UPC 2015 SUMMARY OF NRDC SUBMITTED PROPOSALS (January 18, 2013)

This chart identifies 11 proposals submitted on January 3, 2013 to move sections of the 2012 edition of the IAPMO Green Plumbing and Mechanical Code Supplement (GPMCS) into the 2015 version of the UPC base code, as well as two proposals (on individual shower valves and shower valve marking) that are related to the showerheads proposal . For each topic, columns indicate: UPC 2012 text; GPMCS 2012 text; Submitted Proposal language for UPC 2015 (additions are underlined, deleted text is ~~struck-through~~); Supporters; and Reason Statements.

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
CHAPTER 4					
Water Closets	403.1 Flush Volumes. Flush volumes for low-consumption and water-saver water closets and urinals shall comply with applicable standards referenced in Table 1401.1. 403.2 Water Closets. Water closets, either flush tank, flushometer tank, or flushometer valve operated, shall have an average consumption not to exceed 1.6 gallons (6.1 L) of water per flush.	402.2 Water Closets. No water closet shall have a flush volume exceeding 1.6 gallons per flush (gpf) (6.1 Lpf). 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 (4.84 L) 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 two reduced flushes 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 (6.1 L) of water per flush in accordance with ASME A112.19.2/CSA B45.1. [See also footnote 4 in Table 402.1 which defines a “remote location” where a 1.6 gpf water closet is allowed.] [Note: Similar language appears in UPC 2012 Appendix L.]	~~403.1 Flush Volumes. Flush volumes for low-consumption and water-saver water closets and urinals shall comply with applicable standards referenced in Table 1401.1.~~ ~~403.2 Water Closets. Water closets, either flush tank, flushometer tank, or flushometer valve operated, shall have an average consumption not to exceed 1.6 gallons (6.1 L) of water per flush.~~ 403.2 Water Closets. No water closet shall have a flush volume exceeding 1.6 gallons per flush (gpf) (6.1 Lpf). 403.2.1 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 (4.84 L) of water per flush in accordance with ASME A112.19.2/CSA B45.1 or ASME A112.19.14. Exception: 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, the maximum consumption shall be 1.6 gallons (6.1 L) of water per flush.	Natural Resources Defense Council (Karen Hobbs and Edward R. Osann); Koeller & Company (John Koeller, P.E.)	• The maximum flush volumes in the current UPC are based upon a nationwide standard enacted 20 years ago. In December, 2010, the US Department of Energy determined that states were no longer preempted from adopting more stringent efficiency standards for water closets, among other products. *Federal Register*, Vol. 75, No. 245, December 22, 2010, p. 80289. This document may be accessed here: http://www.regulations.gov/#!documentDetail;D=EERE-2010-BT-WAV-0045-0001. • Today, water closets operating at 1.28 gpf or better are commonly available and perform as well as those with higher flush volumes. Since 2006, the establishment of the WaterSense voluntary labeling program for water efficient products and services by the Environmental Protection Agency has provided a framework for the recognition of products that are substantially more efficient than minimum federal requirements while maintaining full functionality and customer satisfaction. WaterSense criteria for tank-type water closets were established in 2007. Manufacturers have responded by bringing large numbers of models to market that meet or exceed WaterSense specifications. Based on the most recent reports by WaterSense partners, 1,621 models of tank-type toilets from nearly 100 brands currently meet the WaterSense specification, showing the widespread availability and commercial viability of these more efficient water closets. With the pace of introduction of new models that meet WaterSense specifications, it is reasonable to expect that these figures will be substantially larger by 2015. • NRDC estimates that if the flush volumes specified in this proposal were applied to new construction nationwide effective 2016, the following savings would be realized in the residential sector alone: o 41.6 million gallons of water per day by 2030; o Cumulative savings for consumers of more than $138 million through 2030.

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
Urinals	403.1 Flush Volumes. Flush volumes for low-consumption and water-saver water closets and urinals shall comply with applicable standards referenced in Table 1401.1. 403.3 Urinals. Urinals shall have an average water consumption not to exceed 1 gallon (4 L) of water per flush.	402.3 Urinals. Urinals shall have a maximum flush volume of not more than 0.5 gallon (1.9 L) of water per flush in accordance with ASME A112.19.2/CSA B45.1 or IAPMO Z124.9. Flushing urinals shall be listed to the EPA WaterSense Flushing Urinal Specification. [Note: Similar language appears in UPC 2012 Appendix L.]	~~403.1 Flush Volumes. Flush volumes for low-consumption and water-saver water closets and urinals shall comply with applicable standards referenced in Table 1401.1.~~ * * * * * * * 403.3 Urinals. Urinals shall have an average water consumption not to exceed ~~1 gallon (4 L)~~ 0.5 gallon (1.9 L) of water per flush in accordance with ASME A112.19.2/CSA B45.1 or IAPMO Z124.9.	Natural Resources Defense Council (Edward R. Osann and Karen Hobbs); Koeller & Company (John Koeller, P.E.); Best Management Partners (Thomas E. Pape); Affiliated International Management, LLC (Gary Klein)	• The maximum flush volumes in the current UPC are based upon a nationwide standard enacted 20 years ago. In December, 2010, the US Department of Energy determined that states were no longer preempted from adopting more stringent efficiency standards for water closets, among other products. *Federal Register*, Vol. 75, No. 245, December 22, 2010, p. 80289. This document may be accessed here: http://www.regulations.gov/#!documentDetail;D=EERE-2010-BT-WAV-0045-0001. • Today, urinals operating at 0.5 gpf or better are commonly available and perform as well as those with higher flush volumes. Since 2006, the establishment of the WaterSense voluntary labeling program for water efficient products and services by the Environmental Protection Agency has provided a framework for the recognition of products that are substantially more efficient than minimum federal requirements while maintaining full functionality and customer satisfaction. WaterSense criteria for flushing urinals were established in 2009. Manufacturers have responded by bringing large numbers of models to market that meet or exceed WaterSense specifications. Based on the most recent reports by WaterSense partners, 151 models of urinal fixtures from 15 brands and 91 models of urinal valves from 7 brands currently meet the WaterSense specification, demonstrating the widespread availability and commercial viability of more efficient urinals. With the pace of introduction of new models that meet WaterSense specifications, it is reasonable to expect that these figures will be even larger by 2015. • NRDC estimates that if the flush volume specified in this proposal were applied to new construction nationwide effective 2016, by 2030 water savings would reach nearly 3 million gallons per day, and building owners would have realized cumulative savings of more than $9 million. On a life-cycle basis, the cost savings is estimated to be $136 per fixture.

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
Showerheads	408.2 Water Consumption. Showerheads shall have a maximum flow rate of not more than 2.5 gpm at 80 psi (0.16 L/s at 552 kPa), in accordance with ASME A112.18.1/CSA B125.1.	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 2.0 gpm (0.13 L/s) at 80 psi (552 kPa), when listed to ASME A112.18.1/CSA B125.1. [Note: Similar language appears in UPC 2012 Appendix L.]	408.2 Water Consumption. Showerheads shall have a maximum flow rate of not more than ~~2.5~~ 2.0 gpm at 80 psi (~~0.16~~ 0.13 L/s at 552 kPa), in accordance with ASME A112.18.1/CSA B125.1.	Natural Resources Defense Council (Edward R. Osann and Karen Hobbs); Koeller & Company (John Koeller, P.E.); Best Management Partners (Thomas E. Pape);	• NOTE: We ask that this proposal be heard at the same time as two other, related proposals: thermal protection of shower valves (Chapter 4, Section 408.3) and shower valve marking (Chapter 4, Section 408.3.1 -- new). • We understand that staff is working to revise conversion ratios from liters per second to liters per minute. • The maximum flow rate of 2.5 gpm for showerheads in the current UPC is based upon a nationwide standard enacted 20 years ago. In December, 2010, the US Department of Energy determined that states were no longer preempted from adopting more stringent efficiency standards for showerheads, among other products. *Federal Register*, Vol. 75, No. 245, December 22, 2010, p. 80289. This document may be accessed here: http://www.regulations.gov/#!documentDetail;D=EERE-2010-BT-WAV-0045-0001. • Today, showerheads operating at 2.0 gpm at 80 psi are commonly available and perform as well as showerheads operating at 2.5 gpm. Since 2006, the establishment of the WaterSense voluntary labeling program for water efficient products and services by the Environmental Protection Agency has provided a framework for the recognition of products that are substantially more efficient than minimum federal requirements while maintaining full functionality and customer satisfaction. The WaterSense specification for showerheads was adopted in 2010, including a maximum flow rate of 2.0 gpm @ 80 psi. Manufacturers have responded by bringing large numbers of models to market that meet or exceed WaterSense specifications. Based on the most recent reports by WaterSense partners, more than 808 models from 45 brands currently meet the proposed standard, demonstrating the widespread availability and commercial viability of these types of showerheads. With the pace of introduction of new models that meet WaterSense specifications, it is reasonable to expect that these figures will be even larger by 2015. • NRDC estimates that if the flow rate specified in this proposal were applied to new construction nationwide effective 2016, the following savings would be realized in the residential sector alone: o 99 million gallons of water per day by 2030; and o Cumulative savings for consumers of more than $553 million by 2030. • In addition, NRDC estimated electricity and natural gas savings for the flow rates specified in this proposal, again for new construction nationwide by 2016, based on the assumptions in WaterSense's "Specification for Showerheads Supporting Statement" (http://www.epa.gov/WaterSense/docs/showerheads_finalsuppstat508.pdf). The following savings would be realized in the residential sector alone: o More than 1,863 GWh (Gigawatt Hours) per year by 2030; and o 134 million therms of natural gas per year by 2030.

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
Individual Control Valves	408.3 Individual Shower and Tub-Shower Combination Control Valves. Showers and tub-shower combinations shall be provided with individual control valves of the pressure balance, thermostatic, or combination pressure balance/thermostatic mixing valve type that provide scald and thermal shock protection for the rated flow rate of the installed showerhead. These valves shall be installed at the point of use and in accordance with ASSE 1016 or ASME A112.18.1/CSA B125.1. Gang showers, where supplied with a single temperature-controlled water supply pipe, shall be controlled by a mixing valve that is in accordance with ASSE 1069. Handle position stops shall be provided on such valves and shall be adjusted per the manufacturer's instructions to deliver a maximum mixed water setting of 120°F (49°C). Water heater thermostats shall not be considered a suitable control for meeting this provision.	Not addressed.	408.3 Individual Shower and Tub-Shower Combination Control Valves. Showers and tub-shower combinations shall be provided with individual control valves of the pressure balance, thermostatic, or combination pressure balance/thermostatic mixing valve type that provide scald and thermal shock protection for the rated flow rate of the installed showerhead or a flow rate of 1.5 gpm ± 0.1 qpm (5.75 L/m ± 0.35 L/m), whichever is less. These valves shall be installed at the point of use and in accordance with ASSE 1016 or ASME A112.18.1/CSA B125.1. Gang showers, where supplied with a single temperature-controlled water supply pipe, shall be controlled by a mixing valve that is in accordance with ASSE 1069. Handle position stops shall be provided on such valves and shall be adjusted per the manufacturer's instructions to deliver a maximum mixed water setting of 120°F (49°C). Water heater thermostats shall not be considered a suitable control for meeting this provision.	Natural Resources Defense Council (Edward R. Osann and Karen Hobbs); Koeller & Company (John Koeller, P.E.); Best Management Partners (Thomas E. Pape); Affiliated International Management, LLC (Gary Klein).	• The thermal protection afforded by shower valves can be compromised if the flow rate of the showerhead is less than the flow rate for which the protective components of the valve have been designed. As noted by Martin and Johnson (2008) (as cited in codes and Standards Enhancement Initiative (CASE), "Multi-Head Showers and Lower-Flow Shower Heads." 2013 California Building Energy Efficiency Standards, California Utilities Statewide Codes and Standards Team. September 2011), combinations of valves and shower heads were tested to determine whether pressure-compensating valves and thermostatic valves rated for 2.5gpm would perform adequately at lower flow rates. The tests included 22 shower valves from six manufacturers, and the valves were assessed on their ability to maintain water temperature within certain bounds for a given time after a change in pressure event as described by the ASSE 101 6-2005 standard for shower valves. The results indicated that a significant share of shower valves rated for 2.5 gpm failed to provide the thermal protection specified by ASSE 1016 when tested at lower flow rates, As summarized in the CASE report (p. 1 5): "These results indicate that shower valve temperature maintenance is strongly affected by flow rate, and that new showers with lower-flow shower heads would have to be installed with valves that are designed for 2.0 and lower flow rates." • Showerheads with maximum flow rates below 2.5 gpm are widely available on the market today, and simple replacement of a showerhead is typically not subject to code. Since shower valve components are located behind finished walls, replacement of showerheads is likely to be more frequent than replacement of shower valves. This proposed change seeks to reduce the likelihood that consumers replacing a showerhead will compromise the thermal protection offered by a building subject to this code by ensuring that shower valves can fully accommodate showerheads with lower flow rates than the current maximum federal standard of 2.5 gpm. The current EPA WaterSense specification for showerheads has a maximum flow rate of 2.0 gpm, and many showerheads are already available with flow rates between 2.0 and 1.5 gpm. As manufacturers continue to innovate with more water- and energy-efficient showerheads, the code change proposed here will help ensure that new buildings built to this code can safely accommodate showerheads with lower flow rates that may be selected by building occupants in future years. • Note that this language does not require that the showerhead itself have a flow rate of 1.5 gpm, but simply that the shower valve provide the thermal protection called for under the recognized standard when tested at a flow rate as low as 1.5 gpm. • While this proposal is not based on either GPMCS 2012 or UPC 2012 language, it is a critical oversight that must be corrected to safely accommodate showerheads with lower flow rates that are now widely available for installation by consumers. This is why we've requested that the three proposals submitted concerning showerheads [in addition to this proposal, the proposal on water consumption of showerheads (Section 408.2) and shower valve marking (Chapter 4, Section 408.3.1-new) be heard together.

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
Valve Marking	Not addressed.	Not addressed.	408.3.1 Marking Required. Control valves for showers and tub-shower combinations shall be factory marked with the manufacturer's minimum rated flow and such marking shall be visible at final inspection.	Natural Resources Defense Council (Edward R. Osann and Karen Hobbs); Koeller & Company (John Koeller, P.E.); Best Management Partners (Thomas E. Pape); Affiliated International Management, LLC (Gary Klein).	• The marking requirement is necessary to facilitate inspection and compliance. To the extent that the mark is permanent, it will provide a point of reference for building occupants to consider when changing showerheads in future years. • While this proposal is not based on either GPMCS 2012 or UPC 2012 language, it is a critical oversight that must be corrected to safely accommodate showerheads with lower flow rates that are now widely available for installation by consumers. This is why we've requested that the three proposals submitted concerning showerheads [in addition to this proposal, the proposal on water consumption of showerheads (Section 408.2) and thermal protection of shower valves (Chapter 4, Section 408.3) be heard together.

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
Multiple Showerheads Serving Same Compartment	Not addressed.	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 (0.13 L/s) 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 (0.13 L/s) 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 (0.13 L/s) total flow. (2) Where provided, accessible shower compartments shall not be permitted to have more than 4.0 gpm (0.25 L/s) total flow, where one outlet is the hand shower. The hand shower shall have a control with a nonpositive shutoff feature. [Note: Similar language appears in UPC 2012 Appendix L.]	408.XX 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 Lpm) 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 Lpm) 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 Lpm) total flow. (2) Where provided, accessible shower compartments shall not be permitted to have more than 4.0 gpm (15.1 Lpm) total flow, where one outlet is the hand shower. The hand shower shall have a control with a nonpositive shutoff feature.	Natural Resources Defense Council (Edward R. Osann and Karen Hobbs); Koeller & Company (John Koeller, P.E.); Best Management Partners (Thomas E. Pape); Affiliated International Management, LLC (Gary Klein)	• UPC 2012 currently specifies the maximum flow rate for a showerhead in section 408.2. However, the total flow rate of multiple showerheads serving one shower compartment is not addressed in the current code. The intent of this proposal is to specify the maximum cumulative flow of all the showerheads and other water emitters within a showering stall. This proposal is based on language in the Green Plumbing and Mechanical Code Supplement, 2012 edition. Similar language appears in UPC 2012 Appendix L. • EPA's WaterSense Version 1.1 New Home Specification (effective January 1, 2013 and available here: http://www.epa.gov/watersense/docs/home_finalspec508.pdf) states: "The total allowable flow rate of water from all showerheads flowing at any given time, including rain systems, waterfalls, body sprays, and jets, shall be limited to 2.0 gpm per shower compartment…" (p. 3). • Showerheads operating at 2.0 gpm at 80 psi are commonly available and perform as well as showerheads operating at 2.5 gpm. Since 2006, the establishment of the WaterSense voluntary labeling program for water efficient products and services by the Environmental Protection Agency has provided a framework for the recognition of products that are substantially more efficient than minimum federal requirements while maintaining full functionality and customer satisfaction. WaterSense criteria for showerheads were established at 2.0 gpm @ 80 psi in 2010. Manufacturers have responded by bringing large numbers of models to market that meet or exceed WaterSense specifications. Based on the most recent reports by WaterSense partners, more than 808 models from 45 brands currently meet the proposed standard, showing the widespread availability and commercial viability of these types of showerheads. With the pace of introduction of new models that meet WaterSense specifications, it is reasonable to expect that these figures will be substantially larger by 2015.

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
Tub Spout Diverters	Not addressed.	402.6.3 Bath and Shower Diverters. The rate of leakage out of the tub spout of bath and shower diverters while operating in the shower mode shall not exceed 0.1 gpm (0.006 L/s) in accordance with ASME A112.18.1/CSA B125.1.	408.XX Bath and Shower Diverters. The rate of leakage out of the tub spout of bath and shower diverters while operating in the shower mode shall not exceed 0.1 gpm (0.006 L/s) in accordance with ASME A112.18.1/CSA B125.1.	Natural Resources Defense Council (Edward R. Osann and Karen Hobbs); Koeller & Company (John Koeller, P.E.); Best Management Partners (Thomas E. Pape); Affiliated International Management, LLC (Gary Klein)	• A study by Taitem Engineering (available for download at http://www.taitem.com/wp-content/uploads/Diverter-Valve-Tech-Tip-2011.7.20.pdf) looked at leakage rates of bath and shower diverters at approximately 130 apartments and houses. It found that 34% of the diverters leaked more than 0.1 gallons per minute (gpm); the largest leak was 3.0 gpm, and the average of all leaks greater than 0.1 gpm was 0.8 gpm. The study further documented the proportion of tub spout leakage that represents additional water loss (rather than simply a reduction of flow through the showerhead), and found that this proportion is at least 70 % across a variety of flow rates and line pressures, indicating that this measure will provide net savings of both water and energy, while contributing to better shower performance. • We understand that staff is working to revise conversion ratios from liters per second to liters per minute.

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
Lavatory Faucets	403.4 Metered faucets. Self-closing or self-closing metering faucets shall be installed on lavatories intended to serve the transient public, such as those in, but not limited to, service stations, train stations, airports, restaurants, and convention halls. Metered faucets shall deliver a maximum of 0.26 gallons (0.98 L) of water per use. * * * * * * 420.2 Water Consumption. Sink faucets shall have a maximum flow rate of not more than 2.2 gpm at 60 psi (0.14 L/s at 414 kPa) in accordance with ASME A112.18.1/CSA B125.1. Exceptions: (1) Clinical sinks (2) Laundry trays (3) Service sinks	402.5 Lavatory Faucets. The maximum water flow rate of faucets shall be in accordance with Section 402.5.1 and Section 402.5.2. 402.5.1 Lavatory Faucets in Residences, Apartments, and Private Bathrooms in Lodging Facilities, Hospitals, and Patient Care Facilities. The flow rate for lavatory faucets installed in residences, apartments, and private bathrooms in lodging, hospitals, and patient care facilities (including skilled nursing and long-term care facilities) shall not exceed 1.5 gpm (0.09L/s) at 60 psi (414 kPa) in accordance with ASME A112.18.1/CSA B125.1 and shall be listed to the U.S. EPA WaterSense High-Efficiency Lavatory Faucet Specification. 402.5.2 Lavatory Faucets in Other Than Residences, Apartments, and Private Bathrooms in Lodging Facilities. Lavatory faucets installed in bathrooms of buildings or occupancies other than those specified in Section 402.5.1 shall be in accordance with Section 402.5.2.1 or Section 402.5.2.2. 402.5.2.1 Maximum Flow Rate. The flow rate shall not exceed 0.5 gpm (0.03 L/s) at 60 psi (414 kPa) in accordance with ASME A112.18.1/CSA B125.1. 402.5.2.2 Metering Faucets. Metering faucets shall deliver not more than 0.25 gallons (0.95 L) of water per cycle. [Note: Similar language appears in UPC 2012 Appendix L.]	* * * * * * 420.2 Water Consumption. Sink faucets, other than lavatory faucets, shall have a maximum flow rate of not more than 2.2 gpm at 60 psi (0.14 L/s at 414 kPa) in accordance with ASME A112.18.1/CSA B125.1. Exceptions: (1) Clinical sinks (2) Laundry trays (3) Service sinks 420.2.1 Lavatory Faucets. The maximum water flow rate of lavatory faucets shall be in accordance with Section 420.2.1.1 and Section 420.2.1.2. 420.2.1.1 Lavatory Faucets in Residences, Apartments, and Private Bathrooms in Lodging Facilities, Hospitals, and Patient Care Facilities. The flow rate of lavatory faucets installed in residences, apartments, and private bathrooms in lodging, hospitals, and patient care facilities (including skilled nursing and long-term care facilities) shall not exceed 1.5 gpm (0.09L/s) at 60 psi (414 kPa) in accordance with ASME A112.18.1/CSA B125.1. 420.2.1.2 Lavatory Faucets in Other Than Residences, Apartments, and Private Bathrooms in Lodging Facilities, Hospitals, and Patient Care Facilities. The flow rate of lavatory faucets, other than metering faucets, installed in bathrooms of buildings or occupancies other than those specified in Section 420.2.1.1 shall not exceed 0.5 gpm (0.03 L/s) at 60 psi (414 kPa) in accordance with ASME A112.18.1/CSA B125.1.	Incorporate GPMCS language for lavatory faucets without the requirement for WaterSense listing. * * * * * * Natural Resources Defense Council (Edward R. Osann and Karen Hobbs)	• The maximum flow rate applicable to lavatory faucets in the current UPC is based upon a nationwide standard enacted 20 years ago. In December, 2010, the US Department of Energy determined that states were no longer preempted from adopting more stringent efficiency standards for faucets, among other products. *Federal Register*, Vol. 75, No. 245, December 22, 2010, p. 80289. This document may be accessed here: http://www.regulations.gov/#!documentDetail;D=EERE-2010-BT-WAV-0045-0001. • Today, lavatory faucets rated at 1.5 gpm or less are commonly available and perform as well as those with higher flow rates. Since 2006, the establishment of the WaterSense voluntary labeling program for water efficient products and services by the Environmental Protection Agency has provided a framework for the recognition of products that are substantially more efficient than minimum federal requirements while maintaining full functionality and customer satisfaction. WaterSense criteria for residential lavatory faucets and faucet accessories such as aerators were established in 2007. Manufacturers have responded by bringing large numbers of models to market that meet or exceed WaterSense specifications. Based on the most recent reports by WaterSense partners, 5,207 models from 134 brands currently meet the WaterSense specification, showing the widespread availability and commercial viability of more efficient lavatory faucets. With the pace of introduction of new models that meet WaterSense specifications, it is reasonable to expect that these figures will be even larger by 2015. • NRDC estimates that if the flow rate specified in this proposal were applied to new construction nationwide effective 2016, the following savings would be realized in the residential sector alone: o 140 million gallons of water per day by 2030; and o Cumulative savings for consumers of more than $763 million by 2030. • In addition, NRDC estimated electricity and natural gas savings for the flow rate specified in this proposal, again for new construction nationwide by 2016, based on the assumption in WaterSense's "High-Efficiency Lavatory Faucet Specification" (http://epa.gov/watersense/docs/faucet_suppstat_final508.pdf). The following savings would be realized in the residential sector alone: o More than 2,529 GWh (Gigawatt Hours) of electricity per year by 2030; and o 182 million therms of natural gas per year by 2030. • We understand that staff is working to revise conversion ratios from liters per second to liters per minute.

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
Dipper Wells	Not addressed.	406.1.5 Dipper Well Faucets. Where dipper wells 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 2.2 gpm (0.14 L/s) 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 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 2.2 gpm (0.14 L/s) at a supply pressure of 60 psi (414 kPa).	4XX.0 Dipper Wells. 4XX.1 Dipper Well Faucets. Where dipper wells are installed, the water supply to a dipper well shall have a shutoff valve and flow control. 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. 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 2.2 gpm (0.14 L/s) at a supply pressure of 60 psi (414 kPa). (2) Metered 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 2.2 gpm (0.14 L/s) at a supply pressure of 60 psi (414 kPa).	Natural Resources Defense Council (Edward R. Osann and Karen Hobbs); Koeller & Company (John Koeller, P.E.); Best Management Partners (Thomas E. Pape); Affiliated International Management, LLC (Gary Klein)	• Sanitary and useful function of a dipper well can easily be achieved when the water in the well is exchanged at least once every 3 minutes. The proposed amendment allows for a flow rate that exchanges the water no more often than once every minute, three times greater than necessary. • Dipper wells come in a variety of sizes. The majority of models have less than 2 gallons of capacity. The required flow rate should be determined by the water capacity (volume) of the dipper well. • The performance of dipper wells is not addressed in the UPC 2012. This proposal is identical to language in the Green Plumbing and Mechanical Code Supplement, 2012 edition, except that the following sentence which defines the capacity of a dipper well has been relocated from subparagraph 1 to 4XX.1, because it applies to more than one subparagraph: "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."

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
Trap Seal Primers	Not addressed.	414.0 Trap Seal Protection. 414.1 Water Supplied Trap Primers. Water supplied trap primers shall be electronic or pressure activated and shall use no more than 30 gallons (114 L) per year per drain. Where an alternate water source, as defined by this code, is used for fixture flushing or other uses in the same room, the alternate water source shall be used for the trap primer water supply. Exception: Flushometer tailpiece trap primers complying with IAPMO PS 76 are exempted from the provisions of this section. 414.2 Drainage Type Trap Seal Primer Devices. Drainage type trap seal primer devices shall not be limited in the amount of water they discharge.	4XX.0 Trap Seal Protection. 4XX.1 Water Supplied Trap Primers. Water supplied trap primers shall be electronic or pressure activated and shall be rated to use no more than 30 gallons (114 L) per year per drain. Where an alternate water source, as defined by this code, is used for fixture flushing or other uses in the same room, the alternate water source shall be used for the trap primer water supply. Exception: Flushometer tailpiece trap primers complying with IAPMO PS 76 are exempted from the provisions of this section. 4XX.2 Drainage Type Trap Seal Primer Devices. Drainage type trap seal primer devices shall not be limited in the amount of water they discharge.	Natural Resources Defense Council (Edward R. Osann and Karen Hobbs); Affiliated International Management, LLC (Gary Klein)	• A water supplied trap seal primer that is unrestricted can discharge 300 to 500 gallons a year to a trap. A 2" trap, for example, requires less than ½ gallon a year to maintain the trap seal. There are now devices available that limit the amount of water discharging to 8 gallons per year.

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
CHAPTER 6					
Alternate Water Sources for Special Water Features	Not addressed.	408.1 Use of Alternate Water Source for Special Water Features. Special water features such as ponds and water fountains shall be provided with reclaimed (recycled) water, rainwater, or on-site treated non-potable water where the source and capacity is available on the premises and approved by the Authority Having Jurisdiction.	6XX.0 Alternate Water Sources 6XX.1 Use of Alternate Water Source for Special Water Features. Special water features such as ponds and water fountains shall be provided with reclaimed (recycled) water, rainwater, or on-site treated non-potable water where the source and capacity is available on the premises and approved by the Authority Having Jurisdiction.	Natural Resources Defense Council (Edward R. Osann and Karen Hobbs)	• There is no reason to use potable water for ornamental water features such as ponds and water fountains, where alternate water sources are available and approved by the local jurisdiction.

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
Maximum Volume of Hot Water	Not addressed.	602.7 Maximum Volume of Hot Water. The maximum volume of water contained in the hot water distribution shall comply with Sections 602.7.1 or 602.7.2. The water volume shall be calculated using Table 602.7. 602.7.1 Maximum Volume of Hot Water Without Recirculation or Heat Trace. The maximum volume of water contained in the hot water distribution pipe between the water heater and any fixture fitting shall not exceed 32 ounces (oz) (946 mL). Where a fixture fitting shut off valve (supply stop) is installed ahead of the fixture fitting, the maximum volume of water is permitted to be calculated between the water heater and the fixture fitting shut off valve (supply stop). 602.7.2 Maximum Volume of Hot Water with Recirculation or Heat Trace. The maximum volume of water contained in the branches between the recirculation loop or electrically heat traced pipe and the fixture fitting shall not exceed a 16 oz (473 mL). Where a fixture fitting shut off valve (supply stop) is installed ahead of the fixture fitting, the maximum volume of water is permitted to be calculated between the recirculation loop or electrically heat traced pipe and the fixture fitting shut off valve (supply stop). Exception: Whirlpool bathtubs or bathtubs that are not equipped with a shower are exempted from the requirements of Section 602.7. 602.7.3 Hot Water System Submeters. Where a hot water pipe from a circulation loop or electric heat trace line is equipped with a submeter, the hot water distribution system downstream of the submeter shall have either an end-of-line hot water circulation pump or shall be electrically heat traced. The maximum volume of	610.14 Maximum Volume of Hot Water. The maximum volume of water contained in the hot water distribution shall comply with Sections 610.14.1 or 610.14.2. The water volume shall be calculated using Table 610.14. 610.14.1 Maximum Volume of Hot Water Without Recirculation or Heat Trace. The maximum volume of water contained in the hot water distribution pipe between the water heater and any fixture fitting shall not exceed 32 ounces (oz) (946 mL). Where a fixture fitting shut off valve (supply stop) is installed ahead of the fixture fitting, the maximum volume of water is permitted to be calculated between the water heater and the fixture fitting shut off valve (supply stop). 610.14.2 Maximum Volume of Hot Water with Recirculation or Heat Trace. The maximum volume of water contained in the branches between the recirculation loop or electrically heat traced pipe and the fixture fitting shall not exceed 16 oz (473 mL). Where a fixture fitting shut off valve (supply stop) is installed ahead of the fixture fitting, the maximum volume of water is permitted to be calculated between the recirculation loop or electrically heat traced pipe and the fixture fitting shut off valve (supply stop). Exception: Whirlpool bathtubs or bathtubs that are not equipped with a shower are exempted from the requirements of Section 610.14. 610.14.3 Hot Water System Submeters. Where a hot water pipe from a circulation loop or electric heat trace line is equipped with a submeter, the hot water distribution system downstream of the submeter shall have	Natural Resources Defense Council (Edward R. Osann and Karen Hobbs); Affiliated International Management, LLC (Gary Klein)	• Cold or tepid water in the initial draw from a hot water outlet is often unusable for its intended purpose, and is frequently purged, resulting in a waste of water, energy, and time for building occupants. Limiting volume in hot water piping has the effect of reducing the time it takes for hot water to arrive at the outlet (time-to-tap) and reducing the amount of water wasted while waiting for the hot water (volume-to-hot). Limiting the volume in the hot water supply system piping also has the effect of reducing the energy losses during use and when the water in the pipe cools down between uses. • By allowing the volume limitation to be computed from runs from recirculation loops, this provision maintains design flexibility in larger buildings while still effectively limiting the amount of water likely to be purged per draw.

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
		water in any branch from the circulation loop or electric heat trace line downstream of the submeter shall not exceed 16 oz (473 mL). If there is no circulation loop or electric heat traced line downstream of the submeter, the submeter shall be located within 2 feet (610 mm) of the central hot water system; or the branch line to the submeter shall be circulated or heat traced to within 2 feet of the submeter. The maximum volume from the submeter to each fixture shall not exceed 32 oz (946 mL). The circulation pump controls shall comply with the provisions of Section 601.3.2. ** The GPMCS also includes TABLE 602.7, Water Volume for Distribution Piping Materials, which is not duplicated in this chart.	either an end-of-line hot water circulation pump or shall be electrically heat traced. The maximum volume of water in any branch from the circulation loop or electric heat trace line downstream of the submeter shall not exceed 16 oz (473 mL). If there is no circulation loop or electric heat traced line downstream of the submeter, the submeter shall be located within 2 feet (610 mm) of the central hot water system; or the branch line to the submeter shall be circulated or heat traced to within 2 feet of the submeter. The maximum volume from the submeter to each fixture shall not exceed 32 oz (946 mL). Table 610.14 is appended below.		

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
Meters	Not addressed	409.0 Meters. 409.1 Required. A water meter shall be required for buildings connected to a public water system, including municipally supplied reclaimed (recycled) water. In other than single-family houses, multi-family structures of three stories or fewer above grade, and modular houses, a separate meter or submeter shall be installed in the following locations: (1) The water supply for irrigated landscape with an accumulative area exceeding 2500 square feet (232 m^2). (2) The makeup water supply to cooling towers, evaporative condensers, and fluid coolers. (3) The makeup water supply to one or more boilers collectively exceeding 1,000,000 British thermal units per hour (Btu/h) (293 kW). (4) The water supply to a water-using process where the consumption exceeds 1000 gallons per day (gal/d) (0.0438 L/s), except for manufacturing processes. (5) The water supply to each building on a property with multiple buildings where the water consumption exceeds 500 gal/d (0.021 L/s). (6) The water supply to an individual tenant space on a property where any of the following applies: (a) Water consumption exceeds 500 gal/d (0.021 L/s) for that tenant. (b) Tenant space is occupied by a commercial laundry, cleaning operation, restaurant, food service, medical office, dental office, laboratory, beauty salon, or barbershop. (c) Total building area exceeds 50 000 square feet (4645 m^2). (7) A makeup water supply to a swimming pool. (8) The makeup water supply to an	613.0 Meters. 613.1 Required. A water meter shall be required for buildings connected to a public water system, including municipally supplied reclaimed (recycled) water. In other than single-family houses, multi-family structures of three stories or fewer above grade, and modular houses, a separate meter or submeter shall be installed in the following locations: (1) The water supply for irrigated landscape with an accumulative area exceeding 2500 square feet (232 m^2). (2) The water supply to each building on a property with multiple buildings where the water consumption exceeds 500 gal/d (0.021 L/s). (3) A makeup water supply to a swimming pool. 613.2 Consumption Data. A means of communicating water consumption data from submeters to the water consumer shall be provided. 613.3 Access. Meters and submeters shall be accessible.	Natural Resources Defense Council (Edward R. Osann and Karen Hobbs)	• Outdoor water use should be separately metered in large irrigated landscapes, i.e., those greater than 2,500 square feet. According to USEPA's WaterSense Program, as much as 50 percent of commercial and residential irrigation water use goes to waste due to evaporation, wind, improper system design, or overwatering. Without accurate measurement of outdoor water use, potential waste cannot be identified, quantified, and minimized. Avoidance of water waste is a basic obligation of all property owners. • Similarly, the measurement of make-up water to swimming pools is necessary to identify leaks before hazardous conditions can develop and to monitor the performance of essential equipment, such as filters. • Measuring water use within each building on a campus or other large property is essential for effective water management, as well as to assure health and safety for tenants and/or residents. Metering individual buildings supports the early detection and repair of leaks and damaged fixtures which can contribute to hazardous and unsafe conditions such as mold growth, bathroom slip and fall, and ice accumulation. Individual building metering alerts building managers to excessive use in individual buildings (occupied or unoccupied) that may be attributable to significant leakage that may otherwise go undetected or unreported.

Topic	UPC 2012	GPMCS 2012	Submitted Proposal	Supporters	Reason Statements
		evaporative cooler having an air flow exceeding 30 000 cubic feet per minute (ft^3/min) (14 158.2 L/s). 409.2 Consumption Data. A means of communicating water consumption data from submeters to the water consumer shall be provided. 409.3 Access. Meters and submeters shall be accessible.			

TABLE 610.14

OUNCES OF WATER PER FOOT LENGTH OF PIPING[1]								
NOMINAL SIZE (inch)	COPPER M	COPPER L	COPPER K	CPVC CTS SDR 11	CPVC SCH 40	PEX-AL-PEX	PE-AL-PE	PEX CTS SDR 9
3/8[2]	1.06	0.97	0.84	NA	1.17	0.63	0.63	0.64
½	1.69	1.55	1.45	1.25	1.89	1.31	1.31	1.18
¾	3.43	3.22	2.90	2.67	3.38	3.39	3.39	2.35
1	5.81	5.49	5.17	4.43	5.53	5.56	5.56	3.91
1 ¼	8.70	8.36	8.09	6.61	9.66	8.49	8.49	5.81
1 ½	12.18	11.83	11.45	9.22	13.20	13.88	13.88	8.09
2	21.08	20.58	20.04	15.79	21.88	21.48	21.48	13.86

NA: Not Applicable.

[2] For the fixture supply tubing only.