

Code Pipeline

The Following ASME Publications were recently reaffirmed as ASME Standards with new publication dates

- A112.4.1-1993 (R2008)
Water Heater Relief Valve Drain Tubes
- A112.4.2-2003 (R2008)
Water Closet Personal Hygiene Devices
- A112.4.7-2002 (R2008)
Point of use and Branch Water Sub-metering Systems
- A112.6.1M-1997 (R2008)
Floor Affixed Supports for Off-the-Floor Plumbing Fixtures for Public Use
- A112.6.4-2003 (R2008)
Roof, Deck, and Balcony Drains
- A112.14.1-2003 (R2008)
Backwater Valves
- A112.18.3-2002 (R2008)
Performance Requirements for Backflow Protection Devices and Systems in Plumbing Fixture Fittings
- A112.18.6- 2003 (R2008)
Flexible Water Connectors
- A112.19.2-2003 (R2008)
Vitreous China Plumbing Fixtures and Hydraulic Requirements for Water Closets and Urinals
- A112.19.9M-1991 (R2008)
Non-Vitreous Ceramic Plumbing Fixtures
- A112.19.10-2003 (R2008)
Dual Flush Devices for Water Closets
- A112.36.2M-1991 (R2008)
Cleanouts

Water Conservation: It's Not Easy Being Green

By: Ron George, CIPE, CPD
from *Plumbing Engineer Magazine, May 2008*

The "WaterSense" program is one of the latest water conservation programs sponsored by the Environmental Protection Agency (EPA) with the support of many water conservation groups and individuals. WaterSense is a certification program. The WaterSense label identifies water saving products, practices or programs that are approved by the EPA.

Who could be against saving water? The answer is very few people, as long as they can take comfortable showers and flush their toilets without having them plug up. The key to the program's success will be to make sure that, in addition to water conservation, performance and user comfort issues are also considered in the evaluation criteria used to determine whether a product earns the WaterSense label. In other words, the WaterSense program must make sense.

Federal legislation passed as part of the Energy Policy Act of 1992 required showers that previously flowed as much as 7 gallons per minute (gpm) to be reduced to a maximum of 2.5 gpm. The reduction to 2.5 gpm showerheads saved water, it saved fuel to heat the water, it saved electricity to pump the water and, most importantly, it still allowed enough water to flow to provide an adequate shower.

The EPA is now considering lowering the shower flow rate in order for products to qualify for the WaterSense label. Water conservation programs are good and are needed for areas of the country experiencing drought conditions or significant population growth. My concern is that, if the only criteria these programs look at are reduced flow rates, we could be going back to the days of

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outhouses; the highest scoring plumbing fixture might be the waterless shower, followed closely by a damp sponge and showers that work something like the produce-misting systems. Many low flow showerheads will not get high scores for user satisfaction, although there are a few that perform well. Low flow showerheads raise many health and safety issues. The health issues include poor cleaning and rinsing at low flows and Legionella exposure from the fine mist associated with ultra low flow (ULF) showers. One safety issue is that many shower mixing valves are incompatible with ULF showerheads and cannot control the temperature properly at low flows. Another safety issue is; when low flow showerheads are installed on two-handled or non-compensating showers (Generally ones prior to 1987), the older style shower controls do not compensate for changes in pressure or temperature so the risk of scalding and thermal shock increases with reduced flows on these older style shower controls. The Energy Policy Act of 1992 also brought us the 1.6 gallon per flush (gpf) water closets that performed poorly in the first several years after the requirements went into effect. That legislation mandated low flow water closets without any research on the subject. No one wants to repeat the follies of the 1.6 gpf issue. We ended up suffering with product that had design problems because of the short implementation time, lack of adequate research on the issue, poor drain line carry issues, fixture performance issues and poor user satisfaction.

I agree that we need to design water conservation systems now to reduce the water demands for future generations, but the WaterSense program has raised a few eyebrows. The manufacturers, engineers and others in the industry that I have talked with were concerned that the new program might be overlooking some serious issues and focusing only on water conservation. What good is an extra percent or two of water conservation if it creates a dangerous system that can severely injure or kill someone from scald injuries or if it creates unsanitary conditions from inadequate flow in the shower or from sewage back-ups caused by blockages in drain lines related to inadequate drainline carry?

Water use statistics

According to a U.S. Global survey conducted in the 1990s by the EPA, indoor household fresh water use was about eight percent of the total water use. Outdoor household water use was about five percent of the total fresh water available and non-household uses accounted for 87 percent of the available fresh water. Of the eight percent used for indoor household use, about 30 percent was used for flushing toilets, about 30 percent for bathing or washing and about 40 percent for other uses, including drinking, dishwashing and clothes washing. Showers accounted for about two to three percent of overall water use.

We should step back a little, look at the big picture and consider the biggest users of freshwater: irrigation, commercial and industrial uses account for 87 percent. It seems that the opportunity for water conservation is much greater in these sectors than it is in household use. Also, aging infrastructure causes water main leaks, resulting in a significant, yet somewhat unaccountable, amount of water loss.

We should look at saving water wherever we can. The WaterSense program is an opportunity to "get it right" the first time and should address other considerations as well as water conservation. We must consider other important system design issues such as drain line carry for dual flush water closets, pressure disturbances in systems with low flow showerheads and older shower valves that can cause scalding or thermal shock situations.

ASME/CSA harmonization efforts

I recently attended a joint harmonization task group meeting in Reno, Nevada, that included many members of ASME, CSA, and ASSE. The meeting between ASSE 1016, dealing with shower valves and ASME A112.18.1 clause 5.10, dealing with showerheads. Sally Remedios of Delta Faucet Company is chairing the ASME effort, and she is doing a great job of trying to educate water conservation groups on the issues relevant to showerheads and shower control valves. A discussion was held on the test pressures used in the standard for the valves versus the test pressure used in the standard for the showerheads. Shower Control Valves are tested at a pressure of 45 psi; showerheads at 80 psi. So which one needs to be adjusted? Probably, both need to be adjusted to the same pressure. A showerhead should never experience 80 psi because of the pressure drop associated with flow. If there is 80 psi of static pressure in a plumbing system, when the water starts flowing there is likely to be a pressure drop through the building supply pipe, meter, backflow preventer, water heater, shower mixing valve and branch piping. The friction loss can be about 15 to 20 psi. So, if the pressure supplied to the shower valve inlet is 60 psi when the flow starts, it is more likely to drop to something like 40 psi when the water is flowing. The actual pressure would depend on the length of piping and fittings, but the valve should never see 80 psi. There needs to be a way to match shower valve flow rates to showerhead flow rates. When a non-compensating showerhead is supplied with 45 psi, or any pressure lower than 80 psi, the flow will be less than what is published on the showerhead. Maybe a showerhead needs to have two flow numbers, one at 80 psi for the maximum flow possible and one at 45 psi so that it can be matched to the shower valve.

Many organizations were represented at the meeting, including the EPA, the California Energy Commission, industry consultants, manufacturers, testing labs and design professionals. Representatives of the EPA WaterSense program outlined the program and pointed out that it is a work in progress.

The task group discussed many issues, including the impact of low flow showerheads on shower valves. Shawn Martin, of the Plumbing Manufacturers Institute (PMI), presented temperature control test results from 15 shower valve manufacturers. The results showed that 100 percent of the valves passed the ASSE 1016 test at 2.5 gpm. When the shower valves were flowing 2 gpm, only 77 percent passed the test, and, when flowing 1.5 gpm, only 67 percent passed. When the flow was reduced to 1 gpm, only 34 percent passed the test. This test data indicated that lower flow showerheads are indeed a concern if they are installed with existing shower valves.

Just mandate them

One of the independent consultants at the meeting did not seem to care about any of the engineering concerns or user comfort issues that were discussed. He simply wanted to mandate lower flow fixtures. He said, "I don't care about user comfort; we'll just tell them what they can use, and they will have to use it." Several manufacturers and others in attendance, including myself, spoke up after hearing his comments and said that we did not want to blindly choose a flow rate that does not provide user satisfaction. The consultant kept talking about the water savings from reduced shower flow rates, using his simple calculation of flow rate. His logic was that if existing showers flow 2.5 gpm and the new showers are 1 gpm, then during a 10-minute shower you should save 15

WaterSense is currently in the process of writing letters to legislators asking for increased federal funding for the program. If the funding comes through, I hope that they will be able to research and address some of these issues.

WaterSmart

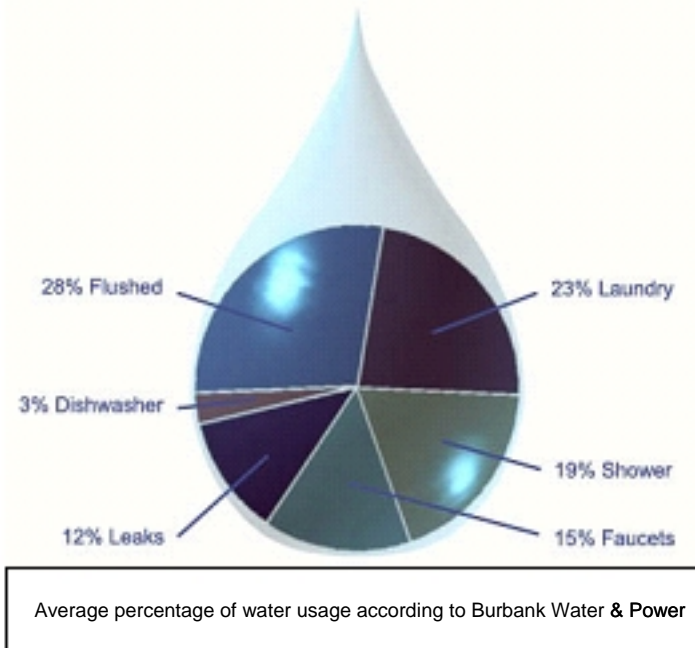
While I was in Reno, the American Water Works Association, Southern Nevada Water Authority and the EPA cosponsored a "WaterSmart" conference on water-efficient practices along with a water efficiency expo. There were a lot of great water and energy savings ideas at the expo; however, quite a few of the products had code violations and engineering design issues. Many products were developed by entrepreneurs who had great ideas, but who were apparently unaware of requirements in the plumbing codes and of general engineering principles for safe plumbing.

Many ULF showerhead manufacturers were touting their new water mist showerheads. Some had aerators and venturis that entrained air, and some had very high velocities, which create quite a wind chill effect in the shower and would cause the temperature setting of the shower valve to be set higher. The misting heads increase the possibility that Legionellae bacteria in the water droplets will be inhaled into the lungs.

Some manufacturers have teamed up with municipalities to distribute ultra low-flow showerheads to water utility customers. It turns out that the showerheads were simply handed out, with no regard as to the type of shower controls they would be used with. Distributing these showerheads without verifying that the shower valve they are used with is designed to control water temperatures at very low flows is extremely dangerous and is likely to lead to an increase in scalding and thermal shock incidents.

Two-handled shower valves have a mixing chamber or piping that allows cross flow between the hot water and the cold water system. For showerheads that have a high volume flow, the path of least resistance for the mixed water is out of the showerhead. If a high volume showerhead is replaced by a low flow showerhead with a flow restrictor, using an adjacent toilet or fixture can cause a pressure drop in the cold water line; the path of least resistance for the hot water is then through the mixing chamber and up the cold water supply pipe. This produces a burst of hot water that can scald someone.

There are numerous engineering solutions at varying degrees and costs, such as adding thermostatic mixing valves to temper the hot water to a safe temperature, replacing the two-handled shower valve with an ASSE 1016-approved shower valve with a temperature limit stop or providing an ASSE 1062 temperature-actuated flow reduction device to shut down the flow of water when it approaches 117 F.



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gallons of water. I pointed out that the water savings would not be 15 gallons, because with low flow showerheads people will generally take a longer shower. The overall savings could amount to just a few gallons. The cost of this savings in health, safety and user comfort and satisfaction issues can be high. What is the cost if someone is scalded or contracts Legionnaires' Disease?

We continued to discuss the concerns about low flow showerheads causing flow restrictions and about the scalding and thermal shock that can occur with non-compensating and two-handled shower valves. These are serious liability issues for any water municipality that is considering simply handing out low flow showerheads in their water conservation efforts. They need to provide warnings, to make sure that the shower valve is not two-handled and that single-handled shower valves are ASSE 1016 compliant, with the maximum temperature limit stops adjusted to prevent scalding. The shower valves should also have check valves to prevent cross flow across the valve and to control temperature at the reduced flows.

Research funding needed

Everyone agreed that there is a great need for research to determine a minimally acceptable shower flow rate that will still provide user comfort and address the issues. My specific concerns that were voiced at the meeting included:

- temperature controls at low flows
- water droplet or mist size (to prevent Legionellae in the water supply from being aerosolized in the water mist)
- velocity of water spray
- scouring action
- shower temperature setting based on entrained air and evaporative cooling and wind chill effect
- additional time required to shower properly because of lower flow rates
- concerns about thermal shock or scalding with flow-restrictor type showerheads and older two-handled or non-compensating type shower valves.

Standard 189.1P: The Future of Green Buildings

By: Kent Peterson, P.E. Special to CONTRACTOR
from *Contractor Magazine*, May 2008

There is no question that high-performance green buildings are quickly becoming the norm of the building industry — as they should. Such buildings represent an enormous potential for saving energy and reducing carbon emissions worldwide.

While building owners and occupants reap the eventual benefits of better performing buildings, contractors, architects and engineers can benefit from learning about what it takes to create a high-performance building so they can secure more business and better understand what value building owners and developers want.

There are many ways people define a "green" building. Energy-saving measures, water efficiency, indoor environmental quality, materials and building orientations all play a role, but it is the way that all of these — and more — come together to make a healthy, safe and efficient building that makes it truly high performing. In recognition of this, the American Society of Heating, Refrigerating & Air-Conditioning Engineers, along with the U.S. Green Building Council and the Illuminating Engineering Society of North America, has been working on a new standard that essentially defines the minimum requirements for a high-performance green building.

As it is standard that sets minimum requirements, Standard 189.1P, *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings*, could very well become a code requirement in local jurisdictions for all buildings whose owners want to tout them as being "green." As everyone seems to be going green these days, this makes it even more important for contractors and the rest of the building community to get on board with and learn about Standard 189.1.

Building designers and contractors must understand the fundamental elements and processes of high-performance green buildings to provide value-based services to building owners. Standard 189.1 addresses nearly all of the elements that make a building high-performing: site sustainability, water use efficiency, energy efficiency, indoor environmental quality, and the building's impact on the atmosphere, materials and resources.

The standard also specifies requirements for construction and operation plans, including the commissioning process, building acceptance testing, measurement and verification, energy use reporting, durability, transportation management, erosion and sediment control, construction, and indoor air quality during construction.

By applying the minimum set of prescriptive recommendations, proposed Standard 189.1P leads to significant energy and water savings. Based on analysis of the first public review draft, site energy savings ranging from 10% to 41% over ASHRAE Standard 90.1-2007, including plug and process loads and all other energy consumption for the building, with an average of 24.9% for all climates. The proposed standard also provides indoor water savings of 35% for an office building and 26% for a multifamily building.

As you can see, many of these areas have the potential to affect contractors on new construction and renovation projects for com-

mercial buildings. By learning about this standard now, you will be placing yourself in a unique position to help advise building owners and project teams how to comply with this standard and make buildings truly high-performing. Proposed Standard 189.1 recently completed its second public review period.

While Standard 189.1 is not written to apply to all buildings, local jurisdictions could very well place it in commercial building codes to apply to all government buildings or all buildings of a certain type. In fact, several cities across the nation — and even other nations, such as India — have already expressed interest in applying the standard in some way once it is complete.

This interest shows that the marketplace is ready for a green building standard that sets minimum energy efficiency requirements beyond those in Standard 90.1, pushing the building industry toward the goal that ASHRAE has set of making net-zero-energy buildings commonplace. It is essential for the energy independence of the United States — and of the world — that the marketplace continues to transform to support more energy efficient and sustainable buildings. Consuming 40% of the nation's energy, buildings represent the largest sector of primary energy consumption. High-performing green buildings should have a starring role in reducing the world's collective carbon footprint.

But such buildings don't happen by themselves. You need the right project team, the dedication of the building owner, the right site and sustainable materials, and of course you need the right technology and set of practices that will tie everything together to make the building a reality. That is where proposed Standard 189.1 comes into play.

ASHRAE and its partners have realized the need for this standard, and now is the time for you to realize that each of us have a role to play in transforming the marketplace as well. Building industry support will be needed to move the building industry forward toward high-performance, green buildings. I urge you to learn about proposed Standard 189.1 and support its adoption in your local jurisdiction. Together, we can help save energy today to create more blue skies for tomorrow.°

Kent Peterson, P.E., is chief engineer, P2S Engineering, Long Beach, Calif. He is serving as ASHRAE's 2007-2008 president. Additional information about Standard 189.1P, is available by contacting Steve Ferguson, ASHRAE's assistant manager of standards-codes, at sferguson@ashrae.org, or <http://spc189.ashrae.org>



The Ballard Library in Seattle, WA is a state-of-the-art green building and listed as on of the American Institute of Architecture's top ten greenbuildings.



International Year of Sanitation 2008

The United Nations Department of Economic and Social Affairs & Water Supply & Sanitation Collaborative Council

The United Nations Department of Economic and Social Affairs is in partnership with several other organizations "to raise awareness and to accelerate progress towards the Millennium Development Goal (MDG) target to reduce by half the proportion of the 2,6 billion people without access to basic sanitation by 2015". The objectives for this plan include: mobilizing governments, securing increased financing, and enhancing knowledge on sanitation.

The Water Supply & Sanitation Collaborative Council (WSSCC) has launched a Global Sanitation Fund on March 14, 2008. With a focus on sanitation and hygiene, WSSCC plans to "help large numbers of poor people attain safe and sustainable sanitation services and adopt good hygiene practices".

For more information, please go to <http://esa.un.org/ivs> or <http://www.wsscc.org/> (under "What We Do")

Services for PVC Water Main Pipe

Information taken from www.nsf.org article *NSF Announces New Certification Services for PVC Water Main Pipe to UL 1285 Standard*

The NSF's Plumbing Programs have been prompted by the industry to become more proactive with the certification for PVC Water Main Piping Products. In order to do so, a service will be created to evaluate and certify PVC pipes which meet UL 1285: *Pipe and Couplings, Polyvinyl Chloride (PVC) for Underground Fire Service's* performance requirements.

Requirements include:

- Final performance of the product
- Physical properties of the material utilized in the production of the products
- Health effects, and other requirements

Nasrin Kashefi, General Manager of the NSF Plumbing Program, explained that, "This listing service expansion will enable manufacturers of PVC piping to take advantage of the convenience of having one source for their plumbing, conduit and now water main pipe testing/certification needs".

Problematic Plumbing Collapses Ceiling

From *Plumbing & Mechanical*: www.pmmag.com, June 2008

A poly butylene plumbing system recently failed in a Boynton Beach, Fla., home causing the ceiling to cave in. Local news reports say the collapse was caused by a leaky pipe in the roof, which came crashing down on the floor inside the home.

PB has a history of failure, and has given way to two class action lawsuits in recent years. Unfortunately, the recovery period for both lawsuits has ended and homeowners insurance must be tapped to fix the problem, or repairs are made out-of-pocket.

According to [CBS 12 News](http://www.cbs12.com), plumbing experts are urging people to have their plumbing inspected for PB plumbing systems in order to take the necessary steps to replace it.

FlexHead is First Manufacturer to Meet New UL2443 Standard

PM Engineer magazine, www.pmengineer.com

Underwriters Laboratories (UL) has informed FlexHead Industries that its products have been listed under the new UL standard for flexible fire sprinkler connections, *UL 2443 Flexible Sprinkler Hose with Fittings for Fire Protection Service*. FlexHead products are currently the only flexible connections that meet this comprehensive new standard. FlexHead Industries invented this technology more than 20 years ago.

The increasing popularity of flexible fire sprinkler connections prompted UL to recognize the need for, and subsequently develop, specific standards for testing these types of products. Previously, these products were listed under the broader standard UL 1474 Adjustable Drop Nipples. This new, more stringent standard addresses characteristics that are unique to flexibles.

As part of its listing process, UL will determine and publish on its website equivalent length values related to the friction loss along with the maximum number of bends and the minimum bend radius allowed for each UL Listed product. This will eliminate any confusion as to how to properly install and incorporate these products into the overall hydraulic calculation for the sprinkler system while providing building owners, contractors, engineers and AHJ's with pertinent information related to the UL Listing.

Upcoming Events:

ICC Annual Conference & Final Action Code Hearings for 2009 Codes

September 14-20, 2008
Minneapolis, Minnesota

8th World Plumbing Conference

September 24-27, 2008
Calgary, Alberta, Canada

IAPMO Convention

September 28-October 2, 2008
Atlanta, Georgia

PHCC 126th Annual Convention

September 29-October 4, 2008
Atlanta, Georgia

ISH North America

October 1-3, 2008
Atlanta, Georgia

WaterSmart Innovations Conference

October 8-10, 2008
Las Vegas, Nevada

ASPE 2008 Biennial Convention and Engineered Plumbing Product Expo.

October 25-29, 2008
Long Beach Convention Center, Long Beach, California
http://www.aspe.org/new/Conv_Symp/conv-symp2008.php

ASSE 2008 Annual Meeting

November 19-23, 2008
Hyatt Regency Grand Cypress Resort, Orlando, Florida



Visit <http://www.worldplumbing.org/2008.html> for More information regarding the 8th World Plumbing Conference that will be taking place in Calgary, Alberta, Canada September 24th-27th, 2008

NSF/Uniform Plumbing Code Certification Marks

From *Plumbing & Mechanical: www.pmmag.com, June 2008*

For decades, NSF has certified products to the standards in the Uniform Plumbing Code (UPC). Section 301.1.1 of the UPC states, "All pipe, pipe fittings, traps, fixtures, material and devices used in a plumbing system shall be listed or labeled (third party certified) by a listing agency (accredited conformity assessment body)..."

The UPC, which is the model code used by some U.S. jurisdictions, also requires products to be certified to the plumbing material standards in Table 14-1 of the code. The NSF Mark, which indicates product certification to a standard accepted in the UPC, is sufficient to demonstrate code compliance.

Although not technically required, many inspectors have asked for a mark that demonstrates compliance with the entire code itself, rather than just the product standard(s).

NSF certifies products to the Uniform Plumbing Code as an optional benefit to manufacturers, inspectors and users. Products also listed to the Uniform Plumbing Code bear the NSF-U.P. Code mark. NSF certification has been accepted in all U.S. jurisdictions that use the Uniform Plumbing Code. To date, NSF has certified more than 100 manufacturers and 7,800 products to the U.P. Code, and hundreds of other manufacturers demonstrate product certification by listing their products to the NSF/ANSI standards referenced in the UPC.°

NSF Certification of Plastic Piping for Portable Water

from *NSF The Plumbing Bulletin, Spring/Summer 2008*

NSF certifies portable water plastic piping to the American National Standard, NSF/ANSI Standard 14-*Plastic Piping System Components and Related Materials* in addition to other required U.S. and Canadian standards. NSF/ANSI Standard 14 provides a significant benefit by combining the minimum physical, performance, health effects, product testing, long-term strength and quality control requirements that are key to ensuring proper product performance in the field.°

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