in Section 601.11.2.
Problem Statement:	Rational: Including this qualifier makes it more clear when a cross-connection test is required. Without it the section could be interpreted as all systems require testing.
Referenced Standards:	

WE-Stand 2017 – (602.9.3.3) Item # 134

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	602.9.3.3
Proposed Text:	**602.9.3.3 Prohibited Discharges.** Overflows and bleed-off pipes from roof-mounted equipment and appliances shall not discharge onto roof surfaces that are intended to collect rainwater without prior approval from the Authority Having Jurisdiction.
Problem Statement:	Rational: In other sections of this same standard some of this water is allowed to be reused, under specified conditions (Section 411.4 Evaporative Cooler Water Use and 412.0 Condensate Recovery) so it seems like there may be instances where using this water could be combined with a rainwater system.
Referenced Standards:	

WE-Stand 2017 – (602.9.4) Item # 135

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	602.9.4
Proposed Text:	**602.9.4 Minimum Water Quality.** The minimum water quality for harvested rainwater shall meet the applicable water quality requirements for the intended applications as determined by the Authority Having Jurisdiction. In the absence of water quality requirements determined by the Authority Having Jurisdiction, the minimum treatment and water quality shall also comply with Table 602.9.4. **Exception:** No treatment is required for rainwater used for non-spray ~~subsurface or non-sprinkled surface i~~rrigation where the maximum storage volume is less than 5 000 ~~360~~ gallons (~~1363~~ 18 727 L).
Problem Statement:	Rational: 360 gallons is very small, this water would be used up in a less than week to irrigate a 1,000 square foot lawn during the summer. Requiring treatment for a system over 360 gallons is onerous and unnecessary. 5,000 gallons would be used in 10 weeks on a 1,000 square foot lawn.
Referenced Standards:	

WE-Stand 2017 – (602.9.4.1) Item # 136

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Delete text
Section Number:	602.9.4.1
Proposed Text:	~~**602.9.4.1 Maintenance.** Non-potable water shall be tested every 12 months and a record of the test results shall be maintained by the system owner for a period of two (2) years.~~ (renumber remaining sections)
Problem Statement:	This is an unreasonable requirement, increasing the cost of maintaining the system, and inconsistent with regulations of any similar system (drinking water wells, septic systems, etc.). Additionally, a once a year test will not provide much information since the water quality in the tank will change day to day and week to week.
Referenced Standards:	

WE-Stand 2017 – (602.11.1) Item # 137

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	602.11.1
Proposed Text:	**602.11.1 Supply System Inspection and Test.** Rainwater catchment systems shall be inspected and tested in accordance with the applicable provisions of the plumbing code for testing of potable water and storm drainage systems. When required by the Authority Having Jurisdiction, indoor storage tanks shall be filled with water to the overflow opening. ~~Storage tanks shall be filled with water to the overflow opening for a period of 24 hours and during inspection or by other means as approved by the Authority Having Jurisdiction.~~ All seams and joints shall be exposed during inspection and checked for water tightness.
Problem Statement:	Rational: It is unreasonable to require tanks to be filled. These systems are designed to conserve water and are often installed in drought-stricken regions, with water rationing in effect. Filling a 10,000 gallons tank could be damaging to the local water supply. Since the overflow will only be overflowing during times of rain, when everything is wet, this requirement is silly for all outdoor tank installations. A visual inspection of the overflow should be able to determine if it was installed properly, and the only risk would be a small leak, which would only occur doing active rain when everything is wet anyway.
Referenced Standards:	

WE-Stand 2017 – (602.11.2) Item # 138

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	602.11.2
Proposed Text:	**602.11.2 Annual Cross-Connection Inspection and Testing.** Where there is the potential for cross-connection, ~~A~~an initial ~~and subsequent annual~~ inspection and test shall be performed on both the potable and rainwater catchment system. Subsequent cross-connection testing shall be conducted in accordance with local regulations. The potable and rainwater catchment system shall be isolated from each other and independently inspected and tested to ensure there is no cross-connection in accordance with Section 602.11.2.1 through Section 602.11.2.4.
Problem Statement:	Not all systems have potential for cross-connection so this should be clarified. Frequency of future cross-connection testing should be left up to the authority having jurisdiction.
Referenced Standards:	

WE-Stand 2017 – (602.11.2.1) Item # 139

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	602.11.2.1
Proposed Text:	**602.11.2.1 Visual System Inspection.** Prior to commencing the cross-connection testing, a dual system inspection shall be conducted by the Authority Having Jurisdiction ~~and other authorities having jurisdiction~~ as follows: (1) Meter locations of the rainwater and potable water lines shall be checked to verify that no modifications were made~~,~~ and that no cross-connections are visible. (2) Pumps and equipment, equipment room signs, and exposed piping in equipment room shall be checked. (3) Valves shall be checked to ensure that valve lock seals are still in place and intact. Valve control door signs shall be checked to verify that no signs have been removed.
Problem Statement:	• It is implied that throughout this standard, the Authority Having Jurisdiction may include subsequent authorities having jurisdiction depending on the application. • If 'and other authorities having jurisdiction' is desired to be left in the text, it should also be used throughout the rest of this standard for consistency. • Punctuation correction. No comma needed.
Referenced Standards:	

Staff Note: Similar language is found in: 501.11.2.1, 503.5, 504.5, 602.5, 602.11.2.2

WE-Stand 2017 – (602.11.2.2) Item # 140

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	602.11.2.2
Proposed Text:	**602.11.2.2 Cross-Connection Test.** The procedure for determining cross-connection shall be followed by the applicant in the presence of the Authority Having Jurisdiction ~~and other authorities having jurisdiction~~ to determine whether a cross-connection has occurred as follows: (1) The potable water system shall be activated and pressurized. The rainwater catchment system shall be shut down, depressurized, and drained. (2) The potable water system shall remain pressurized for a minimum period of time specified by the Authority Having Jurisdiction while the rainwater catchment system is empty.
Problem Statement:	• It is implied that throughout this standard, the Authority Having Jurisdiction may include subsequent authorities having jurisdiction depending on the application. • If 'and other authorities having jurisdiction' is desired to be left in the text, it should also be used throughout the rest of this standard for consistency. • If 'and other authorities having jurisdiction' is desired to be left in the text, it must be added to (2) for consistency: The potable water system shall remain pressurized for a minimum period of time specified by the Authority Having Jurisdiction or other authorities having jurisdiction while the rainwater catchment system is empty.
Referenced Standards:	

Staff Note: Similar language is found in: 501.11.2.1, 503.5, 504.5, 602.5, 602.11.2.1

WE-Stand 2017 – (602.11.2.4) Item # 141

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Delete text
Section Number:	602.11.2.4
Proposed Text:	~~**602.11.2.4 Annual Inspection.** An annual inspection of the rainwater catchment system, following the procedures listed in Section 602.11.2.1 shall be required. Annual cross-connection testing, following the procedures listed in Section 602.11.2.2 shall be required by the Authority Having Jurisdiction, unless site conditions do not require it. In no event shall the test occur less than once in 4 years. Alternate testing requirements shall be approved by the Authority Having Jurisdiction.~~
Problem Statement:	Requiring all rainwater systems to be inspected annually is an onerous requirement and inconsistent with other similar systems (drinking water wells, septic systems, swimming pools, hot tubs, etc.). This requirement would deter legal installations. Local jurisdictions will require cross-connection testing if needed based on other regulations, as well as section 602.11.2 of this same standard.
Referenced Standards:	

Staff Note: Similar language found in Section 501.11.2.4.

WE-Stand 2017 – (702.6) Item # 142

Name:	Tim Keane
Organization:	Legionella Risk Management, Inc.
Recommendation:	Revise text
Section Number:	702.6
Proposed Text:	**702.6 Hard Water.** Where water has hardness equal to or exceeding 9 grains per gallon (gr/gal) (154 mg/L) measured as total calcium carbonate equivalents, the water supply line to water heating equipment in new one- and two family dwellings shall be roughed-in to allow for the installation of water treatment equipment. Water softener shall be capable of delivering an adjustable amount of unsoftened water from 0% to 20% of total softened water blended in with the soft water outlet stream
Problem Statement:	100% softened water is very corrosive to all metals including lead and copper by eliminating calcium and magnesium which are natural corrosion inhibitors and replacing them with sodium. Allowing a certain amount of hardness to bypass the softener reduces corrosion rates and makes showering more comfortable. The amount of softener regenerations and subsequent salt usage is directly proportional to the volume of water softened. If for every gallon of water used only 80% is softened then backwashing water volume and salt consumption is reduced by 20%.
Referenced Standards:	

Name:	Gary Morgan
Organization:	Viega LLC
Recommendation:	Revise text
Section Number:	702.7.1
Proposed Text:	**702.7.1 Maximum Length / Volume of Hot Water in a Branch.** The maximum length of a branch between and source of hot water and the fixture fitting shall not exceed 15 feet or the volume shall not exceed 24 oz. Water heaters, recirculation loops and electrically heat traced pipe shall be considered sources of hot water. Where a fixture fitting shut off valve (supply stop) is installed ahead of the fixture fitting, the maximum length is measured between the source of hot water and the fixture fitting shut off valve (supply stop). **Exceptions**: 1. Where a design layout of a parallel or induced re-circulation loop is used, the maximum length of a branch that is designed to induce flow parallel to a main recirculation system when there is no fixture demanding hot water shall not be subject to the length and internal volume limits. 2. Where a design layout of a series branch is used, branches that incorporate two or more flow-through style fittings as the final connection to a fixture fitting shut off valve shall not exceed 25 foot (7670 m) or the volume shall not exceed 40 ounces (1183 ml). 3. Where a design layout of a series ring is used, branches that incorporate flow-through style fittings as the final connection to a fixture fittings shut off valve and that are piped to provide multiple paths from a recirculation system, but do not experience continuous flow without fixture demand shall not exceed 50 feet (15 240 mm) or the volume shall not exceed 80 ounces (2366 ml). (Renumber existing exceptions 1. and 2. to 4. and 5. respectively)
Problem Statement:	Flow-through style fittings should be considered and even promoted in this code for use in hot and cold water distribution systems to effectively and economically reduce or eliminate dead leg pipe runs to fixtures which can otherwise promote the growth of legionella type bacteria and create water waste while purging tepid water from the dead branch. A fixture shut off valve is attached directly to the flow-through style fitting serving the end-use device. 1. Flow-through fittings can be utilized along with a venturi, valve, or other pressure manipulating device to create secondary recirculation loops that operate in parallel to a primary recirculation loop. These secondary loops, because they have constantly flowing hot water, are also considered a source of hot water. (this principle has been used for years with heating and cooling water) 2. Flow-through fittings can be used to plumb fixtures in series branch (daisy chaining) and use of a fixture draws fresh hot water through other fixture's fittings. Plumbing fixtures in series leads to a more efficient overall system, but may require physically longer branches by a factor of the spacing between the fixtures. 3. Flow-through fittings can be used to plumb fixtures into a series ring (with 2 flow paths to the same hot water source). Water flows along the path of least resistance and any fixture used will bring fresh hot water to each other fixture in the loop. These designs are inherently safer and more efficient and should not be subject to the same limitations as a dead-leg branches. See separate pictorial document illustrating these three different design layouts utilizing flow-through fittings. Illustrations provided as reference.
Referenced Standards:	

WE-Stand 2017 – (703.4.5.2) Item # 144

Name:	Tim Keane
Organization:	Legionella Risk Management, Inc.
Recommendation:	Revise text
Section Number:	703.4.5.2
Proposed Text:	**703.4.5.2 Outlet Temperature Controls.** Temperature controlling means shall be provided to limit the maximum temperature of water delivered from lavatory faucets in high use public facility restrooms to 110°F (43°C). ~~[ASHRAE 90.1:7.4.4.3]~~
Problem Statement:	The growing rate of opportunistic pathogen outbreaks in plumbing systems is simple math. When average pipe diameters (a) are constant and the total amount of pipe lengths in a building (b) are constant in most buildings and increasing dramatically in health care facilities due to many more sinks and showers (4b) and the water use (z) is cut drastically by low flow restrictors then the math is clear the age of water stored in the building (c) is multiplied in proportion to the reduction in flow restriction 4X and increase in fixture count 4X in healthcare. This 4X to 16X or greater increase in water aging in a building water system directly impacts disinfectant residuals. This dramatic reduction in flow rates at fixtures directly impact water velocity in piping, and according this dramatic increase in water aging and decrease in water velocity results in dramatic increase in Legionella growth rate potential. Equally important is temperature. 110F is the best temperature for culturing Legionella. Every 10F temperature rise above 110F reduces in half the potential for Legionella growth. The initial public lavatory codes were good ones recommending lower temperature and flow in areas of high use. The original ASHRAE 90.1 version 1989 states, Public lavatory faucets are those intended for the unrestricted use of more than one individual in assembly occupancies, business occupancies, public buildings, transportations facilities etc." This was based on EPA NAECA code. This lower temperature and lower flow in public facility restrooms that are not used many times a day pose a high risk EPA NAECE provided for reference.
Referenced Standards:	

Name:	Tim Keane
Organization:	Legionella Risk Management, Inc.
Recommendation:	Revise text
Section Number:	703.4.5.2
Proposed Text:	**703.4.5.2 Outlet Temperature Controls.** Temperature controlling means shall be provided to limit the maximum temperature of water delivered from lavatory faucets in public facility restrooms to ~~110°F (43°C)~~ 115°F (46°C). ~~[ASHRAE 90.1:7.4.4.3]~~
Problem Statement:	The growing rate of opportunistic pathogen outbreaks in plumbing systems is simple math. When average pipe diameters (a) are constant and the total amount of pipe lengths in a building (b) are constant in most buildings and increasing dramatically in health care facilities due to many more sinks and showers (4b) and the water use (z) is cut drastically by low flow restrictors then the math is clear the age of water stored in the building (c) is multiplied in proportion to the reduction in flow restriction 4X and increase in fixture count 4X in healthcare. This 4X to 16X or greater increase in water aging in a building water system directly impacts disinfectant residuals. This dramatic reduction in flow rates at fixtures directly impact water velocity in piping, and according this dramatic increase in water aging and decrease in water velocity results in dramatic increase in Legionella growth rate potential. Equally important is temperature. 110F is the best temperature for culturing Legionella. Every 10F temperature rise above 110F reduces in half the potential for Legionella growth. Raising the temperature limit just 5 degrees to 115F would be a significant reduction in risk and could provide significant water and energy savings. Many hospitals to meet risk management requirements will flush to drain these low flow low temperature faucets as much as 20 minutes or longer per day to reduce the risk of Legionnaires' disease.
Referenced Standards:	

Name:	Tim Keane
Organization:	Legionella Risk Management, Inc.
Recommendation:	Revise text
Section Number:	704.1
Proposed Text:	**704.1 Softening and Treatment.** Where water has hardness equal to or exceeding 10 gr/gal (171 mg/L) measured as total calcium carbonate equivalents, the water supply line to water heating equipment and the circuit of boilers shall be softened or treated to prevent accumulation of lime scale and consequent reduction in energy efficiency. Water softener shall be capable of delivering an adjustable amount of unsoftened water from 0% to 25% of total softened water blended in with the soft water outlet stream
Problem Statement:	100% soft water is corrosive to equipment. Allowing a certain amount of hardness in the water reduces corrosion rates and makes showering more comfortable. An additional benefit is if 25% of the makeup water is not softened then backwash rates are reduced by 25% and salt consumption is reduced by 25%.
Referenced Standards:	

Name:	Donald Summers, Chairman
WE-Stand Task Group:	Installer Qualifications Task Group
Recommendation:	Add text
Section Number:	802.1.1
Task Group Recommendation:	**802.1.1 Certifications.** The following certifications demonstrate competency according to the specified qualification. (1) ASSE/IAPMO/ANSI Series 5000-2015 Cross-Connection Control Professional Qualifications Standard (2) ASSE/IAPMO/ANSI Series 10000-2010 Professional Qualifications for Green Plumbing Systems Installers (3) G-Pro Green Professional Building Skills Training (4) ARCSA Rain Catchment Qualifications for Installers
Problem Statement:	The G-Pro certification (http://gpro.urbangreencouncil.org/) is a general introductory tool to the green profession and does not train installers. The applicable G-Pro programs are the Fundamentals and Plumbing. The task group raised the question whether or not general and introductory certifications were within the scope of WEStand or if the certifications need to be specific for the installers of the various systems within WEStand (e.g. Gray Water Installer Certification, Rainwater Catchment Installer Certification, Composting Toilet Installer Certification, Landscape Irrigation Installer Certification, etc.). The ARCSA Rain Catchment Qualifications is under development. The task group declined the idea of developing such qualifications themselves, but rather would recommend ASSE to develop qualification standards for the various systems in WEStand. ASSE would need to consider if developing such standards makes good business sense and would need to assess if there is an industry need and support of such certifications. ASSE could develop the particular installer qualification where the industry believes the standard is required.
Referenced Standards:	ASSE Series 5000 and ASSE Series 10000

Note: ASSE/IAPMO/ANSI Series 5000 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Note: ASSE/IAPMO/ANSI Series 10000 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Note: The ARCSA Rain Catchment Qualifications is under development.

WE-Stand 2017 – (Table 901.1) Item # 148

<table>
<tr><td>Name:</td><td>Angel Guzman, Colleen O'Brien</td></tr>
<tr><td>Organization:</td><td>The American Society of Mechanical Engineering (ASME)</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Recommendation:</td><td>Revise text</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Section Number:</td><td>Table 901.1</td></tr>
<tr><td>Proposed Text:</td><td>
<table>
<tr><th colspan="3">Table 901.1
Referenced Standards</th></tr>
<tr><th>STANDARD NUMBER-YEAR</th><th>STANDARD TITLE</th><th>REFERENCED SECTION</th></tr>
<tr><td>ASME A112.19.3/CSA B45.4-2008 <u>(R2013)</u></td><td>Stainless Steel Plumbing Fixtures</td><td>402.3.1</td></tr>
<tr><td>ASME A112.19.19-2006 <u>(R2011)*</u></td><td>Vitreous China Nonwater Urinals</td><td>402.3.1</td></tr>
</table>
(portions of table not shown remain unchanged)
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<tr><td>Problem Statement:</td><td>The above revisions reflect the latest updates to the ASME standards that are referenced in Table 901.1.</td></tr>
<tr><td>Referenced Standards:</td><td></td></tr>
</table>

Note: ASME A112.19.3/CSA B45.4-2008 (R2013) and ASME A112.19.19-2006 <u>(R2011)</u> meet the requirements for a mandatory reference standard in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (Table 901.1) Item # 149

<table>
<tr><td>Name:</td><td>Kim Wagoner</td></tr>
<tr><td>Organization:</td><td>U.S. Environmental Protection Agency,
Office of Wastewater Management (4204) (EPA)</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Recommendation:</td><td>Revise text</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Section Number:</td><td>Table 901.1</td></tr>
<tr><td>Proposed Text:</td><td>
<table>
<tr><th colspan="3">Table 901.1
Referenced Standards</th></tr>
<tr><th>STANDARD NUMBER-YEAR</th><th>STANDARD TITLE</th><th>REFERENCED SECTION</th></tr>
<tr><td>~~EPA/625/R-04/108-2004~~ EPA/600/R-12/618-2012</td><td>Guidelines for Water Reuse</td><td>501.7, A 101.7</td></tr>
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(portions of table not shown remain unchanged)
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<tr><td>Problem Statement:</td><td>The above revision reflects the latest update to the EPA standard that is referenced in Table 901.1.</td></tr>
<tr><td>Referenced Standards:</td><td></td></tr>
</table>

Note: The EPA/600/R-12/618 does not meet the requirements for a mandatory reference standard in accordance with Section 15.2 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (Table 901.1) Item # 150

Name:	Jeremy Brown
Organization:	NSF International (NSF)
Recommendation:	Revise text
Section Number:	Table 901.1
Proposed Text:	**Table 901.1 Referenced Standards** **STANDARD NUMBER-YEAR** / **STANDARD TITLE** / **REFERENCED SECTION** NSF 58-~~2013~~* 2014 / Reverse Osmosis Drinking Water Treatment Systems / 406.3 NSF 61-~~2012~~* 2014a / Drinking Water Systems Components – Health Effects / A 104.5.1 (portions of table not shown remain unchanged)
Problem Statement:	The above revisions reflect the latest updates to the NSF standards that are referenced in Table 901.1
Referenced Standards:	

Note: NSF 58-2014 and NSF 61-2014a meet the requirements for a mandatory reference standard in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (Table 901.1) Item # 151

<table>
<tr><td>Name:</td><td>IAPMO Staff</td></tr>
<tr><td>Organization:</td><td></td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Recommendation:</td><td>Add text</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Section Number:</td><td>Table 901.1</td></tr>
<tr><td>Proposed Text:</td><td>
<table>
<tr><th colspan="3">Table 901.1
Referenced Standards</th></tr>
<tr><th>STANDARD NUMBER-YEAR</th><th>STANDARD TITLE</th><th>REFERENCED SECTION</th></tr>
<tr><td>ASHRAE 90.2-2007</td><td>Energy Efficient Design of Low-Rise Residential Buildings</td><td>702.2, 702.4</td></tr>
</table>
(portions of table not shown remain unchanged)
</td></tr>
<tr><td>Problem Statement:</td><td>To add the ASHRAE Standard to Table 901.1</td></tr>
<tr><td>Referenced Standards:</td><td></td></tr>
</table>

Note: ASHRAE 90.2-2007 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	Table A 101.5.1

Proposed Text:

Table A 101.5.1
Minimum Potable Rainwater Catchment System
Testing, Inspection and Maintenance Frequency

Description	Minimum Frequency
~~Perform applicable water quality tests to verify compliance with Section 606.2.~~	~~Every 3-months~~
~~Perform a water quality test for E. Coli, Total Coliform, and Heterotrophic bacteria. For a system where 25 different people consume water from the system over a 60 day period, a water quality test for cryptosporidium shall also be performed.~~	~~After initial installation and every 12 months thereafter, or as directed by the Authority Having Jurisdiction.~~

(portions of table not shown remain unchanged)

Problem Statement:

Rational: proposal is to remove lines 3 and 4 from the table- the rest of the table to remain unchanged, This table already contains a requirement to inspect and verify that disinfection, filter and water quality treatment devices and systems are operational, and to perform any water quality tests as required by the AHJ. Since testing is expensive and doesn't ensure the system is functioning well since the quality of the incoming water can change day to day, requiring this testing adds an unfair burden on rainwater system owners and doesn't make the systems safer. Drinking water well owners do not have similar requirements. In addition, there may be differences in the local requirements for public vs. private water systems so this code should not attempt to differentiate and regulate the supplies differently. The AHJ will apply local regulations for rainwater systems providing water for more people/homes. Lastly, some of the testing required is illogical- heterotrophic bacteria are harmless but could indicate the potential for other bacteria to grow, such as E.Coli. As stated by the National Primary Drinking Water Regulations established by the U.S. EPA a "lower concentration of heterotrophic bacteria in the drinking water is linked to a better maintenance of the treatment and distribution systems." According to these regulations, treatment techniques should aim to control HPC concentrations in surface waters and groundwaters influenced by surface waters to less than 500 CFU/mL (using standard methods). Note: "This is not a health-based standard, but reflects the concern that at concentrations above 500 CFU/mL, heterotrophic bacteria can interfere with some total coliform and E. coli recovery methods." - See more at: http://www.moldbacteriaconsulting.com/bacteria/heterotrophic-plate-count-what-is-hpc-and-when-is-the-right-time-to-use-it.html#sthash.T3DRwAah.dpuf

Referenced Standards:

WE-Stand 2017 – (A 101.5.2) Item # 153

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	A 101.5.2
Proposed Text:	**A 101.5.2 Maintenance Log.** A maintenance log for potable rainwater catchment systems should ~~shall~~ be maintained by the property owner ~~and be available for inspection~~. The property owner or designated appointee should ~~shall~~ ensure that a record of testing, inspection and maintenance as required by Table A 101.5.1 is maintained in the log. The log will indicate the frequency of inspection, and maintenance for each system. ~~A record of the required water quality tests shall be retained for not less than 2 years.~~
Problem Statement:	This should be encouraged, but not required. There is no similar requirement for well owners, or septic system owners, or hot-tub owners, etc. These other systems require upkeep and maintenance and it is the system owners responsibility. Rainwater Catchment systems should be regulated constantly with other similar systems, otherwise this regulation puts an unequal burden on rainwater system owners.
Referenced Standards:	

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	A 101.7
Proposed Text:	**A 101.7 Minimum Water Quality Requirements.** The minimum water quality for all potable rainwater catchment systems shall meet the applicable water quality requirements for a drinking water well as a water supply as determined by the Authority Having Jurisdiction. In the absence of water quality requirements, the guidelines EPA/625/R-04/108 contains recommended water reuse guidelines to assist regulatory agencies develop, revise, or expand alternate water source water quality standards.
Problem Statement:	Potable rainwater systems should be regulated for water quality consistent for requirements for drinking water wells in the jurisdiction.
Referenced Standards:	EPA/625/R-04/108

Note: The EPA/625/R-04/108 does not meet the requirements for a mandatory reference standard in accordance with Section 15.2 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (A 103.2, A104.5.1, Table 901.1) Item # 155

Name:	Josh Jacobs
Organization:	UL
Recommendation:	Revise text
Section Number:	A 103.2 and A 104.5.1, Table 901.1
Proposed Text:	**A 103.2 Rainwater Catchment System Drainage Materials.** Gutters and downspouts used in rainwater catchment drainage systems shall comply with NSF Protocol P151, and leaders and conductors shall be listed to NSF 61 and NSF 372. **A 104.5.1 Construction.** Rainwater storage tanks shall be constructed of solid, durable materials not subject to excessive corrosion or decay and shall be watertight. Storage tanks or storage tank liners and coatings shall be listed to NSF 61 and NSF 372 and approved by the Authority Having Jurisdiction for potable water applications, provided such tanks comply with approved applicable standards.
Problem Statement:	With the change to the Safe Drinking Water Act that took effect on January 4, 2014 regarding maximum lead content it would be appropriate to include listing to NSF 372 to help ensure that all products used for potable use do not contain potential harmful levels of lead.
Referenced Standards:	NSF 372-2011

TABLE 901.1
REFERENCED STANDARDS

STANDARD NUMBER-YEAR	STANDARD TITLE	REFERENCED SECTION
NSF-372 2011	Drinking Water System Components – Lead Content	A 103.2, A 104.5.1

(portions of table not shown remain unchanged)

Note: NSF 61 and NSF 372 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Note: NSF Protocol P151 was not developed via an open process having a published development procedure in accordance with Section 15.2 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (Table A 104.2.1) Item # 156

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Delete text
Section Number:	Table A 104.2.1
Proposed Text:	**TABLE A 104.2.1** **MINIMUM WATER QUALITY** Escherichia coli (fecal coliform): Non-detectable ~~Protozoan Cysts:~~ ~~Non-detectable~~ ~~Viruses:~~ ~~Non-detectable~~ Turbidity: <0.3 NTU
Problem Statement:	Testing for protozoan cysts and viruses is incredibly expensive and won't ensure the water system is safe. This regulation should require the use of adequate filtration and disinfection to ensure the water is safe, and NOT require any testing of cysts or viruses. There are over 300,000 types of viruses that infect mammals, and at least 12 common human waterborne disease viruses. Just to test for 2 highly common viruses, norovirus and enterovirus, would cost around $2,5000 per sample. Common cysts- giardia and cryptosporidium cost over $500 per sample. Any treatment system should be certified to remove these viruses and cysts.
Referenced Standards:	

WE-Stand 2017 – (A 104.2.3) Item # 157

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Delete text
Section Number:	A 104.2.3
Proposed Text:	~~**A 104.2.3 Maintenance.** Normal system maintenance shall require system testing every 3 months in accordance with Table A 104.2.3. Upon failure of the fecal coliform test, system shall be re-commissioned involving cleaning, and retesting in accordance with section A104.2.~~
Problem Statement:	Rational: After initial testing the maintenance and monitoring should be left to the system owner. There are no similar requirements for owners of drinking water wells and to place more testing requirements on a rainwater systems owner places an unfair burden upon them. They SHOULD be required to upkeep their filtration and disinfection system, which would prevent potential issues with water quality. Testing every 3 months, or annually, is not helpful or necessary.
Referenced Standards:	

Staff note. This will also delete Table A104.2.3. As such this proposal should be heard at the same time with Item #158.

WE-Stand 2017 – (Table A 104.2.3) Item # 158

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Delete table
Section Number:	TABLE A 104.2.3
Proposed Text:	~~**TABLE A 104.2.3 MINIMUM SYSTEM MAINTENANCE REQUIREMENTS**~~ ~~Escherichia coli (fecal coliform):~~ ~~Non-detectable~~ ~~Turbidity:~~ ~~<0.3 NTU~~
Problem Statement:	Rational: There are already requirements to upkeep the filtration and disinfection system, which ensures the safety of the water to drink. Drinking water wells do not require annual water quality testing- it is up to the well owner to maintain the system adequately. Rainwater systems should be regulated the same, otherwise it places an unfair burden on rainwater system owners. Additionally, annual testing does nothing to ensure the water quality is good, the quality changes frequently (any time a bird flies over and poops on the roof) and so the emphasis should be on installing and educating the user on how to maintain the water treatment system.
Referenced Standards:	

WE-Stand 2017 – (A 104.3.1) Item # 159

Name:	Laura Allen
Organization:	Greywater Action
Recommendation:	Revise text
Section Number:	A 104.3.1
Proposed Text:	**A 104.3.1 Filtration Devices.** Potable water filters shall comply with NSF 53 and shall be installed in accordance with manufacturer's instructions. A minimum of 2 inline filters, one 5 micron filter followed by one 0.5-1 micron filter shall be installed prior to the disinfection system.
Problem Statement:	Rational: Rather than requiring expensive testing for viruses and cysts the code should require filters and disinfection that will remove them to ensure the long-term potable quality of the water.
Referenced Standards:	

Note: NSF53-2014 meets the requirements for a mandatory reference standard in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

WE-Stand 2017 – (A 104.6) Item # 160

Name:	Cambria McLeod
Organization:	Kohler
Recommendation:	Revise text
Section Number:	A 104.6
Proposed Text:	**A 104.6 Pumps**. Pumps serving rainwater catchment systems shall be listed for potable water use. Pumps supplying water to water closets, urinals, and trap primers shall be capable of delivering not less than ~~15 pounds-force per square inch (psi) (103 kPa)~~ the minimum residual pressure required by ~~at~~ the highest and most remote outlet served. Where the water pressure in the rainwater supply system within the building exceeds 80 psi (552 kPa), a pressure reducing valve reducing the pressure to 80 psi (552 kPa) or less to water outlets in the building shall be installed in accordance with the plumbing code.
Problem Statement:	Per ASME A112.19.2, the testing requirements for products, specifically flushometer water closets, are such that the residual pressure is higher than 15psi. In the interest of clarity, consistency and product performance, the system should be designed to accommodate the relevant fixture requirements. (Provided for reference: ASME A112.19.2 UPDATE, Table 5.)
Referenced Standards:	

Name:	IAPMO Staff – Update Extracts
Recommendation:	Revise text
Section Number:	B 101.1 – B 101.4
Proposed Text:	**B 101.0 Vacuum Drainage Systems.** **B 101.1 General.** This section regulates the design and installation provisions for vacuum waste drainage systems. Plans for vacuum waste drainage systems shall be submitted to the Authority Having Jurisdiction for approval and shall be considered an engineered designed system. Such plans shall be prepared by a registered ~~or licensed person~~ design professional to perform plumbing design work. Details are necessary to ensure compliance with the requirements of this section, together with a full description of the complete installation including quality, grade of materials, equipment, construction, and methods of assembly and installation. Components, materials, and equipment shall comply with Section 302.1 or approved by the Authority Having Jurisdiction and other national consensus standards applicable to plumbing systems and materials. Where such standards and specifications are not available, alternate materials and equipment shall be approved in accordance with Section 102.0. [UPC C ~~7.1~~ 501.0] **B 101.2 System Design.** Vacuum waste drainage systems shall be designed and installed in accordance with the manufacturer's installation instructions. A vacuum waste drainage system shall include a vacuum generating system, waste collection center, piping network, vacuum valve, and control components used to isolate the vacuum piping network from atmospheric pressure and to collect waste at its point of origin. Where a vacuum system provides the only means of sanitation, duplicate vacuum generating equipment set to operate automatically shall be installed to allow the system to continue in operation during periods of maintenance. [UPC C ~~7.2~~ 501.2] **B 101.2.1 Vacuum Generating System.** The vacuum generating station shall include vacuum pumps to create a constant vacuum pressure within the piping network and storage tanks. The discharge from the tank shall be through an air gap in accordance with the plumbing code. Operation of pumps, collection tanks, and alarms shall be automated by controls. The vacuum pumps shall be activated on demand and accessible for repair or replacement. The vent from the vacuum pump shall be provided for vacuum pump air exhaust, and shall be of a size capable of handling the total air volume of the vacuum pump. [UPC C ~~7.2.1~~ 501.2.1] **B 101.2.2 Waste Collection Center or Storage Tanks.** Vacuum collection center or storage tanks shall be of such capacity as to provide storage of waste to prevent fouling of the system. Such collection or storage tank shall be capable of withstanding 150 percent of the rated vacuum (negative pressure) created by the vacuum source without leakage or collapse. Waste collection center or storage tanks shall be accessible for adjustment, repair, or replacement. [UPC C ~~7.2.2~~ 501.2.2] **B 101.2.3 Piping Network.** The piping network shall be under a continuous vacuum and shall be designed to withstand 150 percent of the vacuum (negative pressure) created by the vacuum source within the system without leakage or collapse. Sizing the piping network shall be in accordance with the manufacturer's instructions. The water closet outlet fitting shall connect with a piping network having not less than a 1½ inch (40 mm) nominal inside diameter. [UPC C ~~7.2.3~~ 501.2.3] **B 101.2.4 Vacuum Interface Valve.** A closed vacuum interface valve shall be installed to separate the piping network vacuum from atmospheric pressure. A control device shall open

	the vacuum interface valve where a signal is generated to remove waste from the plumbing fixture. [UPC C ~~7.2.4~~ 501.2.4] **B 101.2.5 Control Components.** Where a pneumatic signal is generated at the controller, a vacuum from the system to open the extraction valve shall be designed to operate where vacuum pressure exists to remove the accumulated waste. Each tank shall incorporate a level indicator switch that automatically controls the discharge pump and warns of malfunction or blockage as follows: (1) Start discharge. (2) Stop discharge. (3) Activate an audible alarm where the level of effluent is usually high. (4) Warning of system shutdown where tank is full. [UPC C ~~7.2.5~~ 501.2.5] **B 101.3 Fixtures.** Fixtures utilized in a vacuum waste drainage system shall comply with Section 302.1. Components shall be of corrosion resistant materials. The water closet outlet shall be able to pass a 1 inch (25.4 mm) diameter ball and shall have a smooth, impervious surface. The waste outlet and passages shall be free of obstructions, recesses, or chambers that are capable of permitting fouling. The mechanical valve and its seat shall be of such materials and design to provide a leak-free connection where at atmospheric pressure or under vacuum. The flushing mechanism shall be so designed as to ensure proper cleansing of the interior surfaces during the flushing cycle at a minimum operating flow rate. Mechanical seal mechanisms shall withdraw completely from the path of the waste discharge during flushing operation. Each mechanical seal vacuum water closet shall be equipped with a listed vacuum breaker. The vacuum breaker shall be mounted with the critical level or marking not less than 1 inch (25.4 mm) above the flood-level rim of the fixture. Vacuum breakers shall be installed on the discharge side of the last control valve in the potable water supply line and shall be located so as to be protected from physical damage and contamination. [UPC C ~~7.3~~ 501.3] **B 101.4 Drainage Fixture Units.** Drainage fixture units shall be determined by the manufacturer's instructions. The pump discharge load from the collector tanks shall be in accordance with this appendix. [UPC C ~~7.4~~ 501.4] **B 101.5 Water Supply Fixture Units.** Water supply fixture units shall be determined by the manufacturer's instructions. [UPC C ~~7.5~~ 501.5] **B 101.6 Materials.** Materials used for water distribution pipe and fittings shall be in accordance with the plumbing code. Materials used for aboveground drainage shall be in accordance with the plumbing code and shall have a smooth bore, and be constructed of non-porous material. [UPC C ~~7.6~~ 501.6] **B 101.7 Traps and Cleanouts.** Traps and cleanouts shall be installed in accordance with the plumbing code. [UPC C ~~7.7~~ 501.7] **B 101.8 Testing.** The entire vacuum waste system shall be subjected to a vacuum test of 29 inches of mercury (98 kPa) or not less than the working pressure of the system for 30 minutes. The system shall be gastight and watertight at all points. Verification of test results shall be submitted to the Authority Having Jurisdiction. [UPC C ~~7.8~~ 501.8] **B 101.9 Manufacturer's Instructions.** Manufacturer's instructions shall be provided for the purpose of providing information regarding safe and proper operating instructions whether or not as part of the condition of listing in order to determine compliance. Such instructions shall be submitted and approved by the Authority Having Jurisdiction. [UPC C ~~7.9~~ 501.9]
Problem Statement:	The above sections have been revised to correlate with the Uniform Plumbing Code (latest version) in accordance with the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard (Extract Guidelines)
Referenced Standards:	

WE-Stand 2017 – (Appendix C, Table 901.1) Item # 162

Submitter:	Josh Jacobs
Organization:	UL
Recommendation:	Add text
Section Number:	Appendix C, Table 901.1

Proposed Text:

Appendix C Product Environmental Impact Transparency

C 101.0 Environmental Product Declarations.

C 101.1 General. This Appendix details how the use of environmental product declarations (EPD) can be utilized in understanding the environmental impact of products throughout their life cycle.

C 101.2 Eligible Products. Any permanently installed product or material that touches or utilizes water for use in a building. Any non-permanently installed product that utilizes or touches water in its intended use.

C 101.3 Environmental Product Declarations. All EPDs shall be consistent with ISO 14025 and ISO 21930, with at least a cradle to gate scope.

C 101.3.1 Industry-Wide Declaration. A Type III industry-wide declaration shall be a program operator explicitly recognizes the EPD as representative of the product group on a national level. The manufacturer of the product submitting the industry-wide EPD shall be explicitly recognized participant in its development by the program operator.

C 101.3.2 Product-Specific Declaration. A Type III product-specific declaration shall be manufacturer specific for a product family.

TABLE 901.1
REFERENCED STANDARDS

STANDARD NUMBER-YEAR	STANDARD TITLE	REFERENCED SECTION
ISO 14025	Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures	C 101.3
ISO 21930	Sustainability in building construction -- Environmental declaration of building products	C 101.3

(portions of table not shown remain unchanged)

Problem Statement:

Ensuring our water is conserved is a very important, but small part of the overall picture that needs to be looked at when thinking of our water systems as sustainable. What if a product helps an end user conserve water, but is potentially adding to eutrophication during its manufacturing process...is that truly a sustainable product? The demand for transparency is expanding in response to new green government and commercial procurement policies. Many organizations are now conducting life cycle assessments on many of their products, not necessarily only to understand the environmental impacts, but mostly to understand good business practices. Many of these life cycle assessments are not public information as they are very detailed and contain proprietary information that manufacturers do not want in the public. Environmental Product Declarations though are a way to 'translate' this

	invaluable environmental impact information into an understandable, easier to digest, and useable form. The demand for transparency is expanding in response to new green government and commercial procurement policies by including this tool at least in the appendix of this standard, we will be showing that we understand the needs of the end user and the trends of the marketplace. We would also be providing a valuable educational tool for some who want this information but do not know how to get it.
Referenced Standards:	ISO 14025 and ISO 21930

Note: ISO 14025 and ISO 21930 meets the requirements for a mandatory referenced standard in accordance with Section 15.0 of the Regulations Governing Consensus Development of the Water Efficiency and Sanitation Standard.

Staff note: An electronic copies will be forthcoming or a hard copies will be available to the WE-Stand Technical Committee for review at the April 4-5, 2016 WE-Stand TC Meeting.

Name:	Mathew Lippincott, Chairman
WE-Stand Task Group:	Composting Toilets Task Group
Recommendation:	Add Text
Section Number:	Informative Appendix C - Draft
Task Group Recommendation:	**Composting Toilet Inspection Checklist** This checklist is intended for use to prepare for an inspection. This is only a general list and is not intended to address all possible conditions. References are to the 2017 WE Stand Code. **All Parts** ☐ All parts that are expected to contact leachate or diverted urine are listed or labeled by a listing agency, or approved by AHJ in the design. (WE Stand 403.3) ☐ All components expected to contact excreta or leachate shall be constructed of corrosion resistant material such as stainless steel or durable polymers (ABS, PVC Schedule 40, Polypropylene, High-density polyethylene, Fiber-reinforced polyester, or material of equivalent durability) (403.8.1) ☐ Concrete construction shall be reinforced, watertight and able to withstand loading weight. Where drainage is required, the processor floor shall be sloped not less than ¼-inch per foot. The flange of each sub-drain shall be set level. (403.8.2) **Operation & Maintenance Manual** ☐ An owners manual is on site and accessible to the inspector and includes the following 7 parts: (1) Schedule for addition of necessary compost additives. (2) Source or provider of necessary compost additives. Source may be on-site. (3) Schedule and instructions for all regular maintenance tasks. (4) Expected input of and capacity for excreta and compost additives to compost toilet system specifying loading of commode(s) and compost processor(s). (5) Plan for container transfer and cleaning where transfer is used. (6) Expected schedule for removing humus from composting processors and where used secondary composting bins. (7) Plan for on-site disposal of humus or professional removal. (403.7) **Commode** ☐ Commode can support users (403.8.3.1) ☐ If commode uses repurposed container for transporting excreta into compost processor, container meets third part listing by a listing agency, including US 49 CFR Section 178.274 Specifications for UN Portable Tanks. (403.3) **Compost Processors** ☐ Leachate collection, recirculation or evaporation system is installed as designed. See Leachate Storage Tank section for corresponding checklist (403.8.4.1). ☐ Where unfinished excreta or diverted urine is transferred between processors or from commode to processor, transfer and cleaning materials are accessible as described in the owner's manual (403.8.4.3).

	☐ Commodes connected to compost processor without a trap shall maintain negative ventilation (403.8.4.8) If compost processor is not connected to the commode no vent is required (403.8.4.8). ☐ Vent stacks terminate at exterior of the building as required by the plumbing or mechanical code (403.8.4.8.1). ☐ Compost processer is rodent proof. No unsecured opening other than vents, drainage, or commode may exceed ½-inch in the least dimension (403.8.4.5). ☐ Compost in compost processor is installed in a location that has a daily average temperature of at least 42°F (6°C) (403.8.4.6). ☐ Compost processor is large enough to contain material for a minimum of one year, unless the system is designed with a shorter retention time following 403.8.4.6, and a secondary compost area designated. ☐ If secondary composting is used, the area must be labeled and protected from human contact, surface water and precipitation (403.8.4.7). ☐ The compost processor is sized in accordance with the installation plan (403.8.4.9). ☐ Compost Processors passes water tightness test by filling the system to the maximum designed liquid storage capacity of the unit for a duration of 24 hours (403.8.5.1). **Leachate Storage Tanks (if present)** ☐ If pressure equalization vents are specified in the design, they are installed as designed. (403.8.4.1.1.1) ☐ The connection of storage tank vents to the plumbing venting system shall be six inches above the flood level rim of the highest fixture. (403.8.4.1.1) ☐ Vents extending to the outdoor shall terminate no less than 12-inches above grade. (403.8.4.1.1) ☐ The vent terminal shall be directed downward and covered with a 3/32 inch mesh screen to prevent the entry of vermin and insects. (403.8.4.1.1) ☐ Where storage tank overflows are installed they shall be connected to the plumbing drainage system. (403.8.4.1.2) ☐ Storage tank overflows shall be provided with a backwater valve or check valve at the point of connection to the plumbing drainage system when connected to a public sewer system. The backwater valve shall be accessible for inspections and maintenance. (403.8.4.1.2.1) ☐ Leachate storage tanks shall be constructed of polyethylene terephthalate (PET), polyethylene napthalate (PEN), polyamide (Nylon) or a blend of PET, PEN, ethyl vinyl alcohol (EVOH), Nylon, HDPE, or other tanks listed or certified to US 49 CFR Section 178.274 Specifications for UN Portable Tanks. (403.8.4.1.3) ☐ Above grade storage tanks are prohibited where subject to freezing conditions, or shall be provided with an adequate means of freeze protection. The above grade leachate storage tank shall be provided with a high-water alarm. The alarm shall report when 80 percent volume is reached (403.8.4.1.4). ☐ Where openings are provided to allow a person to enter the tank, the opening is marked "DANGER-CONFINED SPACE." (403.8.4.1.6) ☐ All openings are covered and secured to prevent tampering. Openings shall be screened or covered to prevent rodent infiltration and be protected against unauthorized human entry (403.8.4.1.7). **Below Grade Leachate storage tanks** (403.8.4.1.5). ☐ if present are designed to withstand all anticipated earth or other loads. ☐ Tank covers shall be capable of supporting an earth load of not less than 300 pounds per square foot (lb/ft^2) (1465 kg/m^2). ☐ Tank has manholes. ☐ The manhole opening's minimum diameter is 20 inches (508 mm)

	☐ Manhole is located a minimum of 4 inches (102 mm) above the surrounding grade. ☐ The surrounding grade shall be sloped away from the manhole. ☐ Underground tanks shall be ballasted, anchored, or otherwise secured, to prevent the tank from floating out of the ground when empty. ☐ The combined weight of the tank and hold down system should meet or exceed the buoyancy force of the tank. ☐ The below grade leachate storage tank level shall be provided with a high-water alarm. **Outputs** ☐ Owner or operator has a lab identified to conduct biological testing of finished processor output on hand. If system has been in operation for one treatment period, owner should have on hand moisture and fecal coliform/gram results (403.8.5.2). (should be within X levels.) **Urine Diversion System** ☐ All materials: Material used for urine diversion shall be stainless steel or non-metallic pipe. Concrete piping is prohibited (403.9.2). ☐ Urine diversion piping is identifiable (403.9.3). ☐ Changes in direction of urine diversion piping shall be made by a long-sweep 90 degree fitting or other approved fittings of equivalent sweep (403.9.4). ☐ Pipe sizes are in accordance with the approved system design (403.9.5). ☐ Fixtures discharging into urine diversion piping connected to the plumbing drainage system shall be trapped and vented according to the plumbing code (403.9.6). ☐ Urine diversion piping is installed at a minimum grade of ½- inch per foot, or 4 percent toward the point of disposal (403.9.7). ☐ A urine-diversion system diverts urine to a storage tank or an approved plumbing drainage system (403.9.10). ☐ Every urine diversion system shall have a maintenance plan that includes both a pumpout schedule and contract, or an onsite discharge plan. The maintenance plan shall also include a pipe cleaning schedule (403.9.12). **Urine Diversion System Cleanouts** ☐ Cleanouts installed at each aggregate horizontal change of direction exceeding 135 degrees (403.9.8). ☐ A cleanout provided at the upper terminal of each drain line every 50 feet (403.9.8). **Vent Cleanouts** ☐ Commode fixtures connected directly to compost processor(s) without traps require ventilation and are connected to either a dry toilet ventilation stack or a urine diversion ventilation stack (403.9.9). ☐ Nonwater urinals used as urine diversion systems shall be connected to a dry toilet ventilation stack or a urine diversion ventilation stack (403.9.9) **Urine Storage Tanks** (403.9.11.1 through Section 403.9.11.8) ☐ If vent is required for pressure equalization; vent shall extend above the top of the tank (403.9.11.1). ☐ The connection of storage tank vents to the plumbing venting system shall be six inches above the flood level rim of the highest fixture. (403.9.11.1 ☐ Outdoor vents end no less than 12-inches above grade (403.9.11.1) ☐ Vent terminal is directed downward and covered with a 3/32 inch mesh screen to prevent the entry of vermin and insects (403.9.11.1).

	☐ Pressure equalization vents that prevent nitrogen loss by the use of restrictions, or use of piping or tubing that is less than the minimum pipe diameter required in the plumbing code shall be approved by the Authority Having Jurisdiction (403.9.11.1.1). ☐ Urine storage tanks are constructed of polyethylene terephthalate (PET), polyethylene napthalate (PEN), polyamide 2017 WE-Stand Draft Document for Public Review Period October 1, 2015 - December 1, 2015 16 2017 WATER EFFICIENCY AND SANITATION STANDARD WATER EFFICIENCY AND CONSERVATION (Nylon) or a blend of PET, PEN, ethyl vinyl alcohol (EVOH), Nylon, HDPE, or other tanks listed or certified to US 49 CFR Section 178.274 Specifications for UN Portable Tanks (403.9.11.4). ☐ Maintenance plan is on hand and includes both a pumpout schedule and contract, or an onsite discharge plan. Maintenance plan should also include a pipe cleaning schedule (403.9.12). ☐ Above and Below Grade tank requirements that same as for composting toilet processors (403.9.11.5 and 403.9.11.6). **Urine Storage Tank Traps** ☐ Storage tank trap is installed as designed. Storage tank trap can be a P-trap, mechanical trap, submerged inlet piping, or other means approved by the Authority Having Jurisdiction. (403.9.11.2). Urine storage tanks of five gallons or less connected to fixtures with active ventilation or having an integrated seal do not require traps (403.9.11.2). ☐ If submerged inlet piping is used as trap, the inlet piping must remain submerged during use and after pumpout (403.9.11.2). **Urine Storage Tank Overflow** ☐ If storage tank overflows are installed they shall be connected to a plumbing drainage system (403.9.11.3). ☐ Storage tank overflows have a backwater valve or check valve at the point of connection to the plumbing drainage system when connected to a public sewer system (403.9.11.3.1). ☐ The backwater valve is accessible for inspections and maintenance (403.9.11.3.1).
Problem Statement:	The Composting Toilet Task Group presents to the TC a draft of an informative appendix for composting toilet and urine diversion systems. The informative appendix will serve as a checklist guide for inspections. The task group is looking to TC approval to move forward in finalizing the draft.
Referenced Standards:	

Name:	Dan Cole, IAPMO Staff Liaison
WE-Stand Task Group:	Pipe Size Task Group
Recommendation:	Add text
Section Number:	Appendix X – new Appendix
Task Group Recommendation:	**Appendix X** **Design of the Water Distribution System for Residential Dwellings with Efficient Plumbing Fixtures** **X 101.0 General.** **X 101.1 Applicability.** The intent of this appendix is to provide a method for sizing a water supply distribution system for single- and multi-family dwellings with efficient water-conserving plumbing fixtures, fixture fittings, and appliances. **X 102.0 Design Criteria** **X 102.1 Fixtures.** Plumbing fixtures, fixture fittings, and appliances shall not exceed the flow rate and flush volume in Table X 102.1. **X 102.2 Sizing Method**. The water distribution system shall be sized in accordance with Section X 102.2.1 through X 102.2. 5. **X 102.2.1 Meter, Building Supply and Branches.** The estimated design flow rate for the water meter, building supply, and branches shall be directly calculated using Equation X 102.2.1 and rounded to the nearest whole number. See [hyperlink] for a downloadable sizing calculator in Microsoft Office Excel file as seen in the sizing example below. The number of each kind of fixtures or fixture groups shall be counted in the spreadsheet. The flow rate (q) and probability (p) values for the Equation X 102.2.1 shall not exceed the design values in Table X 102.1 **X 102.2.2 Fixture Branches and Fixture Supplies**. The flow rate for one fixture branch and fixture supply shall be the design flow rate of the fixture using Table X 102.1. Where the maximum fixture flow rate is less than the design flow rate in Table X 102.1, the lesser flow rate shall be permitted. Where the demand calculated with Equation X 102.2.1 for a supply branch serving two fixture branches is greater than the sum of the two fixture's maximum flow rate, the sum shall be used for the supply branch flow rate. Rounding shall be to the nearest whole number. **X 102.2.3 Sizing for Velocity**. The estimated design flow rate for the building supply, branches and fixture supplies shall not exceed ten feet per second (10 ft/sec). Velocity limitations for the cold and hot water supply pipe diameters shall be applied to Table X 102.2.3 or shall be in accordance with the manufacturer's specifications for the type of pipe material. **X 102.2.4 Pressure Loss Due to Pipe Friction.** Pressure loss due to pipe friction shall be determined by accepted Engineering calculations. Accepted Engineering calculations include the Hazen-Williams and the Darcy-Weisbach formulae. **X 102.2.5 Continuous Supply Demand**. Continuous supply demands in gallons per minute (gpm) for lawn sprinklers, air conditioners, etc., shall be added to the total estimated demand for the Building Supply. **X 102.2.6 Other Fixtures**. Fixtures not included in Table X 102.1 shall have the design flow rate specified by the manufacturer. The p-value shall approximate the design p-value of a fixture having a similar frequency of use in Table X 102.1.

$$Q_{0.99} = \frac{1}{1-P_0}\left[\sum_{k=1}^{K} n_k p_k q_k + (z_{0.99})\sqrt{\left[(1-P_0)\sum_{k=1}^{K} n_k p_k (1-p_k) q_k^2\right] - P_0\left(\sum_{k=1}^{K} n_k p_k q_k\right)^2}\right]$$ (Equation X 102.2.1)

Where: $Q_{0.99}$ = estimated design flow rate (gpm) in the 99th percentile
q = design flow rate of an individual fixture (Table X 102.1)
n = number of fixtures of the same kind
K = number of distinct fixture groups (as listed in Table X 102.1)
p = probability of single fixture use (design p-value in Table X 102.1)
P_0 = probability of no flow given by $(1-p_1)^{n_1}(1-p_2)^{n_2}\cdots(1-p_K)^{n_K}$
$z_{0.99}$ = 99th percentile of the standard normal distribution (z = 2.33)

Table X 102.1
Design Parameters for Water-Conserving Plumbing Fixtures in Residential Occupancies

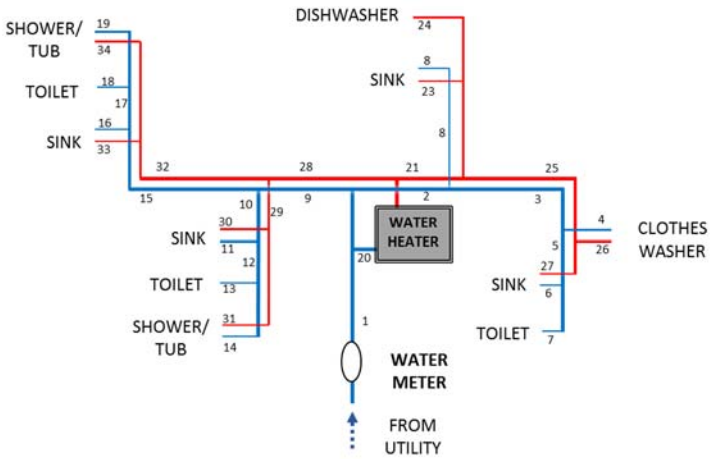
FIXTURE	DESIGN FLOW RATE (GPM)	DESIGN P-VALUE
Shower	2.0	0.025
Combination Tub/Shower	4.5	0.030
Tub Filler – Standard Standalone Bathtub[1]	7.0	0.005
Water Closet Gravity Tank – 1.28gpf	4.0	0.010
Lavatory Faucet	1.5	0.025
Kitchen Faucet	2.2	0.025
Dishwasher[2]	1.6	0.005
Clothes Washer[2]	4.5	0.050
Laundry Faucet (with aerator)	2.0	0.025
Bathroom Group – Lavatory, Water Closet, Combination Tub/Shower	7.0	0.065
Kitchen Group – Kitchen Faucet , Dishwasher	3.8	0.030

[1] For high-flow tub fillers, the design flow rate shall be determined by the fixture fitting flow rate specification. The high-flow tub fixture shall not be subject to a fixture-use probability to determine pipe size.
[2] Clothes Washers and dishwashers shall have an Energy Star label.

Table X 102.2.3
Maximum Flow Rate (gpm) for Pipe Diameters
(Smooth pipe – L-copper)

Maximum Flow Rate at 5 f/s						
3/8	**1/2**	**3/4**	**1**	**1 1/4**	**1 1/2**	**2**
2	4	8	13	20	28	48
Maximum Flow Rate at 8 f/s						
3/8	**1/2**	**3/4**	**1**	**1 1/4**	**1 1/2**	**2**
4	6	12	21	31	44	77
Maximum Flow Rate at 10 f/s						
3/8	**1/2**	**3/4**	**1**	**1 1/4**	**1 1/2**	**2**
5	7	15	26	39	55	97

Figure X 102.2 Example Illustrating the Sizing Method



Pipe Section	Flow Rate gpm	Pipe Diameter (nominal inches)
1	12	3/4
2	7	3/4
3	7	3/4
4	4.5	1/2
5	5	1/2
6	1.5	3/8
7	4	3/8
8	2.2	3/8
9	10	3/4
10	7	3/4
11	1.5	3/8
12	5	1/2
13	4	3/8
14	4.5	1/2
15	7	3/4
16	1.5	3/8
17	5	1/2
18	4	3/8
19	4.5	1/2
20	8	3/4
21	7	3/4
22	4	3/8
23	2	3/8
24	1.6	3/8
25	6	1/2
26	4.5	1/2
27	1.5	3/8
28	7	3/4
29	6	1/2
30	1.5	3/8
31	4.5	1/2
32	6	1/2
33	1.5	3/8
34	4.5	1/2

Sizing for Pipe Section 1 – Building Supply

Fixture type	n	p	q	npq	np(1-p)q^2	Po	
	Count	Probability	Flow rate gpm	Mean Flow gpm	Flow variance $(gpm)^2$	Prob. No flow	Max po
Shower	0	0.025	2.0	0.0000	0.0000	1.0000	
Tub/Shower Combo	0	0.030	4.5	0.0000	0.0000	1.0000	
Tub Filler - Stand alone Bathtub	0	0.005	7.0	0.0000	0.0000	1.0000	
Water Closet, Gravity Tank	1	0.010	4.0	0.0400	0.1584	0.9900	
Lavatory Faucet	1	0.025	1.5	0.0375	0.0548	0.9750	
Kitchen Sink Faucet	0	0.025	2.2	0.0000	0.0000	1.0000	
Dishwasher	0	0.005	1.6	0.0000	0.0000	1.0000	
Clothes washer	1	0.050	4.5	0.2250	0.9619	0.9500	
Laundry Sink Faucet	0	0.025	2.0	0.0000	0.0000	1.0000	
Bathroom Group	2	0.065	7.0	0.9100	5.9560	0.8742	
Kitchen Group	1	0.030	3.8	0.1140	0.4202	0.9700	
Total	**6**			**1.3265**	**7.5513**	**0.7776**	
			Busy time	**5.9646**	**6.2899**		
Z value	2.326						
Demand Q	**12**	**gpm**					

1. In the second column (n), list the number of bathroom groups and kitchen groups for the whole house. List additional fixtures that are not included in the groups. The spreadsheet will automatically calculate the demand (Q) for the Building Supply.
2. Add any continuous supply demands to the peak demand estimate.
3. Use Table X 102.2.3 to determine the pipe diameter. At 8 ft/sec, the pipe diameter for 12 gpm is ¾-inch.

Sizing for Pipe Section 2 – Cold Water Supply Branch

Fixture type	n	p	q	npq	np(1-p)q^2	Po	
	Count	Probability	Flow rate gpm	Mean Flow gpm	Flow variance $(gpm)^2$	Prob. No flow	Max po g
Shower	0	0.025	2.0	0.0000	0.0000	1.0000	
Tub/Shower Combo	0	0.030	4.5	0.0000	0.0000	1.0000	
Tub Filler - Stand alone Bathtub	0	0.005	7.0	0.0000	0.0000	1.0000	
Water Closet, Gravity Tank	1	0.010	4.0	0.0400	0.1584	0.9900	
Lavatory Faucet	1	0.025	1.5	0.0375	0.0548	0.9750	
Kitchen Sink Faucet	1	0.025	2.2	0.0550	0.1180	0.9750	
Dishwasher	0	0.005	1.6	0.0000	0.0000	1.0000	
Clothes washer	1	0.050	4.5	0.2250	0.9619	0.9500	
Laundry Sink Faucet	0	0.025	2.0	0.0000	0.0000	1.0000	
Bathroom Group	0	0.065	0.0	0.0000	0.0000	1.0000	
Kitchen Group	0	0.030	0.0	0.0000	0.0000	1.0000	
Total	**4**			**0.3575**	**1.2931**	**0.8941**	1
			Busy time	**3.3746**	**2.0245**		
Z value	2.326						
Demand Q	**7**	**gpm**					

1. In the second column (n), list the number of fixtures for the cold water supply for Pipe Section 2. The cold water supply at Pipe Section 2 serves (1) water closet, (1) lavatory faucet, (1) kitchen faucet, and (1) clothes washer. The spreadsheet will automatically calculate the demand (Q) for the cold water branch.
2. Use Table X 102.2.3 to determine the pipe diameter. At 8 ft/sec, the pipe diameter for 7 gpm is ¾-inch.

Sizing for Pipe Section 28 – Hot Water Supply Branch

Fixture type	n	p	q	npq	np(1-p)q^2	Po	
	Count	Probability	Flow rate gpm	Mean Flow gpm	Flow variance $(gpm)^2$	Prob. No flow	Max po g
Shower	0	0.025	2.0	0.0000	0.0000	1.0000	
Tub/Shower Combo	2	0.030	4.5	0.2700	1.1786	0.9409	
Tub Filler - Stand alone Bathtub	0	0.005	7.0	0.0000	0.0000	1.0000	
Water Closet, Gravity Tank	0	0.010	4.0	0.0000	0.0000	1.0000	
Lavatory Faucet	2	0.025	1.5	0.0750	0.1097	0.9506	
Kitchen Sink Faucet	0	0.025	2.2	0.0000	0.0000	1.0000	
Dishwasher	0	0.005	1.6	0.0000	0.0000	1.0000	
Clothes washer	0	0.050	4.5	0.0000	0.0000	1.0000	
Laundry Sink Faucet	0	0.025	2.0	0.0000	0.0000	1.0000	
Bathroom Group	0	0.065	0.0	0.0000	0.0000	1.0000	
Kitchen Group	0	0.030	0.0	0.0000	0.0000	1.0000	
Total	**4**			**0.3450**	**1.2882**	**0.8944**	1
			Busy time	**3.2684**	**2.6495**		
Z value	2.326						
Demand Q	**7**	**gpm**					

1. In the second column (n), list the number of fixtures for the hot water supply for Pipe Section 28. The hot water supply at Pipe Section 28 serves (2) combination tub and showers and (2) lavatory faucets. The spreadsheet will automatically calculate the demand (Q) for the hot water branch.

Use Table X 102.2.3 to determine the pipe diameter. At 8 ft/sec, the pipe diameter for 7 gpm is ¾-inch.

Problem Statement:

The computational method presented in Equation X 102.2.1 is the result of a task group five-year study reported in a peer-reviewed unpublished paper (provided upon request). The peer review affirmed the soundness of the statistical method. The input parameters for the equation are the number of fixtures (n), fixture flow rates (q), and the probability of fixture use (p). These parameters were derived from a large U.S. database for residential end use of water (Aquacraft,

	Inc.). A database comprising of over 1000 homes was specially developed for the purpose of querying probabilities and flow rates for various levels of fixture water efficiencies. The fixture probabilities and flow rates in Table X 102.1 are derived from queries for efficient fixture flow rates and probability of use during peak hours. Similar to the criterion used by Dr. Hunter, the estimated peak demand is the 99th percentile (Q_{99}) of all water demands expected at the residence during the design hour. The 99th percentile means there is only a one percent chance that the actual demand will exceed the design demand during the peak hour of water use in the residence. Exceeding the design demand in residential dwellings does not impose severity upon the plumbing system. The efficient fixtures are purposely designed for flows with low intensity and short duration. Exceeding the demand may slightly lengthen the flow duration or slightly reduce the flow rate at the fixture. These effects would probably be imperceptible to the user. The equation works efficiently in an Excel spreadsheet that will be provided for the user by means of a www.link to a downloadable spreadsheet. Snapshots of the spreadsheet are provided in the Example. The values in Table X 102.1 are provided in the spreadsheet, and the only variable the user needs to provide is the number of plumbing fixtures (n) in column 2 of the form. The information in the spreadsheet columns may be useful to the user when needing to evaluate the mean flow rate, the variance, the probability of no flow, and the maximum possible flow if all the fixtures are flowing at the same time. The data shows that simultaneous is infrequent in single family homes as reflected in the spreadsheet calculator. The pipe sizing process is simplified based on velocity limitations. The spreadsheet calculator will provide the estimated demand for all branches in the plumbing system following the provisions in Sections X 102.2.1 and X 102.2.2 as well as the Example. The demand will determine the pipe size according to the velocity requirements shown in Table X 102.2.3. Similar tables can be created for other pipe material using the Hazen-Williams or Darcy-Weisbach formulae. An example of pipe sizing is provided to demonstrate how the spreadsheet calculator works with the velocity table. The velocity table has three variations: for hot water limitations, especially for a circulation system (5 ft/sec); for copper piping systems (8 ft/sec); and for CPVC and PEX according to manufacturer's specifications not to exceed 10 ft/sec. In comparison to the UPC pipe sizing method in Chapter 6, the Example shows pipe reductions for the building water supply and meter, and fixture branches with 3/8-inch diameter. The pipe sizing table justifies the increasing use of 3/8-inch diameter pipe for fixture branches because of the low-flow efficient fixtures. The proof of the adequacy of the proposed method of estimating the demand loads to be expected in residential water-supply systems will, in the end, depend on its success in actual trial over a period of years. Dr. Hunter expressed the same thing when he promoted his curve in 1940. The Hunter method has proven successful with a sparse sample of wake up calls to hotel guests. The proposed method has greater confidence based on 863,000 water use events during 11,385 home-days of monitoring over 1,000 homes. The proposal is recommended for the UPC Appendix as an alternate pipe sizing method for single- and multi-family applications with high-efficiency plumbing fixtures and appliances. The method proposes adequate pipe sizing without excessiveness and may be a factor toward mitigating pathogens due to stagnation. Maintaining the design flow rates at the recommended velocities will ensure pipe scouring that is vital in reducing biofilms. The pipe sizing task group has made every effort to consider adequate sizing for satisfactory use for the residential water supply system.
Referenced Standards:	