The Authoritative Source for Plumbing, Hydronics, Fire Protection and PVF

Plumbing Engineer®

A TMB Publication

Find us on Facebook & Twitter
twitter.com/plumbingeng
facebook.com/PlumbingEngineer

ASPE

THE OFFICIAL PUBLICATION OF THE AMERICAN SOCIETY OF PLUMBING ENGINEERS

April 2012

Scan with your smart phone to renew your subscription to *Plumbing Engineer.*

Hands-free Technology

Exploring the issues of hygiene, water efficiency and cost savings.

ALSO INSIDE:

- Harvesting the Rain
- Piping Needs Met on Federal Modernization Project
- Legionnaire's Disease: Have We Learned Anything?

Water Goes In

SURE SEAL

Odors Stay Out!

Certified Fully ASSE 1072 Compliant

ASSE Listed: 1409
ICC-ES Listed: PMG-1070
IAPMO Listed: C-4165

TRAP PRIMER

ODORS

BUGS

NO PROBLEMS!

STOP floor drain odors before they start with waterless trap protection.

✓ New Construction ✓ Repair & Retrofit

100% SAFE & EFFECTIVE!

SureSeal eliminates the need for expensive and failure prone trap primers, yet blocks the emission of noxious sewer gases from backing-up into living or work areas. SureSeal is cost effective, simple to install, and easy to maintain; eliminating complex, time consuming, and expensive repairs when trap primers fail.

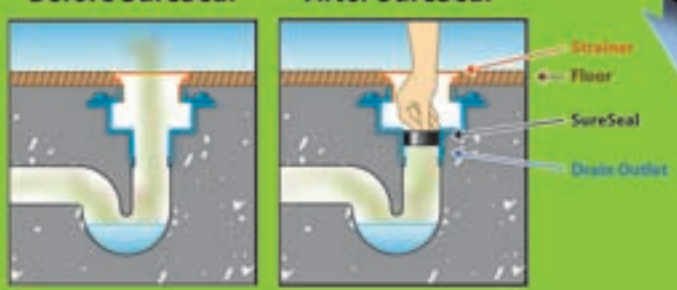
Visit www.TheSureSeal.com/pe for a video demo and to download test results, specifications, and detailed product information.

Available in 4 sizes: 2", 3", 3.5" & 4"

- Stops floor drain odors
- Resistant to lime scale and microbiological growth
- Effective alternative to trap primer replacement
- Fast & simple to Install
- No special tools or silicon needed
- Prevents insects from escaping the drain
- No Effective Flow Restriction
- Suitable for both new & retrofit applications
- Eliminate Callbacks
- 10 year Limited Warranty

Before SureSeal

After SureSeal



Ideal for use in the following applications:

- Washroom Drains
- Shower Drains
- Basement Drains
- HVAC & Maintenance Areas
- Outdoor Drains
- Condensation Drains

ASSE USA C IAPMO ICC ES PMG PHCC

SureSeal
www.TheSureSeal.com/pe
877-201-2663

Circle 1 on Reader Reply Form on page 69

Circle 2 on Reader Reply Form on page 69

Photo courtesy of Bradley Corp.

Plumbing Engineer®

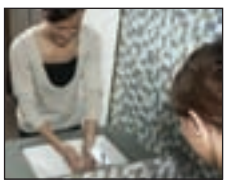
A TMB Publication

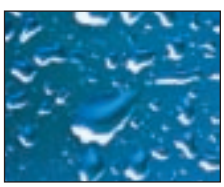
THE OFFICIAL PUBLICATION OF THE AMERICAN SOCIETY OF PLUMBING ENGINEERS

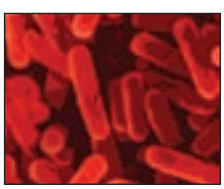
Volume 40, Number 4, April 2012

INSIDE THIS ISSUE

FEATURES







ASPE REPORT

COLUMNS

DEPARTMENTS

THE **CORE** OF A PROFESSIONAL **HYDRONIC INSTALLATION**

2012 AHR Expo® INNOVATION AWARDS Value Impact HONORABLE MENTION

PATENTS PENDING

Webstone Ball Drain™

Webstone Isolator® with Rotating Flange & Drain

T-Flow Ball for Compact Design

T Flow R

Directs flow into either the boiler or purge drain.

Integrated Mesh "Y" Strainer with Rotating Flange

Precision-Crafted Closely Spaced Tees for Hydraulic Separation

Three Union Connection Styles

1. Basic Connection
2. 1/4" Plugged Pressure Gauge Port (shown)
3. With Multiple Device Ports

HYDRO-CORE™

EASILY INSTALL & SERVICE ANY NEAR BOILER OR SECONDARY CIRCUIT LOOP

- **Replaces 15 components**
- **Eliminates 13 connections**
- **Saves nearly 2 hours of labor**

Webstone

VALVE INNOVATION

Technical information available at:
www.webstonevalves.com/hydrocore
(800) 225-9529

Circle 3 on Reader Reply Form on page 69

INSTALLATION KITS AVAILABLE TO FIT OVER 100 DIFFERENT BOILERS FROM:

BAXI • BIASI • BURNHAM • CROWN BOILER • ECR - DUNKIRK • ECR - UTICA • HEAT TRANSFER PRODUCTS • IBC TECHNOLOGIES • LAARS • LOCHINVAR • NAVIEN • NORITZ • NY THERMAL INC • PEERLESS • PENSOTTI • RAYPAK • SIME • SLANT FIN • TRIANGLE TUBE • VIESSMANN • WEIL-MCLAIN • WILLIAMSON-THERMOFLO

Editor's Letter

John Mesenbrink, editorial director
editor@plumbingengineer.com

ACCA: Beyond the palindrome

The newly formed Radiant & Hydronics council (RHC) has gained more momentum as it shared part of the 2012 ACCA Conference — which boasts the largest, most exciting learning experience for indoor environment businesses — held in Las Vegas, March 5-8. Look for a more involved radiant and hydronics representation at next year's show. Also, stay tuned as the RHC looks to sponsor "The Hydronics Roundtable," a new two-day conference aimed at hydronics professionals, tentatively set for later this fall. The conference will feature a variety of learning labs led by leading hydronics contractors.

Formed only five months ago, the ACCA Radiant & Hydronics Council (RHC) has attained a membership of more than 500 contracting businesses, making it the largest hydronics contracting organization in the country. "We are extremely pleased with the number of contractors we have on board with the RHC," said Paul T. Stalknecht, ACCA president and CEO. "We knew there was a need for a contractor-led organization that was focused on hydronics when we started the RHC, and the response we've seen shows us that we were on the right track. Led by a dedicated and knowledgeable group of hydronics contractors, the RHC is just getting started, with new training materials, products and events underway for 2012."

The broad goal is to have a strong organization that represents the hydronics contractor. "We are a contractor-focused, contractor-driven and contractor-led organization," said Dan Foley, chairman of the RHC. This council could not have been organized without the support of ACCA. According to Foley, "We are an advisory council that reports to, and is accountable to, the ACCA Board. We are part of ACCA. The entire organization covers the entire comfort equation: heating, cooling, radiant, hydronics, humidification, filtration and IAQ. All of these components are necessary to deliver comfort to our clients. No one component can stand alone. It is only natural for one organization to cover all aspects of comfort delivery. ACCA is it."

One of the most valuable tools is the ACCA MIX (Management Information Exchange) Groups. "ACCA has had this program in place for years but we are tailoring this program to hydronics contractors. Think of it as a board of directors for your company. Like-minded, non-competing contractors meet several times a year to compare best practices, review financials and share ideas. This is one of the most popular and well-regarded ACCA resources," said Foley.

The Air Conditioning Contractors of America (ACCA) is a non-profit association serving more than 60,000 professionals and 4,000 businesses in the HVACR community, who work together to promote professional contracting, energy efficiency, and healthy, comfortable indoor environments. For info, www.acca.org. ■

PLUMBING ENGINEER
(USPS 567-950)
ISSN 0192-1711

PLUMBING ENGINEER (USPS 567-950) ISSN 0192-1711 is published monthly by TMB Publishing Inc., 2165 Shermer Rd., Suite A, Northbrook, IL 60062. Phone (847) 564-1127, Fax (847) 564-1264. Magazine is free to those who design and specify plumbing/piping systems in commercial, industrial, institutional and governmental buildings; as well as government officials and plumbing inspectors. Subscription rates for U.S. and Canada: $50 for one year, $90 for two years. Other countries: $300 per year. Periodical postage paid at Northbrook, IL, and additional mailing offices. POSTMASTER: Change of address should be sent to ***Plumbing Engineer***, 440 Quadrangle Dr., Suite E., Bolingbrook, IL 60440. Material and opinions contained in contributed articles are the responsibility of the authors, not of TMB Publishing Inc., *Plumbing Engineer* magazine or its Editorial Advisory Board. The publisher cannot assume responsibility for any claims made by advertisers.

Volume 40, Number 4. *Plumbing Engineer* is microfilmed by University Microfilms, Ann Arbor, MI, and indexed by Engineering Index Inc. Publications Mail Agreement No. 41499518. Return Undeliverable Canadian Addresses to PO Box 503, RPO West Beaver Creek, Richmond Hill ON L4B 4R6

Plumbing Engineer
A TMB Publication

THE OFFICIAL PUBLICATION OF THE AMERICAN SOCIETY OF PLUMBING ENGINEERS

Editorial, Advertising, Production, Accounting and Administrative Offices

2165 Shermer Rd., Suite A
Northbrook, IL 60062
(847) 564-1127 • Fax: (847) 564-1264
E-mail: *info@tmbpublishing.com*

Owner
Tom M. Brown

Editorial & Production Staff
John Mesenbrink, *Editorial Director*
Marilyn Cunningham, *Associate Editor*
Cate C. Brown, *Production Manager*
Mark Bruno, *Art Director/Prepress*

ASPE Managing Editor
Gretchen Pienta
gpienta@aspe.org

Contributors
Timothy Allinson, P.E., *Designer's Guide*
Sam Dannaway, *Fire Protection*
Ron George, CPD, *Code Classroom*
Dan Foley, *Hydronics*
Bob "Hot Rod" Rohr, *Green Systems*
Bristol Stickney, *Solar Solutions*

Sales Staff
Brad Burnside, Publisher, *East sales*
2165 Shermer Rd, Suite A, Northbrook, IL 60062 Phone: 847/564-1127
Cell: 224/659-3984
Fax: 847/564-1264
E-mail: brad@tmbpublishing.com

David Schulte
Midwest, South and E. Canada sales
2165 Shermer Rd, Suite A, Northbrook, IL 60062 Phone: 847/564-1127
Cell: 847/420-4686
Fax: 847/564-1264
E-mail: dave@tmbpublishing.com

Diane Spangler
West, Texas and W. Canada sales
PO Box 9802, Fountain Valley, CA 92728 Phone: 714/839-6700
Fax: 714/839-6777
E-mail: diane@tmbpublishing.com

ASPE Offices
2980 S. River Road
Des Plaines, IL 60018
(847) 296-0002 • Fax: (847) 296-2963
info@aspe.org

The more you use it, the smarter you get.

NEW

leonardvalve.com

Water temperature control made easy

Built for your busy schedule, leonardvalve.com has made it easier to access Leonard when and where you need it.

- ☐ Easy navigation
- ☐ Straightforward product details
- ☐ Direct link to experts
- ☐ Personalized project details
- ☐ Leonard exclusive CASPAK® sizing software

Stay connected and boost your support of water tempering requirements with the brand you know and the service you demand: Leonard Valve. Visit the new leonardvalve.com and bookmark it today.

100 YEARS LEONARD

LEONARD®
WATER TEMPERATURE CONTROLS

Experience the NEW leonardvalve.com today!

Circle 4 on Reader Reply Form on page 69

Industry News

New ASPE student chapter formed at Wentworth Institute of Technology

CHICAGO — The American Society of Plumbing Engineers (ASPE) announced the recent formation of a student chapter at the Wentworth Institute of Technology (Wentworth) in Boston. The student chapter held its first meeting on January 31, 2012. The chapter is currently comprised of 13 students representing Bachelor of Science programs in mechanical engineering technology and architecture. Students participating in the chapter will have access to ASPE technical presentations and publications, mentoring opportunities with practicing engineers and designers and networking connections that will be with them their entire careers.

Frederick Neth, EIT, ASPE Boston chapter vice president, technical and lead mechanical engineer at Parsons Brinckerhoff, has taken the lead in working with the faculty and students of Wentworth to help form the student chapter. Neth notes, "As a proud alumnus of Wentworth, I understand the importance of mentoring and working with today's students to help them set a strong foundation for future success in the field of plumbing engineering and design and, more importantly, helping them to be successful in all aspects of their lives."

Neth thanks Ryan Eisenhauer, a student at Wentworth, who was elected president of the student chapter. "Ryan has been the driving force in helping bring the student chapter together," Neth says. "His enthusiasm and passion are the two critical components that led us to our first meeting, and I am confident that he will lead the chapter to continued success in the future."

The Wentworth-ASPE student chapter will have direct support from the ASPE Boston chapter. Richard Dean, CPD, ASPE Boston chapter president and senior plumbing designer at Vanderweil Engineers LLP, states, "Many of our Boston chapter members received their engineering degrees from Wentworth, and we are committed to giving back to the Wentworth community by supporting the new student chapter. I am particularly excited about working with all stakeholders in the plumbing community, including manufacturers and contractors, to set up internship programs for the student chapter members."

ASPE president William F. Hughes Jr., CPD, LEED AP, FASPE, comments, "There is no doubt that the future success of our profession is largely based on encouraging engineering and technology students to consider entering the field of plumbing engineering and design. ASPE is committed to working with all of our local chapters to build strong relationships with universities and colleges to create a national network of student chapters."

Fire-safety hazards of lithium-ion batteries featured in latest NFPA Journal

QUINCY, MASS. — The latest issue of the NFPA Journal, the official magazine of the National Fire Protection Association (www.nfpa.org), focuses on concerns related to fire-safety hazards of lithium-ion battery use in its cover story, "Elemental Questions." NFPA has conducted research and established several partnerships to study and address fire-safety risks associated with lithium-ion batteries, a fuel source used for hundreds of millions of devices.

The electric vehicle industry has invested heavily in lithium-ion technology to power its products and the rise in the number of electric vehicles on roads presents new challenges for emergency responders. A recent incident involving a Chevrolet Volt which caught fire a few weeks after passing a crash test brought closer examination to issues related to lithium-ion batteries in vehicles and NFPA is working with government agencies, insurers, and car manufacturers to address these issues on a national scale.

Education, entertainment on tap for 2012 NFPA Conference & Expo

The 2012 NFPA Conference & Expo is a four-day opportunity for fire and life safety professionals to share best practices, find solutions to safety challenges and stay abreast of technological innovations in their fields. The conference will be held at the Mandalay Bay Convention Center in Las Vegas June 11–14.

The annual conference and expo is the year's largest and most important event for the fire protection, life safety and electrical industries. Attendees will have more than 130 education sessions to choose from in 12 tracks, plus opportunities to learn more about the latest fire and safety-related products presented by 300 exhibitors.

This year's featured presentation, "9/11: Leadership Before and After the Crisis," given by Chief Jay Jonas, a deputy chief in the New York City Fire Department, will take place on Tuesday, June 12. Jonas is one of only 20 people who remained inside the Twin Towers when they collapsed and survived the incident.

The Association Technical Meeting, a collaborative forum for experts to set the stage for new safety and building standards, will begin at 2 p.m. on Wednesday, June 13.

ASSE releases white paper to address, minimize potential water heater scald hazards

WESTLAKE, OHIO — The American Society of Sanitary Engineering (ASSE) has released a white paper intended to educate and give guidance on minimizing potential water heater scald hazards. "Understanding Potential Water Heater Scald Hazards: A White Paper" was developed by the American Society of Sanitary Engineering Scald Awareness Task Group; a group comprised of 36 industry professionals who have dedicated their time and expertise to the development of this paper.

The ASSE Scald Awareness Task Group was formed

More Industry News on page 10

Rheem

The new degree of comfort.™

COMMERCIAL WATER HEATERS

MAXIMUM PERF°RMANCE

Delivering High Efficiency and Real Savings for Today's Businesses

The Rheem SPIDERfire is the perfect solution for many restaurants, schools, hotels and laundromats looking for a highly efficient way of producing large volumes of hot water — it's sure to take a bite out of fuel costs:

- Up to 97% thermal efficiency
- Twelve ultra high efficiency 80- and 100-gallon models
- Patented multi-pass heat transfer system eliminates hot spots
- Operates on natural gas or LP
- Ultra low NOx certified
- Single-pipe power vented or two-pipe power direct vented
- Eye-level LCD diagnostics

Visit Rheem.com/spiderfire today or your local independent Rheem distributor to learn more.

SPIDERfire®

INTEGRATED AIR & WATER

Rheem.com

Circle 5 on Reader Reply Form on page 69

Continued from page 8

to educate the general public and plumbing industry about scalding hazards associated with hot water at the point of use. "Understanding Potential Water Heater Scald Hazards: A White Paper" focuses on the general misconception that the water hear thermostatic control is capable of delivering a consistent and safe water temperature without further temperature-control downstream of the water heater outlet.

This paper gives examples of problems associated with relying solely on the thermostatic setting at the water heater as the primary water temperature control, details how scalding, thermal shock and other health-related concerns can be avoided, and explains how to properly control the final point-of-use temperature.

"Understanding Potential Water Heater Scald Hazards: A White Paper" can downloaded at: www.asse-plumbing.org/WaterHeaterScaldHazards.pdf.

Fire Protection System Solutions rebranded

MATTHEWS, N.C. — Conbraco Industries Inc. has introduced Apollo® Fire Protection System Solutions (FPSS), the most recent addition to its Apollo® brand. The fire protection fittings were previously sold through Elkhart Products Corporation. Both Conbraco Industries and Elkhart Products Corporation are Aalberts Industries companies.

This rebranding strategy will capitalize on the well-recognized Apollo brand, adding to their wide range of UL/FM approved products. Currently, Apollo offers backflow prevention products, pressure reducing valves and pressure relief valves. Combining all these products under the Apollo FPSS brand will increase the service levels of all fire protection products to the industry, providing the high quality products, exceptional sales support and on-time delivery customers have come to expect.

At the heart of the Apollo Fire Protection System Solutions are the Xpress galvanized and stainless steel piping systems. The Xpress fittings are a labor saving, high quality addition to traditional threaded pipe and fittings. These press fittings are ideal for both new construction and retrofit projects such as hospitals, hotels, schools, food and beverage facilities or any other buildings with complex fire sprinkler layouts. For info, www.conbraco.com.

ASHRAE standards available as downloadable offerings from ICC

WASHINGTON, D.C. — For easy access and application for codes and standards users, the International Code Council (ICC) is collaborating with ASHRAE to make construction industry safety standards, as referenced in the 2012 International Codes, available to the building industry in a downloadable PDF format from www.iccsafe.org.

"In today's mobile, digital environment, building officials and other professionals demand information, including industry standards, anytime, anywhere. We are proud to feature additional ASHRAE titles in our growing digital standards library," ICC executive vice president & director of business development Mark A. Johnson said.

The latest series of standards from ASHRAE available in the ICC digital standards library include, but are not limited to:

- *ANSI/ASHRAE 15 — 2010 — Safety Standard for Refrigeration Systems and Standard 34-2010 — Designation and Classification of Refrigerants*
- *ANSI/ASHRAE 62.1 — 2010 Ventilation for Acceptable Indoor Air Quality*
- *ANSI/ASHRAE/IES 90.1 — 2010 Energy Standard for Buildings Except Low-rise Residential Buildings (ANSI/ASHRAE/IESNA 90.1 — 2007)*
- *ANSI/ASHRAE 140 — Standard Method of Test for the Evaluation of Building Energy Analysis Computer Programs (2007 and 20011)*
- *ASHRAE 193-2010 Method of Test for Determining the Airtightness of HVAC Equipment*
- *ANSI/ASHRAE 55-2010 Thermal Environmental Conditions for Human Occupancy*
- *ANSI/ASHRAE 62.2-2010 Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings.*

Eemax Inc. plans expansion

OXFORD, CONN. — For nearly a quarter century, Eemax Inc. has grown both physically and in terms of sales. With further expansion anticipated, the company has outgrown its Oxford, Conn. headquarters and is searching locally for larger facilities, with hopes of moving by this September.

(Left to right) Eemax's Jeff Hankins, vice president of operations and technology, and Kevin Ruppelt, president and CEO explain to U.S. Rep Jim Himes how their company has managed to grow even during challenging economic times. Eemax has outgrown its Oxford headquarters and is currently searching for larger facilities in the local area.

U.S. Rep. Jim Himes (D-Conn., 4th District) recently paid a visit to the Eemax headquarters. Himes aggressively works to connect small businesses with government resources and strives to ensure that local businesses have access to the capital they need to invest in their operations.

More industry news on page 12

SPEAKMAN®

the KEY for every application


EYEWASHES


ELECTRONIC FAUCETS


FLUSH VALVES


SHOWERHEADS


SPACESAVER EYEWASH


SHOWER VALVE


MECHANICAL FAUCETS

EDUCATION

- Public Restroom
- Science Lab
- Locker Room
- Janitorial Closet
- Boiler Room

HEALTHCARE

- Public Restroom
- Chemistry Laboratory
- Patient Room
- Nurses Station
- Janitorial Closet
- Boiler Room

HOSPITALITY

- Public Restroom
- Guest Bathroom
- Kitchen
- Janitorial Closet
- Boiler Room

SPEAKMAN®

Absolutely the best.

WWW.SPEAKMANCOMPANY.COM

Circle 6 on Reader Reply Form on page 69

Industry News

Continued from page 10

"Small businesses are the heart of our economy," said Himes. "They create almost all of our new jobs and provide a daily demonstration of the entrepreneurial spirit."

Eemax is a positive example of a successful and growing U.S.-based manufacturing facility. "Eemax exhibits true American spirit by manufacturing innovative 'green' products that save energy, water, time, space, and money," said Congressman Himes. "Their high quality products create jobs, because they are manufactured right here in our own backyard."

Zurn Industries celebrates World Plumbing Day

ERIE, PA. — On March 11, as members of plumbing organizations across the world joined together to recognize World Plumbing Day and to promote the vital role the plumbing industry plays in protecting public health and safety, Zurn Industries LLC announced that its entire line of products will be available "lead-free" by the close of 2012.

Inspired by their relationship with NSF International (NSF) and their dedication to offer the highest-quality and safest products available, Zurn products will comply with NSF low-lead Standard 61: Drinking Water System Components – Health Effects, Annex G requirements more than a year in advance of the deadline mandated by the Reduction of Lead in Drinking Water Act.

"Zurn focused resources early to create product solutions, and we are pleased to announce we will be in compliance ahead of schedule," said David Scelsi, director of product management & engineering, Zurn Commercial Brass Operation.

The Reduction of Lead in Drinking Water Act (S. 3874) requires that any valve, fitting or fixture coming in contact with potable water must meet NSF/ANSI Standard 61-G requirements, having weighted average of less than 0.25 percent lead content. The law will take nationwide effect on January 4, 2014, but states like California and Vermont have already begun enforcing it. Other states may soon follow. With their early compliance, Zurn becomes the leader in lead-free applications and global awareness of lead-related health issues.

Centrotherm system approved by A.O. Smith and Bradford White

ALBANY, N.Y. — Centrotherm Eco Systems® InnoFlue® can now be utilized on all A.O. Smith residential power direct vented (PDV) tanked water heaters that accept PVC or CPVC. This includes units under the A.O. Smith, GSW, State and John Wood brands.

"A.O. Smith's approval of InnoFlue will provide a significant competitive edge for the company's product lines. This will provide owners of A.O. Smith power direct vented residential tanked water heaters with a flue gas delivery system that will eliminate restrictions associated with flue gas temperatures. Our flexible venting options allow

More Industry News on page 14

The 3500 Series

Style, convenience, and affordability.

The 3500 Series brings Chicago Faucets quality and a new, modern look to our line of water conserving metering faucets.

The 3500 is easy to install, easy to operate, and easy on the budget. It can also help dramatically reduce water use when compared to older, conventional faucets. And since it's from Chicago Faucets, you can count on long lasting operation and simple maintenance.

For a free brochure on our metering faucets, call 800/323-5060 or circle the number below on the reader service card.

Like us on Facebook

facebook.com/ChicagoFaucets

Use your smart phone to scan this code for more information on the newest addition to the industry's leading line of water conserving metering faucets.

CHICAGO FAUCETS

a Geberit company

www.chicagofaucets.com

800/323-5060

Circle 9 on Reader Reply Form on page 69

Continued from page 12

for the reuse of an existing B-vent to be used as a chase," notes Joel Dzekciorius, vice president of operations.

Bradford White has approved InnoFlue for their high efficiency condensing commercial, power direct vent commercial, residential power direct vent and residential power vent model series.

ESP-System Syzer available as a mobile app

MORTON GROVE, ILL. — Xylem Inc.'s popular Bell & Gossett ESP System Syzer® is now available for mobile handheld devices. The ESP-System Syzer is extremely accurate at calculating flow rates and pressure drops in piping systems.

The new mobile app version of this industry-standard tool now allows HVAC professionals to easily download it on an iPhone® or iPad® and to enjoy the same functionality while working in the field.

The ESP System Syzer performs several critical calculations and offers a variety of unique features, including:

• Calculating the friction loss and velocity through various pipe types and sizes based on existing fluid conditions.

• Calculating the relationship between fluid temperatures, system flow and heating/cooling load.

• A unique Cv tool that shows the relationship between Cv, flow and head and accounts for fluid properties.

• A pipe length/pressure drop tool that interfaces with the other calculators to view the relationship between pipe length, friction loss and total head loss.

• A bundled Circuit Setter®/triple duty valve calculator that is very useful during the design phase to help predetermine valve settings and out in the field to determine flow through the valves based on pressure drop readings.

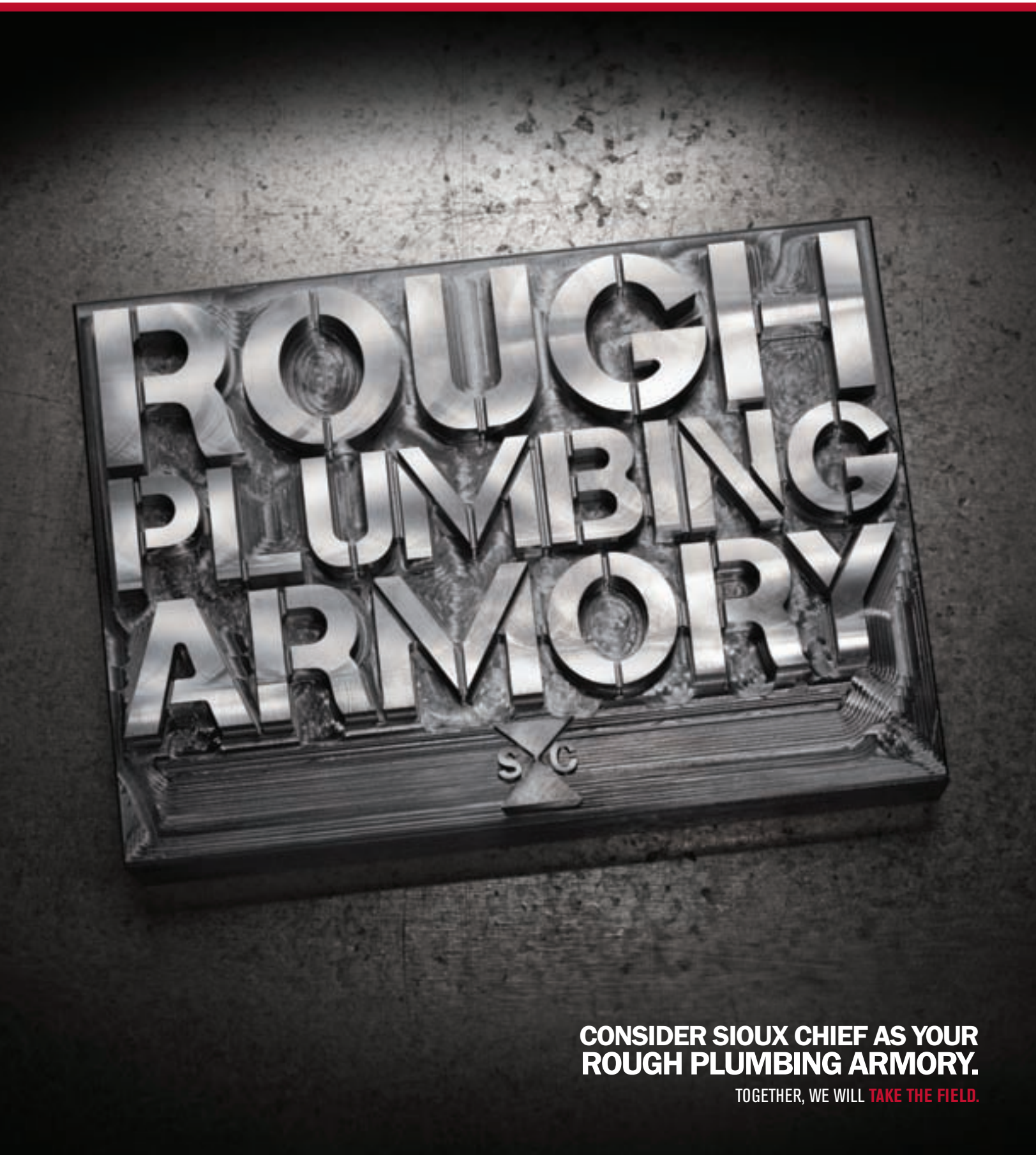
IAPMO ES renamed as Uniform Evaluation Service

ONTARIO, CALIF. — The agency that has been providing top-notch service in the field of building product certification since 1936 is getting a new Uniform.

A Uniform Evaluation Report from IAPMO's Uniform Evaluation Service, formerly IAPMO ES, will provide manufacturers with the only tool they need to ensure that their products are completely in compliance with all applicable codes and standards.

Richard Beck, director of Evaluation Services, said the

More industry news on page 16



CONSIDER SIOUX CHIEF AS YOUR ROUGH PLUMBING ARMORY.

TOGETHER, WE WILL TAKE THE FIELD.

Supply | Drainage | Support

www.siouxchief.com

TAKE THE FIELD.

Sioux Chief

Circle 11 on Reader Reply Form on page 69

Industry News

Continued from page 14

name change reinforces IAPMO's relationship with the Uniform family of codes, which includes the *Uniform Plumbing Code® (UPC), Uniform Mechanical Code® (UMC), Uniform Solar Energy Code® (USEC)* and the *Uniform Swimming Pool, Spa and Hot Tub Code® (USPC)*.

OASIS partners with Philips

COLUMBUS, OHIO — OASIS International has partnered with Philips Lighting to integrate a unique disinfection solution in OASIS's water coolers.

For the first time, water dispensed from coolers can be disinfected instantly and efficiently, on-demand with the Philips InstantTrust solution and will soon be available in the OASIS KALIX® water cooler and in Aqua Pointe® and VersaFiller® bottle fillers.

Taco offers full-line BIM and CAD content

CRANSTON, R.I. — Taco continues to invest in BIM technology and digital modeling. Buyers and specifiers will soon have digital access to information they require for all Taco products when designing or assembling HVAC and hydronic systems.

"We're committed to providing state-of-the-art modeling for all Taco technology, especially considering the value it adds when building green and sustainable mechanical systems," said Eugene Fina, Taco commercial product manager.

Taco's Innovation and Development Center Project ahead of schedule

Work on Taco's new Innovation and Development Center is continuing at a fast pace. When complete, the building will offer a high-tech, hands-on learning environment for the most advanced HVAC equipment available today.

The Taco Innovation & Development Center will be a state-of-the-art learning and training facility, complete with new classroom spaces, conference rooms, a business center, and functional labs for testing and teaching. The HVAC products and systems will be visible throughout the entire facility forming "Living Laboratories" that allow for close-up viewing, hands-on learning and teaching.

Taco Expands FloPro Factory Training for 2012

Taco's FloPro Factory Training offers a broad range of professional development opportunities for plumbing and heating contractors in 2012. Participants learn to grow

their hydronic expertise and boost profitability. All hands-on classes offer useful information and experience. Their popular webinar series will be held once a month, free of charge. The company will focus its efforts on its most popular, John Barba-driven course: the 'Compleat' Boiler Room (CBR). These 2-day factory classes are NATE-Recognized and NORA Approved. This two-day program is designed for and will benefit any experienced hydronics installer or designer. Class information and online registration is available at www.floproteam.com.

Course Schedule:

"Field Factory" Training
- April 12-13 — BJ Terroni -Bensalem, Pa. — Compleat Boiler Room
- May 10-11— Wales-Darby – Warren, N.J. — Hydronic Control Strategies
- June 28-29 — Wales-Darby – Islandia, N.Y. — Hydronic Control Strategies
- July 23-27 — JTG Muir – Berkley, Calif. — Compleat Boiler Room
- Aug 2-3 — McCoy Sales – Denver — Compleat Boiler Room

Factory Training at Taco
- July 19-20 CBR - Cranston, RI
- Aug. 23-24 CBR - Cranston, RI
- Sept. 27-28 CBR - Cranston, RI
- Oct. 11-12 CBR - Cranston, RI

Consortium for Energy Efficiency launches CEE Forum

BOSTON — Consortium for Energy Efficiency announced the launch of a new password-protected website, CEE Forum at CEEForum.org. With more than 130 member organizations, hundreds of stakeholders and thousands of participants on the committees that advance energy efficiency programs, there has been a pressing need for a more efficient, structured way for CEE members to work together alongside the relevant experts invited to contribute. The CEE Forum is one more tool for supporting this vital work.

Continued on page 70

Industry Movers

Watts expands Kinnaird's role

NORTH ANDOVER, MASS. — Watts announced that **Malcolm Kinnaird**, vice president, channel management and marketing for North America, has moved into an expanded role as vice president, sales, marketing and business development – Americas. Kinnaird will take on new responsibility for the U.S, Canadian, Mexican and Latin American market development and new business and channel partnerships.

Dahl makes changes to sales team

MISSISSAUGA, ONTARIO — Dahl recently announced several enhancements to the company's sales team. Gaylen Anderson will transition to his new role as an independent sales representative for Dahl and Thomas Husebye will take on the role of vice president of sales. Dahl also recently welcomed Mark Trenbeth as OEM sales manager.

PMI welcomes new committee co-chairs

ROLLING MEADOWS, ILL. — Plumbing Manufacturers International's (PMI's) president, Stewart Yang of Kohler Co., has made his selections for two chairs to serve on PMI's Focus and Standing Committees.

The Marketing Council will again be co-chaired by Rick Reles, vice president of kitchens, cast iron and corporate accounts worldwide for Kohler Co. Reles will serve alongside current co-chair Tim Doyle of Amerikam.

The Government Affairs Standing Committee will be co-chaired by Daniel Gleiberman, manager of product compliance and government affairs for Sloan Valve Company. Gleiberman will co-chair the committee with David MacNair of InSinkErator.

Component Hardware expands sales/marketing team

LAKEWOOD, N.J. — Component Hardware Group has appointed Lois Schneck as director of marketing and promoted Kevin Tumpey to business development and sales operations manager.

BMI CANADA names VP of business development

BOISBRIAND, QUEBEC — Marc Bouthillette, President of BMI CANADA INC. announced the nomination of Mike Lavoie as vice president, business development. Since his joining BMI as Eastern Canada sales manager in 2005, Mike has significantly contributed to the achievement of growth objectives of the company.


Omnivore™ X2
2-Stage Grinder
Unleash the power and reliability of the OmnivoreX2 with patented V-Slice® cutter technology.
Now in a high-head, 2-stage design.
• High-head performance to 185' max. TDH.
• Robust curve and head pressure allow for installation where progressive cavity style pumps have traditionally been installed.
• Better cutting and macerating.
• Improved reliability.
• Improved flow.
• Complete interchangeability with single stage Omnivore® units.
Liberty Pumps®
800-543-2550
www.libertypumps.com
Circle 14 on Reader Reply Form on page 69
U.S. patent #7,159,806
Copyright © Liberty Pumps, Inc. 2009 All rights reserved.
Inc. 5000
One of America's fastest growing, privately owned companies.

ASPE REPORT

AMERICAN SOCIETY OF PLUMBING ENGINEERS

From the President's Pen

William F. Hughes Jr., CPD, LEED AP, FASPE
2010-2012 ASPE PRESIDENT
aspepres@aspe.org

Earlier this year the American Society of Plumbing Engineers, the ASPE Boston Chapter, and Wentworth Institute of Technology took a giant step toward the promotion of plumbing engineering and plumbing product manufacturing. In case you haven't heard about this historic event, here is a segment of the opening statement from the press release:

"The American Society of Plumbing Engineers is proud to announce the recent formation of a student chapter at the Wentworth Institute of Technology located in Boston. The student chapter held its first meeting on January 31, 2012. The chapter is currently comprised of 13 students representing Bachelor of Science programs in mechanical engineering technology and architecture." You can read the entire press release in the "Industry News" section of this issue.

Wentworth Institute of Technology is an independent, co-educational institution offering career-focused education through 20 bachelor's degree programs in areas such as applied mathematics, architecture, computer science and networking, construction management, design, engineering, engineering technology, and management. It also offers master's degrees in construction management and architecture.

The formation of this student chapter would not have occurred without the hard work and dedication of a small group of individuals. The ASPE board of directors would like to thank two special individuals in particular who committed a lot of effort and countless hours to establishing this student chapter.

The first is graduate and alumnus of Wentworth Institute of Technology Frederick Neth, EIT, ASPE Boston Chapter vice president, technical and lead mechanical engineer at Parsons Brinckerhoff. Rick first brought this idea to the Boston Chapter board of directors, and they welcomed the program with open arms. Rick then presented the idea to his former student advisor and member of the faculty at Wentworth Institute of Technology, who graciously supported the idea and helped with the process.

The second is Ryan Eisenhauer, a student at Wentworth, who was elected to serve as the president of the Wentworth-ASPE Student Chapter. Ryan has been the driving force in encouraging students to become members of the chapter.

Rick and Ryan made several presentations to various groups of students about the formation of a student chapter, and their enthusiasm and passion toward the advancement of the profession are two critical components needed to begin such an undertaking, especially with an organization of all volunteers. These two individuals have been working on this program for more than a year, and it is only through their dedication and commitment that this student chapter became a reality.

ASPE realizes the importance of this endeavor and fully supports the efforts of the Boston Chapter and Wentworth students. Creating student chapters is important to the future growth and development of our Society. Getting students involved in plumbing engineering, providing quality educational tools to assist them in the development of their careers, and informing them about the profession and the industry are priorities of ASPE.

ASPE needs students as much as students need ASPE. We as a Society need to welcome and support young members and their new ideas. Doing this can only make the Society grow stronger and prosper. We need young members to build the future of ASPE and provide new leadership. These

potential leaders will bring fresh ideas and solutions to all segments of the industry.

The future success of our profession is based largely on encouraging engineering and technology students to consider entering the field of plumbing engineering and design. ASPE is committed to working with all of our local chapters to build strong relationships with universities and colleges to create a national network of student chapters. Several chapters have already expressed interest in starting the process, and ASPE is developing several new tools to help members and students who need information on how to start a student chapter. ASPE is also developing a database of colleges and universities to assist chapters in their search for potential new student chapters within their areas. Since this is a new program for ASPE, we are committed to continuously updating our process to streamline the program to provide as much information as possible in assisting the establishment of future student chapters. We also are formulating a bylaw amendment that specifically addresses the formation of student chapters—something we presently do not have. This new bylaw will be presented to the delegates at our Convention and Exposition in Charlotte later this year.

The education and mentoring of student members is an important part of this process. ASPE needs to help students and set a strong foundation for their future success in the field of plumbing engineering and design and, more importantly, help them be successful in all aspects of their lives.

Students, faculty, or ASPE members who are interested in working with ASPE to form a student chapter at their institution or chapter can contact any board member or Stacey Kidd, ASPE director of membership, at skidd@aspe.org for additional information.

The board of directors hopes that members understand the importance of and take an interest in developing a student chapter at their alma mater. We look forward to working with chapters and individuals who want to establish a student chapter of ASPE in their area. The establishment of student chapters will not only benefit ASPE and students—it also will benefit the industry. ***ASPE***

Join the Discussion

Twitter
LinkedIn
Facebook

Facebook:
ASPE: http://bit.ly/ASPEFacebook
LinkedIn:
http://linkd.in/ASPELinkedIn
Twitter:
ASPE: www.twitter.com/ASPEorg

New ASPE Members

Atlanta Chapter
Christopher Speaks

Baltimore Chapter
Erik Jankowiak

Boston Chapter
Pluton Angjeli
Timothy Begin, GE
Paul Francis Covino Jr.
Jose Manuel Herrera
Belinda Hinkley
Michael Ryan Horton
David Jimkovitz
Roger Michael Johnson
Jayson Drew Kimball
Ross Kyle Malin
Jonathan Oak
Doug Riccio
Javier Felipe Jimenez Rincon
Alan Wang
Dominique Mark Wilson

Central Florida Chapter
Richard Patrick Williamson

Central Indiana Chapter
R. Kevin Squires, GE

Central New York Chapter
Travis Ray Fisher, GE
Joseph Michael Parisella

Central Ohio Chapter
Teresa Lynn Dezelski, GE, LEED AP

Central Texas Chapter
Yasser Saleh Alqadi, GE

Charlotte Chapter
David Mark Goodson, PE, LEED AP

Cleveland Chapter
Derek Ryan Hunt

Dallas/Ft. Worth Chapter
Darin Scot Barnes
Jeff Musser, PE
Greg H. Swafford
Todd Joseph Weir

Greenville Chapter
Lawrence Smith

Houston Chapter
Kevin Milazzo

Intermountain Chapter
Max Lee Gandy, PE, LEED AP

Kansas City Chapter
Jeff S. Cretors

Member at Large
Jeremiah Scott Fugate
Mannan Mohammed, P.Eng
Michael J. Myatt

Minnesota Chapter
Jason J. Bloom
Alex Robert Dahl
Jon Edward Fox
Brian P. Jacobs
Erik C. Jensen
Samantha Pearl Lynch
Matthew Brian Marciniak
Douglas F. McGregor
John Dean Molitor
Gregory Barrett Moore
Leon A. Navarro
Kim Olson
Peter Ott
Michael Paul Peterson
Nathan Rafe Picht
Jareth Micheal Treat
Kao Vang
Thomas Martin Walters
Charlie Brian Worten

Montreal Chapter
Sylvain Hubert

New York City Chapter
Michael Andrew Piccirillo

North Florida Chapter
John Ashley Creech

Overseas Chapter
Naji Raymond Edde

Philadelphia Chapter
Steve Cavagnaro, PE

Phoenix Chapter
Scott A. Sellin

Pittsburgh Chapter
Sonny Raso

Quebec Chapter
Gilles Carrier

Raleigh Chapter
James Chandler, PE
Tony Goodson, PE

Seattle Chapter
Richard Arper, PE, Stirrett Johnsen Inc.
Shanti Oram, PE

Southern Nevada Chapter
Hans Grabau, PE

Southwestern Ohio Chapter
Pamela Jo McGill

West Coast Florida Chapter
Don Karr

Wisconsin Chapter
Dale Gallman

From the Executive's Desk

Jim Kendzel, CAE, MPH
ASPE EXECUTIVE DIRECTOR
jkendzel@aspe.org

I am writing this column primarily to owners of engineering and contracting firms. The following thoughts are based on the foundational belief that it is critical for your business for your engineers and designers to be knowledgeable in how existing products and systems function as well as what new technologies are coming into the market. If you agree, please read on.

Now, what if I told you how you can access an opportunity to keep your engineers and designers current on technology—without paying any registration fees? In addition, how you can be as efficient as possible and minimize the amount of time your engineers and designers spend away from the office to obtain that knowledge? ASPE offers a two-day training and professional development program every other year that exposes your engineers and designers to more than 300 different product manufacturers and thousands of existing and new products. The ASPE Convention and Exposition is what I am referring to, and this year it occurs in Charlotte, North Carolina, on October 29–30. That is right: you can send your engineers and designers to the Exposition portion of the program at no cost beyond the travel expenses, and they will be able to obtain valuable first-hand training on the products they specify. Having that knowledge and a direct connection with the suppliers of those products provides a significant return on investment by helping ensure that the systems they design for your clients are of the highest quality. This is the only plumbing exposition in North America where the emphasis is placed on the attendees learning about the products they specify.

Recognizing this significant value for little upfront investment, ASPE will be developing tools that will help those attending the Exposition obtain the information and knowledge that will serve them and you in the future in designing high-quality systems—with the ultimate result of client satisfaction. Attendees will be provided with educational programs prior to the show explaining how to plan for their visit, so they can "walk the floor" as efficiently as possible and know what types of questions they should ask when meeting with various manufacturers' representatives. In addition, we will be providing tools that will help your engineers and designers generate reports that will be of value to you and other employees within your organization.

Of course, I would encourage all of you to further support your employees by providing them with the opportunity to register for the tremendous Convention portion of the event, where seminars and other educational programs will be offered. However, I understand that this might not be feasible in the current economy. Yet you can still provide your employees with access to those who know the plumbing products and systems the best—the product and system manufacturers—for just the cost of travel.

By the way, if you are not an owner of an engineering or contracting firm but an engineer or designer who would like the experience of attending the ASPE Convention and Exposition, do not hesitate to share this article with your employer! I am sure you will agree: it is a value very seldom seen in today's world for such a small cost and time investment.

See you in Charlotte!

Nature's Fury

The first quarter of 2012 brought with it a host of weather-related disasters across the United States—from damaging winds and floods to devastating tornados. The ASPE board of directors and staff send our thoughts and prayers to those who were impacted by these events. If any member is in need of assistance, please do not hesitate to contact the ASPE headquarters at 847-296-0002 or your local ASPE chapter. ***ASPE***

Touch it on. Touch it off.

Addison® Bath Collection

Or go hands-free.

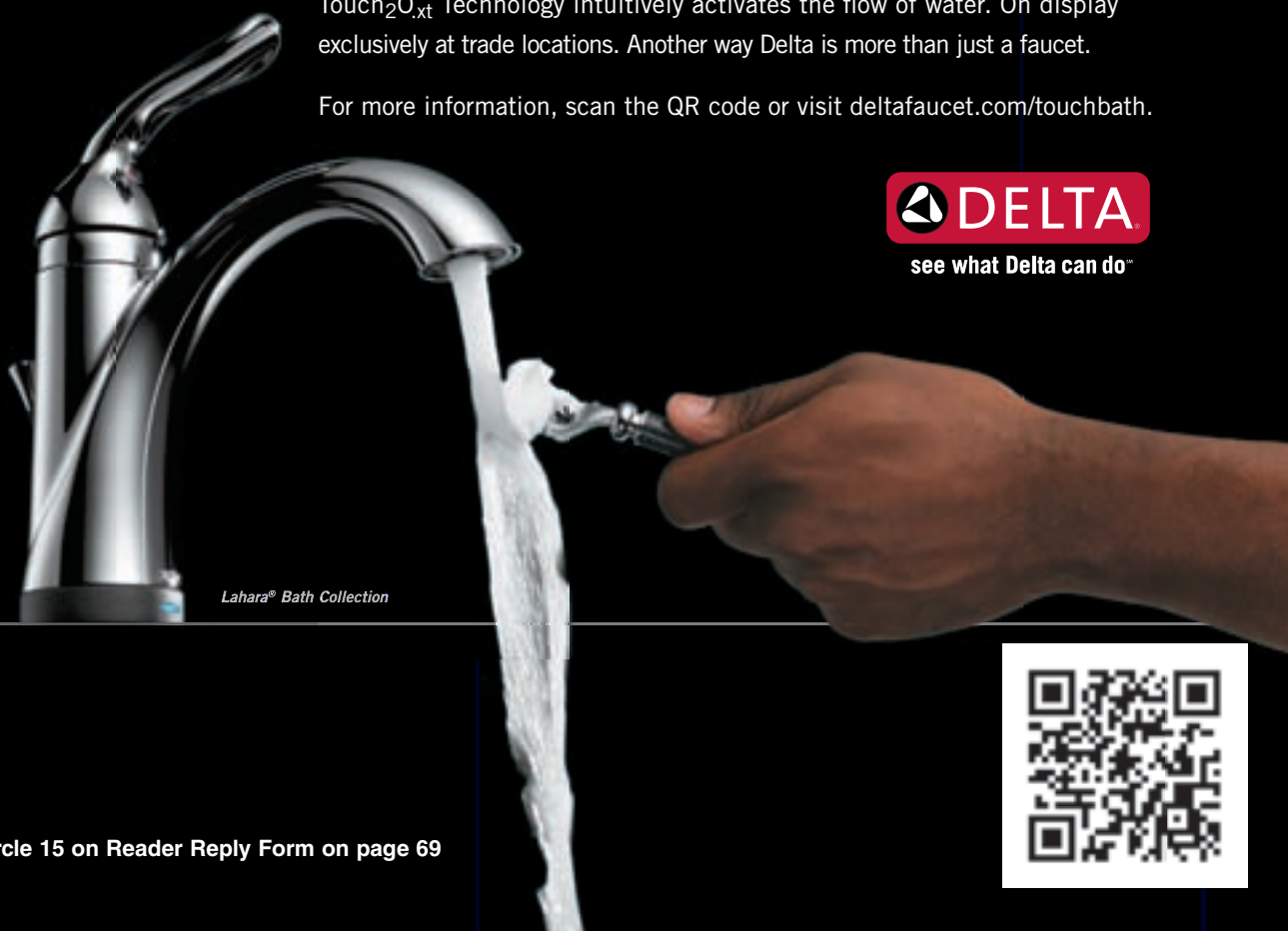
Touch$_2$O.$_{xt}$™ Technology for the bath.

A simple touch anywhere on the spout or handle turns the water on and off. For an even cleaner experience, when your hand moves close to the faucet, Touch$_2$O.$_{xt}$ Technology intuitively activates the flow of water. On display exclusively at trade locations. Another way Delta is more than just a faucet.

For more information, scan the QR code or visit deltafaucet.com/touchbath.

DELTA

see what Delta can do™



Lahara® Bath Collection

WaterSense Meets EPA Criteria
Certified by CSA International

Circle 15 on Reader Reply Form on page 69

Submit Your Proposed Bylaws Amendments by May 1

During the ASPE Business Meeting at the 2012 Convention and Exposition, chapter delegates will vote on proposed amendments—additions or modifications—to the ASPE Bylaws.

How to Submit an Amendment

Any member can propose an amendment, and every properly submitted amendment must be considered at the ASPE Business Meeting. According to the bylaws, proposed amendments must be submitted to the ASPE office at least 120 days prior to the Convention. Thus, the last day you can submit a change is June 29. However, if you would like the chapter presidents to have time to discuss your amendment at the region meetings this June, please submit it by May 1.

Proposals should contain the original bylaw and the modification, as well as a rationale for the change. (The ASPE Bylaws can be found at aspe.org under About ASPE.) Send your proposed amendment to ASPE Executive Director/CEO Jim Kendzel via e-mail at jkendzel@aspe.org or mail to 2980 S. River Road, Des Plaines, IL 60018.

All submitted amendments are published for the membership to review and are distributed to the chapters for discussion with the selected delegates. It is important to remember that no properly submitted amendment may be discarded. Once the executive director has received a properly composed bylaw modification, by the deadline, it will be published for all members to see. Only the proposing member can withdraw an amendment.

Role of the Bylaws Committee

The Bylaws Committee is responsible for reviewing amendments proposed by the membership and ensuring that they are properly worded and that all modifications are clearly delineated. If questions arise as to the intent of a change, the committee will contact the issuing member. The committee also is charged with continually reviewing the bylaws and proposing necessary edits and amendments to the board of directors.

How Is an Amendment Approved?

All proposed amendments are debated and voted on during the Business Meeting. Any proposed amendment may be modified from the floor for the purpose of clarification or elimination of conflict, if the change does not violate the spirit or intent of the proposed amendment.

To ensure sufficient time to fully review and understand the amendments, the Business Meeting has specific rules providing for a motion and a second for each amendment under consideration, followed by discussion. Depending on the scope and number of the proposed amendments, the chair may permit the actual vote to be delayed until the delegates have had sufficient time to discuss the proposals amongst themselves.

Neither the Bylaws Committee nor the board of directors will make specific recommendations regarding proposed amendments. Rather, each member of the committee and the board may speak freely as a delegate during the bylaw discussion period.

For an amendment to be approved, three-fourths of the delegates present and voting at the Business Meeting must vote affirmative.

It's in Your Hands

All ASPE members are responsible for maintaining and overseeing the Society's bylaws. They are yours to change as you see fit.

If you will not be a delegate to the Convention, be sure to carefully review all of the proposed amendments and tell your chapter delegates how you would like them to vote on your behalf. ***ASPE***

Read, Learn, Earn

Do you find it difficult to obtain continuing education units (CEUs)? Through this special series, ASPE can help you accumulate the CEUs required for maintaining your Certified in Plumbing Design (CPD) designation or numerous regulatory agency CE programs.

The process is simple: Each month, just go to **ASPE.org/ReadLearnEarn**, where you will find a PDF containing an article followed by a 12-question multiple-choice quiz and an application form. Read the article, answer the questions based on the article, and submit the form to the ASPE office. If you earn a grade of 90 percent or higher on the test, you will be notified that you have logged 0.1 CEU, which can be applied toward CPD renewal or numerous regulatory agency CE programs.

Tests are valid for one year, so you can earn up to 1.2 CEUs by successfully passing each test. (You can only receive one credit per test.) The cost is free for ASPE members and $35 per test for nonmembers.

Forms may be e-mailed to aspeeducation@aspe.org or faxed to 847-296-2963.

Attention Engineering Firm Owners and Principals

How can you help your young engineers and designers stay up to date on industry trends and technologies AND help your business flourish?

Encourage your employees to join ASPE!

The national and local networking available through ASPE help your employees develop invaluable relationships that will strengthen their abilities and, in turn, your business.

American Society of Plumbing Engineers
aspe.org

"These relationships give our engineers another avenue to discuss problems and ideas, which opens their minds to think outside the box. This type of thinking is what generates **better system designs** and, in the end, **better products and services for our clients.**"

Kevin M. Noble, PE, LEED AP, Principal
Scheeser Buckley Mayfield LLC
Uniontown, Ohio

Through ASPE, your employees can access:

- creative solutions to design challenges
- one-on-one interaction with local manufacturer reps
- new ideas to solve common problems
- training in the latest technologies
- current trends in design techniques
- innovative ways to approach their projects
- the combined knowledge of 6,200 plumbing engineers across North America

Invest in your employees and watch your company prosper. Encourage them to join ASPE today.

Learn how our resources help plumbing engineers excel by calling 847-296-0002 or visit ASPE.org.

Circle 16 on Reader Reply Form on page 69

Designer's Guide

Timothy Allinson, P.E., Murray Co., Long Beach, Calif.

That old leaky feeling and copper pipe corrosion

Just before Thanksgiving, six months after I moved into my current home, I experienced my first slab leak. For those unfamiliar with the term, this refers to homes in warm climates without basements that have a portion of their water piping installed below the grade slab. When one of these pipes springs a leak, it is referred to as a slab leak, because the water comes up through the slab. These leaks are, unfortunately, quite common in So Cal and, just as unfortunate, expensive to fix.

Since I sit on the board of two homeowners associations, I am all too familiar with the frequency of slab leaks and pinhole pipe leaks that occur several times a month in these two So Cal communities.

Since I sit on the board of two homeowners associations, I am all too familiar with the frequency of slab leaks and pinhole pipe leaks that occur several times a month in these two So Cal communities. For this reason, a local news headline that read, "Homebuilders Sue Water Districts over Pipe Leaks" caught my attention. It seems that two large local homebuilders, Shapell Industries and Lennar Homes, are suing the Moulton Niguel Water District (MNWD), Metropolitan Water District (MWD), and Santa Margarita Water District (SMWD) for using chloramines to disinfect their water supply, with the claim that the chloramines are destroying the copper water pipe in the homes they build.

The reason this subject interests me so much is not just because of my personal stake in my home and its piping but the increasing acceptance and use of plastic piping products in the plumbing industry, and the fact that plastics are less subject to damage from the treatment chemistry of water purveyors than copper is.

This is not a new subject. For whatever reason, it received a lot of attention in 2005 – 2006; since then, the subject seems to have gone dormant — until now.

In June 2005, *Builder Magazine* reported that the California Professional Association of Specialty Contractors (CalPASC) alleged that chloramine use in California was causing pinhole leaks in copper pipes. Their goal was to get the state of California to stop its code restriction against the use of plastic piping products, which it has done recently.

The EPA, as a response to Builder's inquiry, has stated that it does not have an official position on the use of plastic versus copper pipe but noted that leaks in copper pipe can be the result of excessive water corrosivity, and that water utilities should adjust the chemistry of their water accordingly. Has that happened? It would not seem so. The EPA has noted recently that any utility considering the use of chloramines "should determine whether or not it has the resources to properly maintain and monitor its water quality so that these issues do not become problems."

So, what are safe chloramines levels for copper pipe? The debate on that is far reaching and, sadly, inconclusive. There are so many variables that affect the corrosion process that it seems impossible to point to a single solution. The EPA's standard is a maximum of 4 ppm (or mg/L). In contrast, investigations done at the Willmar, Minn., water treatment plant (Murphy, O'Connor and O'Connor) suggest that chloramines should be limited to 1 ppm to protect household plumbing. However, this same report also notes that the absence of disinfectant residual can permit the colonization of microorganisms that accelerate copper corrosion rates. So, clearly, the use of chloramines is a balancing act.

The studies done on chloramines and copper pitting are voluminous and inconclusive. The subject of a master's thesis by Caroline Nguyen for Virginia Polytech in 2005 was 96 pages in length and said little more than, "further work is required in this area."

The NAHB Research Center (National Association of Home Builders via toolbase.org) gave a partial list of studies done on the source of pinhole leaks in 2006. Causes ranged as follows: combinations of pH, organic matter, aluminum solids and chlorine reported by Virginia Tech in 2004; aggressive water, poor workmanship and water softeners reported by University of Florida in 1997; excessive use of flux, reported by the AWWA in 1996; aluminum-bearing compounds reported by a Maryland task force; myriad combinations of water quality and system maintenance, but no mention of chloramines reported by the AWWA in 2001; chloramines, specifically, reported by Virginia Tech in 2004 (which contradicts their other report on the same subject in the same month and year) and design problems such as pipe sizing and velocity reported by Lewis Engineering and Consulting Inc.

It is very hard to determine the real source of leaks in copper pipe because of the time it takes for the leaks to occur, combined with variations in water velocity and water chemistry.

It is very hard to determine the real source of leaks in copper pipe because of the time it takes for the leaks to occur, combined with variations in water velocity and water chemistry.

Continued on page 28

KD NAVIEN®

Condensing **Combi** Gas Boiler/Water Heater

In Today's Market, Cost Savings are Important!

Now customers will enjoy lower installation costs and cash in on low annual operating costs and receive the best payback, compared to conventional combination systems.

- ***SCH 40 3" PVC Venting***
- ***Built-In Primary Loop Pump***
- ***Eco-Friendly Technology***
- ***Space Saving Design***
- ***Ultra-Condensing Efficiency***
- ***2 Stainless Steel Heat Exchangers***

Remote Control
NR-10DPU
(Included)

** **ASME Models** are **Energy Star** Qualified*

KD NAVIEN®
The Leader in Condensing Tankless Technology

Circle 17 on Reader Reply form on page 69

www.NavienAmerica.com **1-800-519-8794**

Continued from page 26

copper pipe because of the time it takes for the leaks to occur, combined with variations in water velocity and water chemistry. It is claimed that chloramines themselves do not cause corrosion, except in combination with aluminum, but sources such as Citizens Concerned About Chloramines (CCAC) in San Francisco, as well as the EPA, make claims that chloramines will cause pinhole leaks purely by the nitrification they create, which lowers pH and causes pinhole leaks. Nitrification itself carries a host of other problems, such as loss of disinfectant residual and myriad health effects.

Another complicating factor in this debate is that many of the problematic leaks, at least here in So Cal, are the aforementioned slab leaks. While above-grade pinhole leaks can be sampled and studied, slab leaks are typically abandoned below grade and piping rerouted. As such, the leak source cannot be studied. A slab leak might be caused by a pinhole leak, or it might be caused by a cracked fitting or puncture from a rock due to building settlement. There is no practical way of knowing the cause.

In my opinion, as well as that of the CCAC's, water utilities should be banned from using chloramines until more accurate studies can be performed to determine a safe method for their use. Until such time, a combination of filtration and traditional chlorine would better safeguard our health and copper piping. It would seem in the interest of the Copper Development Association (CDA) to lobby for this change. Perhaps they already are, but if this does not occur, the water utilities are pushing the industry toward increased use of plastics. I personally wish my home were piped in plastic rather than copper. If so, I wouldn't have to turn my water off every time I leave the house for a day or more, due to lack of confidence in the copper piping.

Water utilities should be banned from using chloramines until more accurate studies can be performed to determine a safe method for their use.

What angers me the most is attitudes such as that of Bob Gumerman, general manager of the MNWD, in response to the Shapell Industries' $5 million claim. "If the water was to blame [for the pinhole leaks], the problem would be more widespread." Well, Bob, get your head out of the sand, because the problem is so widespread that it is driving change in our industry and

our codes. All you need is Internet access in order to figure that out.

If Shappell and Lennar win their lawsuits (which they probably won't, due to great pressure to the contrary), there will be a plethora of ensuing lawsuits to the same effect. This, of course, will benefit no one except the attorneys. We, the water consumers and taxpayers, will just end up paying the damages. Because, after all, we can't stop consuming water, can we? ■

Timothy Allinson *is vice president engineering with Murray Co. mechanical contractors in Long Beach, Calif. He is licensed in both mechanical and fire protection engineering in various states and is LEED accredited. He can be reached at laguna_tim@yahoo.com.*

Code Classroom

Ron George, CPD
President, Plumb-Tech Design & Consulting Services, LLC

Warning! Anti-scald shower valves can scald you! (Part 2)

Editor's Note: The following is a continuation of last month's column from Ron George.

Every year, thousands of people suffer serious thermal shock and/or scalding injuries in showers or combination tub/shower fixtures. Tens of millions of currently installed code compliant shower valves, referred to as anti-scald or safety shower valves, can potentially scald people.

Plumbing inspector's responsibility

I recently spoke to a group of about 80 at a code inspectors' conference. I asked by a show of hands how many inspectors carried a temperature gauge or thermometer with them on a final inspection to check for the maximum temperature at a shower or tub/shower. Only a couple raised their hands. When I asked why, one person said that his municipality would not pay for expensive testing equipment. I explained that you can a food thermometer (available at the grocery store for about ten bucks) can be used. Another said he never thought to use a thermometer and that he tested the water temperature by feeling it; as long as it did not get too hot, he considered it all right. Most attendees said they had not given the problem much thought. Several said they were going to purchase thermometers.

Model Plumbing Code requirements for showers

The two model plumbing codes in the United States have the following language covering showers:

The 2009 International Plumbing Code
424.3 Individual shower valves.
Individual shower and tub-shower combination valves shall be balanced-pressure, thermostatic or combination balanced-pressure/thermostatic valves that conform to the requirements of ASSE 1016 or ASME A112.18.1/CSA B125.1 and shall be installed at the point of use. Shower and tub-shower combination valves required by this section shall be equipped with a means to limit the maximum setting of the valve to 120°F (49°C), which shall be field adjusted in accordance with the manufacturer's instructions. In-line thermostatic valves shall not be utilized for compliance with this section.

The 2009 Uniform Plumbing Code
418.0 Shower and Tub-Shower Combination Control Valves.
Showers and tub-shower combinations in buildings 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. These valves shall conform to ASSE 1016 or ASME A112.18.1/CSA B125.1. Gang showers, when supplied with a single temperature-controlled water supply pipe, shall be controlled by a mixing valve that conforms to 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). The water heater thermostat shall not be considered a suitable control for meeting this provision

Limit stop readjustment needed.

The maximum temperature limit stop on all pressure-balancing type shower valves should be readjusted seasonally to correct for changes in the incoming cold water temperatures. These temperatures can vary as much as 50 degrees in some areas, which can correspond to a relative change in the outlet temperature, based on the delivered hot water temperature and the ratio of hot to cold. I recommend having maintenance workers check the limit stops at least twice a year to assure the maximum hot water temperature does not exceed 120 F.

All compensating type shower valves should be readjusted every time there is a change in the domestic hot water system that could affect the system temperature. The limit stop should be readjusted when a water heater is replaced, when the master thermostatic mixing valve temperature is readjusted, when the circulating pump is replaced, when the thermostat on the water heater is adjusted or if any work is done on the hot water system that can potentially change the hot water delivery temperature. Manufacturers of all hot water system components should mention this in their literature.

Schools and institutional facilities

For gang showers in schools or prisons, where the bather cannot adjust the temperature, there is typically an on-off shower valve or a metering button. Shower valves for this application are set by staff, and the thermostatic mixing valve should comply with the standard titled *ASSE 1069-2005 - Performance Requirements for Automatic Temperature Control Mixing Valves* for gang showers. In all cases water should be flowed from the shower valve long enough to assure that the water temperature is not a hazard. ■

***Ron George** is president of Plumb-Tech Design and Consulting Services LLC. He has served as chairman of the International Residential Plumbing & Mechanical Code Committee. Visit www.Plumb-TechLLC.com, email Ron@Plumb-TechLLC.com or phone 734/755-1908.*

TAP INTO OUR RESOURCES

IAPMO R&T offers certification to every code and standard you need.

- Uniform Plumbing Code® (cUPC®)
- Uniform Mechanical Code® (cUMC®)
- Uniform Solar Energy Code® (cUSEC®)
- Uniform Swimming Pool, Spa and Hot Tub Code® (cUSPC®)
- National Plumbing Code of Canada
- EPA WaterSense®
- EPA ENERGY STAR®
- Green
- NSF/ANSI 61 Toxicity
- NSF/ANSI 14 Plastic Pipe & Fittings
- Federal Lead Plumbing Law (commonly known as U.S. Senate Bill No. S.3874 "Reduction of Lead in Drinking Water Act")
- California Lead in Plumbing Law H&S Code 116875 (commonly known as AB 1953)
- Electrical Products
- Fuel Gas Products
- Food Equipment

IAPMO R&T

First in Fast, Trusted Certification

WWW.IAPMORT.ORG · 1-877-4 UPC MARK

Circle 20 on Reader Reply Form on page 69

FPE Corner

Samuel S. Dannaway, PE, FSFPE
President, S.S. Dannaway Associates Inc., Honolulu

Ban the Banners

Being an ex-smoker, I did not complain very much when smoking was prohibited in airline flights over a few hours long and, later, when banned on all U.S. flights and, finally, on all international flights. I did not complain when smoking was banned in restaurants and bars in Honolulu. It was nice to go out to eat and not return smelling like a cigarette.

Nowadays, however, banning stuff is getting out of hand. It seems that our legislators' favorite pastime has turned to banning stuff (for our own good). In Honolulu, our city council is considering a ban on plastic bags. What am I going to do when I take Halligan and Kaylee for a walk? They seem ready to ban my sugar, ban my fat, and I have nightmares about The Banners coming for my double quarter pounder with cheese.

Banning is one of the techniques governments use to pick winners and losers in the game of life. Also, critical to the efforts of The Banners is the need to come up with a scapegoat to organize against and pump up hysteria.

The art of banning has reached a new level and has literally hit home. In this case, the winners are the homebuilders; the loser is life safety (in my altruistic view, and I always act altruistically). What I am referring to is the many state legislative bodies that are currently dealing with bills that attempt to prohibit jurisdictions from requiring the use of residential sprinklers in one- and two-family dwellings.

As noted in a previous article, with the publication of the 2009 IRC, all major U.S. model codes now require sprinklers in one- and two-family dwellings.

As noted in a previous article, with the publication of the 2009 IRC, all major U.S. model codes now require sprinklers in one- and two-family dwellings. Proponents of the ban have done a very good job of organizing their fight. Locally, these groups are usually led by homebuilder organizations that are trying to head off new residential sprinkler requirements that will result as government entities begin to adopt the 2009 International Residential Code. This is the case in Hawaii, which is currently reviewing the 2009 IRC for adoption.

Unfortunately, the present state of the U.S. housing industry leaves legislators sensitive to any perceived increase in the cost of housing. Enter the perfect scapegoat, residential sprinklers. Ban legislation has raised its ugly head in Colorado, Illinois, Oklahoma, Tennessee and, embarrassingly, Hawaii (source www.firesprinklerinitiative.org/Legislation/Anti-sprinkler-legislation.aspx). Interestingly, all of the proposed bills are similar in that they propose to prohibit local jurisdictions within the state from enacting sprinkler legislation. This makes one wonder whether these ban efforts are truly independent, local, grass root movements.

On the surface, this legislation appears to be incapable of standing up to any legitimate judicial review. First, there is the home rule issue, in which the state usurps the right of the local jurisdiction. Second is the infringement of trade by actually not allowing the installation of sprinklers in a home. These bills actually prohibit jurisdictions from requiring you to own a residential sprinkler system. A third reason is the impact it will have on the consensus standard making in the U.S. (good-bye NFPA).

The manner in which The Banners market their legislation is essentially dishonest. They give the following major reasons why the legislation is needed:

1. Sprinklers are expensive and are driving up the cost of homes.
2. Residential sprinklers are not a proven life safety device.
3. Sprinklers are not needed in new housing, as only old homes burn.

NFPA's website cites several other reasons and appropriately debunks them. I will briefly address these three:

Regarding reason 1, Yes, residential sprinklers do cost money, about as much as the additional cost of the upgraded carpet option. The Banners argument ignores the economy of scale that can be realized with sprinklering entire subdivisions, as well as the efforts to come up with incentives for providing sprinklers. It also fails to recognize concessions made in the IRC based on the presence of sprinklers, such as continuing to allow the use of composite wood beams (you know, those beams consisting of two 2 × 4s held together with cardboard that fail without warning during a fire in seven minutes and kill firefighters).

Reason 2 does not deserve the time of day, but it is important to note that our very intelligent legislators are more than willing to believe this argument, especially when it's coming from a constituent with deep pockets.

Reason 3 is another non-starter. NFPA has statistics that debunk this myth. We all know that the new houses of today are tomorrow's 30-year old homes.

So, here is my call to action. If The Banners show up in your neighborhood, you can be prepared. You can provide legislators with correct information that will help them see the true motives behind The Banners. The NFPA website, www.firesprinklerinitiative.org/, is an excellent place to start.

You may say, "What's the big deal? Our business is not involved in the home building industry." In response, I present the latest effort of The Banners in my state. State of Hawaii House Bill 2358, http://1.usa.gov/GB4z84, is now going through the various committees. The bill amends the statutes related to the Hawaii State Building Code. It takes local code development authority away from the various

Continued on page 34

Add Depth to Your Project

Introducing our 2d and 3d CAD Library

Simplify your building modeling process. We have the industry standard 2d and 3d CAD files you're looking for including: Revit, DWF, ACIS, STEP, DWG and more. Files are available for our popular water safety & flow control, backflow prevention and drainage product lines with more becoming available every day.

Go to **watts.com/CAD** to download today. How's that for simple!

Available in 3dCAD at watts.com

WATTS®
A Watts Water Technologies Company

Circle 21 on Reader Reply Form on page 69

FPE Corner

Continued from page 32

county building officials and places it in the hands of the State Building Code council, which is dominated by building contractors and construction unions. Removed from the council are the four county building officials, the structural engineers of Hawaii, a mechanical engineer and the state elevator inspector. A key provision of the bill makes the State Building Council the sole arbiter of minimum standards of public safety, stating:

§107-24 Authority and ***duties of the council****. (a) The council may adopt any amendments to the Hawaii state building code set forth in section 107-25(a) upon a vote of approval by a majority of all voting members of the council; provided that any amendments adopted shall not exceed minimum standards necessary to protect public health and safety. The council shall have sole authority to determine these minimum standards.*

This is interesting, since only three of the 13 voting members, the Honolulu chapter of The American Institute of Architects, American Council of Engineering Companies of Hawaii, and the Hawaii State Fire Council (representing the four county fire chiefs), have a direct public safety interest and responsibility.

It is unlikely that any of these bills in their present form will become law. However, we should be concerned that they are being taken seriously as legitimate pieces of legislation.

I say, "*Ban the Banners.*" Long live the double quarter pounder with cheese.

Back to Elevators

In the February issue, I mentioned that I would go back into old editions of NFPA 13 to locate the origin of elevator fire sprinkler requirements. I had gone back to the 1994 edition in the article. It turns out that this was the edition when specific requirements for elevators first appeared. Prior to that, elevators where lumped in with the requirements for vertical shafts, and there was no specific requirement for elevator shafts, as long as the shaft was of noncombustible construction.

SFPE Notes

The Society of Fire Protection Engineers, in collaboration with the International Code Council, has issued a draft of Guidelines for Designing Fire Safety in Very Tall Buildings for comment. Comments are due June 8, 2012. This guide provides information on the topics that affect the performance of very tall buildings and their occupants in the case of fire. It addresses these topics using performance-based fire protection engineering concepts. It is not intended to be a recommended practice or a document that is suitable for adoption as a code. To download the draft guide and a comment form, visit http://bit.ly/Ag0qPI. ■

Samuel S. Dannaway*, PE, is a registered fire protection engineer and mechanical engineer. He is past president and a Fellow of the Society of Fire Protection Engineers. He is president of S.S. Dannaway Associates Inc., a 15-person fire protection engineering firm.*

The views and opinions expressed in this column are those of the author and do not reflect those of *Plumbing Engineer,* TMB Publishing, or ASPE.

Sustainable Design

By Winston Huff, CPD, LEED AP BD+C

What have we done to the water?

If I were a moviemaker, I would make a movie about water. Humans are fascinated with water. We can sit on a beach, in a boat or a bathtub or by a swimming pool or stream for hours, letting the sound, smell and feeling of the water flow around and through us. This is true for most humans from any culture or at any time in history. Could a movie capture that fascination?

I think of this movie while traveling in a plane high over the clouds. The movie begins with a view of a deep blue ocean and the empty blue sky above; then misty clouds roll into the scene. The clouds transform from white to light gray to a menacing dark purple; lightning flashes and thunder rumbles.

The camera angle lowers to the ocean, where huge waves are now pushing large ships like toys in a bathtub. On the nearby shore, trees twist and leaves blow; in the distance, lights suddenly turn on to illuminate city skyscrapers and busy streets. On the ground, umbrellas open, people on the streets and animals outside the city run for shelter.

The rain begins, and nature's dark mood changes to one of relief. The long-awaited rain works like soothing medicine on a dry, parched landscape. The brown land celebrates the gift of rain from faraway regions. Trees, animals and even the fish in the water dance and enjoy the rain and the life that it sustains. The clean rainwater picks up dust from the air and dirt from the ground, and the muddy water that is not absorbed by the land flows into streams and rivers, becoming clear and clean again.

At the end of the movie, the sun shines on the bodies of water, creating a fog that rises back to the sky. The camera follows the fog as it lifts from the ground, and the view of the blue sky and ocean is the same as when the movie began.

As building professionals, we sometimes forget the cycle of water that flows through us. In addition to sustaining our land and bodies, water sustains those in the plumbing industry financially. From time to time, we all need to stop what we are doing and take a step back to look at the process of water: where it comes from, what we do to it and where it goes. Earth and the biosphere cycle water through a natural process, while human-made systems use another procedure.

Biosphere process

Where does water come from? Much like the movie description, water does not come from a single source; rather, it is a cycle. The cycle begins when water is suspended in clouds as vapor. It is in a relatively pure form, with small traces of chemical elements. In this state, the biosphere has the ability to keep the water clean and pure while moving it hundreds and thousands of miles around the world.

The sun shining over North Africa can create energy that flows west over the Atlantic Ocean, where, in a natural desalination process, water from the oceans is changed into clouds. This energy can increase as it travels thousands of miles across the ocean to the Gulf of Mexico. By this time, hurricane force winds can cause the water from the clouds or in the ocean to flood large portions of North America.

What is in the water? While it is in the clouds, water is free of biological contaminants. Water in this state cannot make you sick. As it falls to the ground, it picks up particles from the air, which can be carried for miles. When rain hits the plants, animals and ground, it picks up minerals, nutrients and biological matter that are carried away to other locations via streams and rivers.

Where is it going? Water is on a journey back to the clouds. It begins to flow, mostly by gravity, underground and over the surface. As it flows, it flushes and moves excess nutrients, solids and minerals from one parcel to another. As water travels on its long journey, its progress slows in areas where the sun's energy pulls it back up into the clouds.

What did this journey do to the water? Not much. In the natural biosphere cycle, water is constantly moved for thousands of years. The quality of the water in the clouds is not much different now than it was when dinosaurs roamed the earth. This means that a molecule of a dinosaur could be in the water you drink.

Human process

Where does the water come from? In the past two centuries, humans have developed a process very different from the biosphere process to "create" water. The human system is different in that it changes the nature of the water, while the natural water cycle has maintained almost the same level of water quality for thousands of years.

Like the biosphere system, it is a cycle but, in most cases, the human system begins with water from bodies of water on or in the ground. Unlike the water in clouds, the quality of this water may be contaminated with various amounts of biological, mineral and solid materials. Consuming this water untreated could be harmful to people, so it must be taken to a water treatment facility before distribution.

It's amazing that a typical water treatment facility can treat, filter and distribute this water across an entire region. In some cases, such as in Southern California and New York City, water is transported hundreds of miles for use in other areas. This water is treated, maintained and distributed in drinking water quality seven days a week, 24 hours a day, in all types of weather and drought conditions.

Municipal water treatment facilities filter and distribute high-quality water directly into our buildings. A person can stop in any business and use the toilet, wash their hands and drink water from the tap without worrying about getting sick or making someone else sick. Having this much water constantly available has increased our water usage in the past 100 years. In most communities, approximately 130 gallons of water is processed to drinking water quality for each person using the system per day. This part of the water story is a wonder of our modern society.

Continued on page 38

We Mean Business: *Yours*

We make faucets like you would:

- Attractive
- Reliable
- Profitable

Gerber faucets offer one important feature the competition can't:
An exclusive trade partner who cares about your business.

Join us at theplumbersbrand.com
Let Gerber drive business to you...

EPA WaterSense PARTNER

www.gerberonline.com

GERBER

Circle 23 on Reader Reply Form on page 69

Sustainable Design

Continued from page 36

Where does the water go? Water supply is only half of the story. The clean drinking-quality water that flows out of the spout is used for less than a second; then it flows into the drain. In this split second, the high-quality water is changed into wastewater. In modern sewer systems, wastewater contains a mix of biological, chemical and solid waste material and is hazardous to plants, people, animals and the soil.

People are in the middle of this process. Water treatment facilities do not make wastewater. In the natural cycle, the term *wastewater* is not used and the term water *quality* does not mean very much. These are terms we use to talk about the wastewater people make. We make wastewater every time we flush a toilet, turn on a faucet or use a plumbing fixture.

In some instances, however, humans aren't even necessary. Sensor-operated plumbing fixtures change drinking water to wastewater without a person touching a thing. We can program systems to use hundreds of gallons of water to irrigate our exotic lawns and landscaping. We do nothing to make it happen except pay the water bill.

The modern waste system carries the same 130 gallons a day per person away from our buildings in a complex system of piping, pumps and filters. The cocktail of contaminants is removed from the waste stream and, in most cases, the water entering the natural biosphere is safe.

Typical water and waste systems are a marvel of modern engineering, and water distribution and treatment are the responsibility of the plumbing industry. It is important to remember that these systems must operate properly for the health and safety of others.

What did we do to the water? The human system is amazing when the quantity and quality of the water are considered. Is our system successful in removing the trace materials that may remain after we use the water? Many studies have shown that there are trace pharmaceuticals in our water supply, due to the disposal of medications.

This automatic system also comes at a great energy cost. A recent study showed that 20 percent of the energy generated by California is used for the state's water systems.

Is our model a good one for the developing world to use? What if China were to follow our example and supply 130 gallons of drinking-quality water per person every day and then treat the wastewater in the same way we do? China has 20 times as many people as California and would have to generate four times the amount of energy used by the entire state of California just for their water systems. What about other countries with dense populations, such as India and Brazil? Is there enough energy in the world to do this? What would the quality of the water be if these countries copied the United States?

The water distribution system may have started with the intent to supply safe drinking water to people, now it is also a system to carry waste away from people. The system has evolved into a water-based waste system. Have we ever stopped to think whether this is the best way to carry our waste away? Is providing 130 gallons of drinking-quality water per person per day the most efficient way to operate?

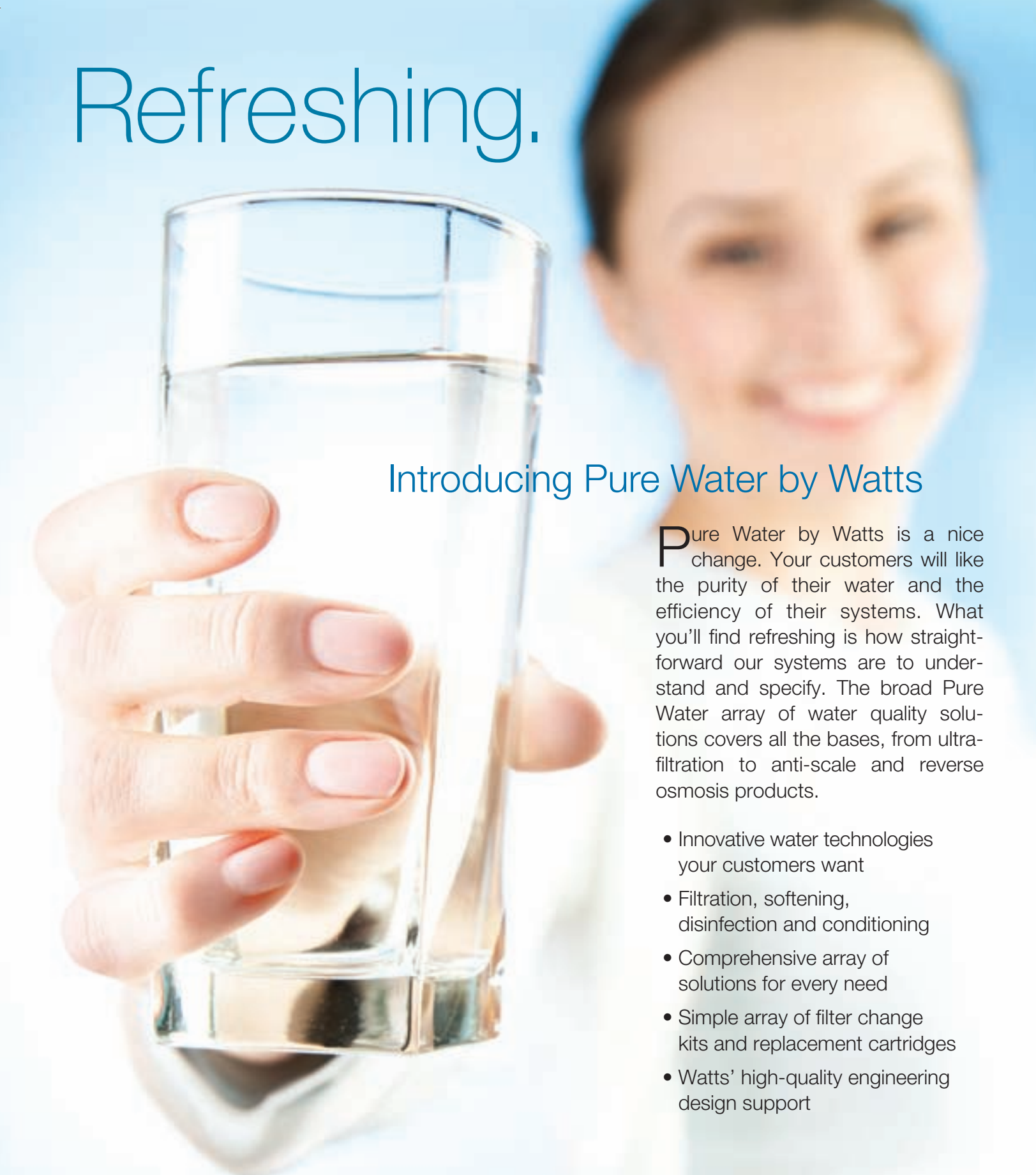
What have we done to our water? In the future we need more efficient ways to handle water. Here are some examples:

- Energy-efficient pumping
- Alternate water sources
- Alternate waste systems
- Move away from water-based waste systems
- Mimic the natural biosphere where the words waste and quality have little meaning

In the future, we could design plumbing systems using less water. Imagine that! ■

***Winston Huff**, CPD, LEED AP, is a project manager, plumbing fire protection designer and sustainable coordinator with Smith Seckman Reid Consulting Engineers in Nashville, Tennessee. He serves as an ASPE representative on the ICC Green Construction, Energy and Water Code Development Committee and is on the U.S. Green Building Council's Water Efficiency Technical Advisory Group. He was the founding editor of Life Support and Biosphere Science and has served as its editor-in-chief. He also is editor of Me Green You Green (megreenyougreen.com), a LEED credit databank.*

Refreshing.



Introducing Pure Water by Watts

Pure Water by Watts is a nice change. Your customers will like the purity of their water and the efficiency of their systems. What you'll find refreshing is how straightforward our systems are to understand and specify. The broad Pure Water array of water quality solutions covers all the bases, from ultrafiltration to anti-scale and reverse osmosis products.

- Innovative water technologies your customers want
- Filtration, softening, disinfection and conditioning
- Comprehensive array of solutions for every need
- Simple array of filter change kits and replacement cartridges
- Watts' high-quality engineering design support

Scan this QR code to view our entire Pure Water line

watts.com/purewater

WATTS®

A Watts Water Technologies Company

Circle 25 on Reader Reply Form on page 69

Solar Solutions

Bristol Stickney, chief technical director, SolarLogic LLC, Santa Fe, N.M.

Bristol's Six Principles for Good Solar Hydronic Design

Diminishing return from multiple collectors

When large solar heat collector arrays are installed to heat a building, it is not uncommon to see large groups of collectors of four to eight in a group and even multiple rows of these large "banks." But, as more collectors are added to increase solar heat to a building, each additional collector provides a diminishing impact on the annual solar heat contribution to the building. When taken to an extreme, if too many collectors are installed, the heat from some of those collectors may never be used throughout the year, and therefore provide no actual fuel savings. For this reason, solar heating systems are rarely designed to provide "one hundred percent" of the annual heat load, because some of the collectors in such a system would only be needed for a few days each year during the most demanding heating conditions. Let's take a closer look at the balance between the solar heat available, the heat load in a building and the diminishing utility that can occur with large banks of solar heat collectors.

An example installation

To illustrate these principles, consider a project where a community center near Pecos, New Mexico will be solar heated using a Solar Combisystem that is configured to allow all the heat sources (solar included) to provide heat to all the heat loads. (This project is real, but some of the options used in these examples, while reasonable, are hypothetical.) The building will be well-insulated, is in a sunny climate that is cold in winter and the results will be calculated first including a seasonal swimming pool (taking solar heat in summer) and then without the pool.

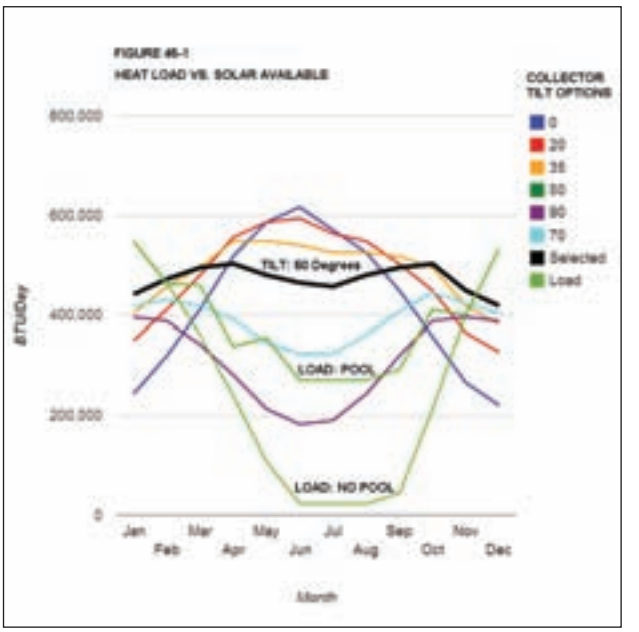
EXAMPLE JOB SPECIFICATION

Location	Near Pecos, New Mexico		
Latitude	36	North	
Collector Tilt	50	Degrees	
Heated Floor Area	4634	Square Feet	
Annual Heat Load	83	M BTU	No Pool
Annual Heat Load	133	M BTU	+ Pool
DHW Load Included	40	Gal/Day	
Pool Size	15000	Gallons	Seasonal Use

Note: Pool is seasonal and absorbs less than 250,000 BTU/Day throughout spring, summer and fa

Solar heat versus heat load

The need for heat (the heat load) is not constant throughout the year and the solar heat available can be drastically out of sync with the need for space heating depending on the collector tilt. Figure 45-1 shows the need for heat with the pool (upper green line) and without the pool (lower green line). The solar heat available from the equivalent of nine solar heat collectors (4' by 10' size) is shown at various collector tilts by the other colored lines. The most commonly chosen tilt of 50 degrees is seen as a black line, which provides the most solar heat in the coldest part of winter.



Notice that when the summer-season heating load of the pool is added to the load of the building (upper green line) the heat output from the collectors is a much better match to the total heating load. Without the pool, a large amount of potentially useful heat must be dumped during the warm season which can be seen as the gap between the lower green line and the black line above it in the center of the graph. Heat that is dumped cannot be counted as "useful" heat, and accounts for most of the diminished annual output of large collector banks.

How many heat collectors?

Figure 45-2 shows how much useful heat is contributed (saved) each year by solar collectors as the number of collectors is increased from 1 to 16 panels (4' × 10' size) for our example community center building project. On a project of this size, the solar benefit raises steadily as the number of collectors increases until a 'knee in the curve' occurs (at around seven or eight collectors in the pool example). Then, as more collectors are added, the benefit raises more slowly until around 15 collectors where the curve becomes flat. This is the asymptote, where the real benefit from additional collectors stops. You can think of this as the point of diminishing return where the 'return' on additional collectors becomes zero. Another way to say this is the nominal annual solar heating fraction becomes 100%. Of course, this is based on annual results when using Typical Meteorological Year (TMY) weather data. When the weather is not "typical" or a different building plan is used, the point of zero

Continued on page 42

LEADING THE WAY IN A CHANGING INDUSTRY

The International Code Council's Plumbing, Mechanical & Fuel Gas (PMG) Resources

The building industry is constantly evolving. So is ICC. The new 2012 I-Codes include the latest technology, efficiency and performance provisions to ensure safe and sustainable construction for the community you serve.

ICC also offers a complete solution with the most up-to-date codes, training and industry experts that fits your needs.

Highlighted states indicate adoption of an ICC PMG code at state or local level

- **Widest Adoption and Uniformity of Codes:** Allows for easier transferring and sharing of knowledge and best practices with peers across the country.
- **Complete Code Resources:** Books and references, from basic to advanced, are available in multiple formats to best suit your needs.
- **Most Staff Experts:** Licensed contractors, plumbers, inspectors, and engineers on staff provide members with technical support.
- **Comprehensive Training:** Wide ranging subject matter taught by experts - online, in-person, or on-site - provides you with the knowledge & skills to succeed.
- **Leading Industry Certifications:** Career-enhancing Inspector and/or Examiner certifications from ICC that are respected throughout the PMG community.
- **Up-to-date Community Resources:** A new PMG Official Membership Council provides new opportunities for PMG officials and industry professionals www.iccsafe.org/Councils.
- **Extensive Product Evaluation:** Reliable and accurate evaluation services for plumbing, mechanical, and fuel gas products offered through the ICC-ES PMG Listing Program - www.icc-es.org/pmg.

ASPE MEMBERS RECEIVE 20% OFF YOUR 1ST YEAR'S MEMBERSHIP

The American Society of Plumbing Engineers (ASPE) and ICC have joined forces to offer a special member discount of 20% to ASPE members who are interested in becoming a new* member of ICC.

*Offer to new ASPE members, first year of membership. Renewal will be at regular membership price.

INTERNATIONAL CODE COUNCIL®

People Helping People Build a Safer World™

For more information go to www.iccsafe.org/plumbing or contact us directly by email at pmgresourcecenter@iccsafe.org or by phone at 1-888-ICC-SAFE ext. 4PMG.

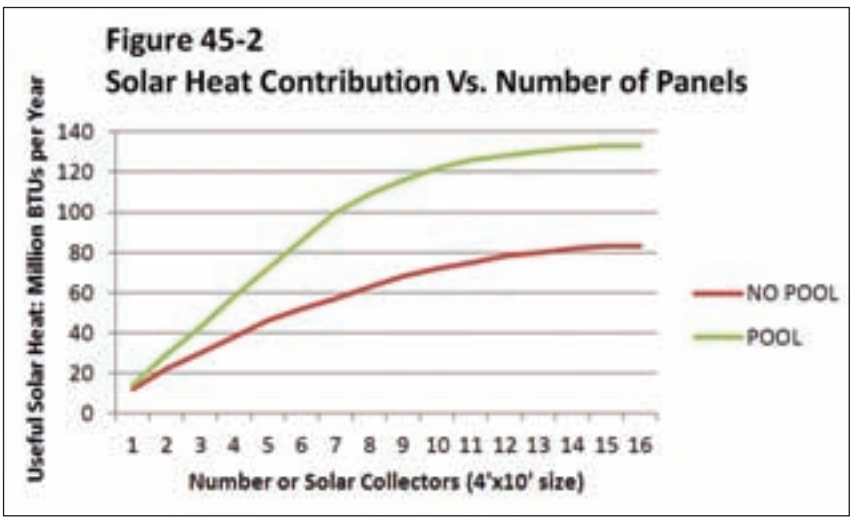
12-05815

Circle 26 on Reader Reply Form on page 69

Continued from page 40

return can change.

The sweet spot in this example appears to be in the middle of the 'knee' of the curve where 70-80% of the annual heat load is provided by solar. This number of collectors can be pumped with a single circulator and so the extra complexity of using two banks with two pumps is avoided. And it is interesting to note that the annual solar contribution is nearly doubled when useful heat can be collected throughout the summer season. This might be good to keep in mind the next time a solar heating opportunity comes along at a motel, B&B, public building or other reasonable location where a swimming pool might



Final notes

These articles are targeted toward residential and small commercial buildings smaller than 10,000 square feet. The focus is on pressurized glycol/hydronic systems since these systems can be applied in a wide variety of building geometries and orientations with few limitations. Brand names, organizations, suppliers and manufacturers are mentioned in these articles only to provide examples for illustration and discussion and do not constitute any recommendation or endorsement. The simulation modeling and graphics presented here were accomplished using "SLASH-D" software from SolarLogic. ■

Bristol Stickney *has been designing, manufacturing, repairing and installing solar hydronic heating systems for more than 30 years. He holds a Bachelor of Science in Mechanical Engineering and is a licensed Mechanical Contractor in New Mexico. He is the Chief Technical Officer for SolarLogic LLC in Santa Fe, N.M., where he is involved in development of solar heating control systems and design tools for solar heating professionals (visit www.solarlogicllc.com for more information).*

In this series of articles, I have been making the case that the key ingredients for solar/hydronic design and installation can be divided into six categories, roughly in order of their importance.

1. Reliability
2. Effectiveness
3. Compatibility
4. Elegance
5. Serviceability
6. Efficiency

The success of any solar hydronic home heating installation depends on the often-conflicting balance between any of these six principles. Finding the balance between them defines the art of solar heating design.

RISE AND SHINE!

From Riser to Fixture, a Complete Plumbing Solution

FlowGuard Gold®/Corzan® CPVC plumbing systems provide superior durability and, unlike metallic systems, will not pit, scale or corrode, regardless of water quality. For more than 50 years Lubrizol CPVC piping systems have been successfully installed in numerous commercial buildings including hotels, hospitals, schools, universities and high-rise applications.

Benefits include:

- **Stable Material Cost**s – projects stay on budget
- **Ease of Installation** – lightweight with a fast, reliable joining system
- **Maintained Water Quality** – no concerns regarding copper leaching
- **Quiet Operation** – 4 times quieter than copper systems
- **Reduced Condensation** – virtually eliminates the risk of costly drip damage

CORZAN® PIPING SYSTEMS
FLOWGUARD GOLD®

855.735.1431 | www.flowguardgold.com

Lubrizol

Circle 28 on Reader Reply Form on page 69

A Touchy Subject

Hands-free technologies address hygiene, water efficiency and cost savings

By Jason Renner

When you think of all the touchpoints in many public restrooms, there are easily five –10 commonly touched restroom surfaces that come to mind. Multiply that number by research recently published by Idaho's Southeastern District Health Department stating that humans carry 10 million bacteria between their fingertips and elbows, that damp hands spread 1,000 times more germs than dry hands and that the number of germs on fingertips doubles after using the toilet.

Not surprisingly, the number of germs passed around in restrooms quickly becomes a large and cringe-worthy statistic, further compounded by people's aversion to coming into contact with public restroom surfaces (See sidebar).

Designed to minimize cross-contamination, touch-free fixtures are increasingly becoming the norm in a variety of commercial restroom facilities. Hygiene is only one advantage linked with these fixtures: Enhanced savings associated with water, energy, maintenance and labor costs and increased sustainability, round out the benefit equation. Moreover, particularly in the last decade or so, manufacturers have made major strides in developing smarter and more durable designs that are easier to install, activate and maintain.

Weighing the Public's Attitude Toward Restrooms

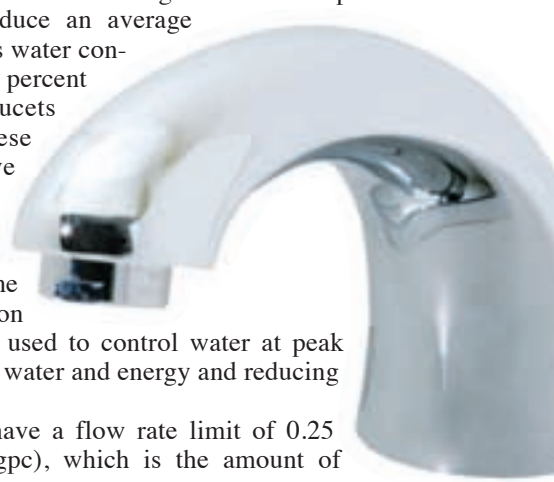
A national survey conducted by Bradley Corp. examined Americans' attitudes toward touching restroom surfaces in public facilities, bearing witness to people's aversion to making contact with common restroom areas. According to the 2011 study, 62 percent of respondents said they dislike touching faucet handles. The majority of respondents also cited their disdain for touching stall door handles (76 percent) and restroom entrance door handles (68 percent).

Further, the survey revealed that non-working soap and towel dispensers taint users' restroom experiences. While more than one-third complained about soap and towel dispensers that were empty, jammed or didn't dispense enough towels at once, it was the overall negative appearance (old, dirty or unkempt) of the restroom that was the number one complaint mentioned by three-fourths of respondents.

Due to these demonstrated efficiencies and to advances in hands-free technology, more than half of institutional and commercial facilities are now using touchless fixtures. But there are still a number of facilities that have opportunities to capitalize on the many benefits of these highly efficient restroom fixtures for retrofits or new construction.

Here's how these fixtures prove to be an economical choice.

Faucets: Touchless faucets using infrared or capacitive sensors can reduce an average commercial facility's water consumption up to 30 percent vs. non infrared/faucets with handles. These fixtures also save energy, because the faucet automatically shuts off after a user's hands leave the sensor area. Activation settings can also be used to control water at peak times, further saving water and energy and reducing utility charges.



Touchless faucets using capacitive sensing technology employ an omni-directional detection zone that surrounds the entire spout rather than a sensor window, commonly used with infrared-controlled faucets.

Metered faucets have a flow rate limit of 0.25 gallons per cycle (gpc), which is the amount of water used during each activation. Depending on local codes, water used by lavatories varies from 2.5

Some newer lavatories utilize photovoltaic technology, which converts restroom lighting to energy to activate the flow of water, eliminating the need for batteries and electricity.

gpm to 2.2 gpm; however, many public restrooms use just 0.5 gpm. Some newer-generation touchless fixtures feature 0.38 gpm faucets vs. 0.5 gpm, and achieve over 20% water savings. In any case, fixtures using less than the 2.5 water conserving gpm standard can help earn LEED credit.

Toilets: Low-flow toilet fixtures using 1.6 gallons or less, or urinals using 0.5 to 1.0 gallons, have become the standard in commercial facilities. One-pint urinals and waterless urinals have made strides in recent years. Low-flow fixtures can be complemented with standard-flow fixtures such as dual-flush toilets, which conserve water by using different amounts of water for various flushing needs. Some newer technologies have sensors to determine the size of flush by measuring the time a user spends at the toilet in addition to the user's distance from the toilet.

Photovoltaics: Photovoltaic cells integrated into the top of a lavatory system convert either normal restroom lighting or day lighting into energy that is stored and used to power valves and sensors in the units. Some fixtures even eliminate the need for batteries and electrical hookups, therefore cutting maintenance and operating costs and maximizing savings and environmental efficiency.

Vandal-resistance: Capacitive sensing uses an omnidirectional zone to detect a user's presence around the entire faucet spout in place of a small infrared sensor window under the spout, which can be punctured or covered with soap scum that can interfere with the sensor window. These units are virtually vandal-free and maintenance-free, since the mechanicals are safely concealed in a sealed control box.

Washroom Accessories: Touchless hand dryers, paper towel dispensers and soap dispensers also underscore energy and environmental efficiencies and convenience for users and maintenance staff. More recent automatic hand dryer designs have made some key advances. Some energy-efficient, sensor-operated hand dryers use 80 percent less electricity than other hand dryers. The energy to operate this new generation of hand dryers is generally less than 10 percent of the cost of paper towels, including eliminating labor costs for ordering, storing, replenishing dispensers, collecting and disposing of paper towels.

Touchless, forced-air hand dryers feature infrared sensors that activate the dryer when hands are placed three to six inches below the nozzle. Improved units dry hands in 15 seconds and are designed to automatically adjust voltage to all power conditions.

In general, electric hand dryers are an environmentally friendly choice over paper towels, because they conserve resources and use relatively little electricity, while offering the hygienic benefit of operating automatically and promoting a cleaner restroom appearance, since paper towel debris is eliminated.

Hands-free soap dispensers also reduce the number of germs on surfaces. If the soap dispenser is integrated into the lavatory, users never have to remove their hands from the bowl. That reduces the amount of water pooling on countertops and potentially dangerous drips on floors.

Employing the latest models of hands-free restroom fixtures gives building management and patrons alike the best of all worlds — from saving water, energy and money to providing healthier, more convenient and more hygienic environments. ■

Jason Renner *is a senior product manager at Bradley Corporation of Menomonee Falls, Wis. A USGBC member and manufacturer of locker room products, plumbing fixtures, washroom accessories, partitions and emergency fixtures, Bradley serves the commercial, industrial, health care, recreation, education and corrections markets worldwide. Renner can be reached at Bradley Corp., W142 N9101 Fountain Blvd., Menomonee Falls, Wis., 53052-0309. For more information, call 800/BRADLEY or visit www.bradleycorp.com.*

The newest generation of touchless adjustable speed hand dryers uses 80 percent less electricity than other popular hand dryers. These dryers offer the option to choose preferred air speed and sensor range, allowing hands to dry in as little as 10 seconds.

Harvesting the Rain

By Mark Girgenti

More than 99 percent of all the water on Earth is not available for human use, being locked in oceans, ice and the atmosphere. With just a fraction of water available and with the ever-increasing movement toward green technologies, water recycling has come to the forefront in building design and integration. In the past 10 years, these technologies have taken root in commercial, municipal, educational, residential and industrial buildings. A great deal of this emphasis has come from the Leadership in Energy and Environmental Design (LEED) program and green building standards that require water reduction and water recycling systems.

Various types of water are being recycled today. It is important upfront in a project's design phase to review the quality and nature of the water to be recycled, as this has an impact on the treatment and available uses. The most common reclaimed water source is rainwater. Rainwater recycling in its basic form is the catchment, capture, treatment and reuse of direct precipitation.

The nature of rainwater

Rainwater has some very useful characteristics. First, due to its lack of contact with minerals found in bodies of water and in the ground, it has virtually no hardness and very low total suspended solids (TSS) and total dissolved solids (TDS), generally around 20 parts per million (ppm) compared to city water, which can have TSS/TDS as high as 800 ppm. As a downside, the majority of rainwater that falls in the United States is acidic in nature, due to its lack of contact with neutralization minerals found in the ground as well as to its capacity for dissolving carbon and sulfate molecules in the atmosphere.

Rainwater harvesting system components

The anatomy of a rainwater harvesting system involves several key components. These include a catchment surface for the rainwater, a gutter or conveyance system to transfer the rainwater, a collection cistern for storage and a treatment system. The treatment system consists, at a minimum, of pressurization pumps, filtration, sanitization, dye injection as required by local codes and additional treatment depending on the quality of the water (See Figure 1).

Calculating the supply

The roof catchment surface determines the overall volume of the rainwater that can be collected. The general rule of thumb for determining the volume of the water collected is shown in Figure 2. First, calculate the square footage of all flat and slightly angled roof surfaces. Then calculate the square footage of all vertical surfaces on the roof and multiply that number by a factor of 0.5. (You can only collect water from two vertical sides on a four-sided vertical catchment surface during any given precipitation event.) Adding these two numbers gives you the total collection surface area.

Multiply this value by the average rainfall in feet in one month. (A good source of this data is worldclimate.com). Then multiply by 0.65, which is a correction factor that accounts for approximately 35 percent of rainfall loss due to runoff, evaporation and freezing. This value can be as high as 42 percent in areas with very high hourly rainfall totals (four – eight inches per hour).

Finally, multiply by the runoff coefficient, which accounts for additional rainwater loss due to the roof material. Clay and concrete roofs, as well as ceramic and asphalt tile roofs, can add an additional 10 percent rainwater loss due to their porosity and texture. (Runoff coefficients for various surfaces can be found in design handbooks.)

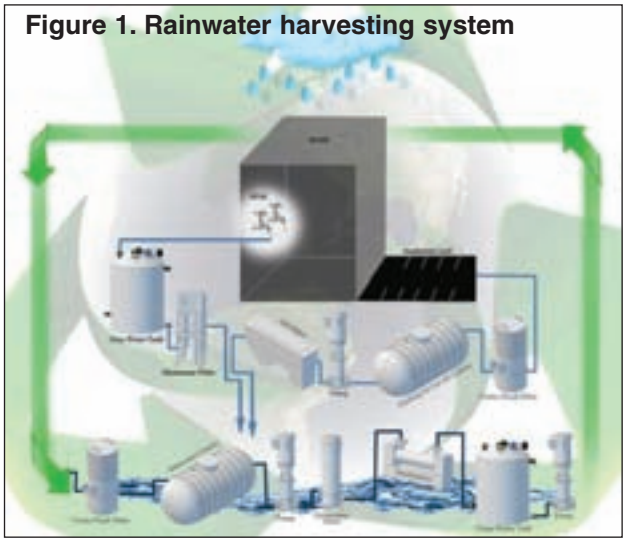
It is important to note that most rainwater system designs also require you to review five- and 100-year rainfall events to determine a maximum single precipitation event. The purpose for this is not to calculate the rainwater capacity but to size the storm drain piping (outside the scope of this article). This is important when sizing roof or conveyance system prefiltration systems.

Water pretreatment

The treatment process for rainwater begins at the roof surface. Before the water is stored, it passes through a conveyance/gutter system. There are two types of pretreatment filters in this piping system. The first type is referred to as a first-flush device. These are mechanical float systems that divert approximately the first five percent of collected rainwater directly to the storm drain; the majority of the contaminants found on the catchment surface are washed into the gutter system during the first few minutes of a precipitation event. By diverting this water from the reclaim system, the contaminant load that the treatment system must remove is reduced.

Continued on page 48

Figure 1. Rainwater harvesting system



Finally, valve configuration online!

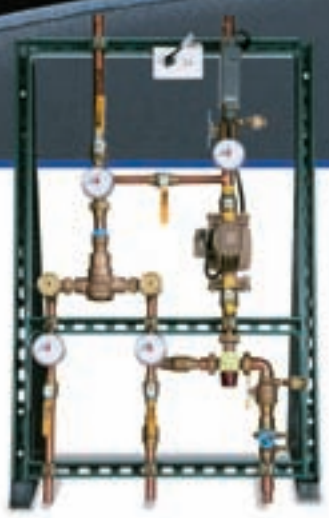
FEATURING – PowerStation™

Water Tempering and Recirculation Systems

Dynamic duo simplifies valve specification – increases valve system performance.

Take the work out of valve specification with Powers' new online valve configuration software. Log on today to configure our new HydroGuard® XP master mixing and hi/lo tempering valves.

- *Easily configure new HydroGuard® XP valve systems*
- *Quickly go from design to 2D and 3D drawing downloads*
- *Draft, revise, print, share and securely archive plans*
- *New valves are ASSE 1017, ASSE 1071 listed and CSA B125 certified*
- *Valves regulate outlet temperature at flows down to 1 gpm*
- *Control at approach temperatures as low as 5°F*



Visit www.DynamicDuoExposed.com/pe

POWERS™

A Watts Water Technologies Company

Circle 29 on Reader Reply Form on page 69

Rainwater

Continued from page 46

The second pretreatment device is a gravity screen filter, which filters large sediment and either flushes a continuous stream of sediment and a fraction of the reclaimed water (generally in the range of 15 percent) to the storm drain or collects the particulates for removal later. These filters are used primarily to prevent large particulates such as leaves from entering the reclaim system.

Storage tanks

The third component of a rainwater harvesting system is the storage tank for the collected rainwater, which are available in a wide variety of sizes and configurations. The most common styles are interior thermoplastic or fiberglass tanks (if the building footprint permits), exterior thermoplastic, fiberglass, concrete or wood tanks and buried fiberglass or concrete tanks. Metal tanks are not commonly used for rainwater storage, because the acidic nature of rainwater can cause metal leaching and discoloration of the water.

Tank sizing depends largely on the application. For LEED designs, the tank is sized for a minimum volume of two days of water use. This is generally considered a fairly small volume of collected water. Sizing the tank volume for the water use for the longest drought period in the region will guarantee the maximum use of captured rainwater. Across the United States, drought periods vary widely, from 10 days to 125 days. This can lead to the need for large cisterns, so a balance must be struck between optimizing water recovery and the available space and budget for the application.

Figure 2. Calculating rainwater supply

Cistern features include level controls to monitor volume and transfer to the point of use, manways for access and overflows in the event of a large precipitation event. Additional features include floating filters that allow cistern pumps to draw off the middle layer of the tank, which

Continued on page 50

Continued from page 48

mitigates pumping the solids that build up at the bottom of the tank, and smoothing inlets, which prevent the agitation of built-up debris in the tank.

Water treatment

Treatment is the final step in the rainwater reclaim system. Two types of designs include similar components but differ in how they interact with the cistern. The first type is referred to as the direct storage system, which pressurizes the water for use directly from the cistern through the treatment system. They are used primarily for low-flow applications or tight footprint constraints. Since rainwater reclaim systems act as a second nonpotable water source for a building, they generally require high instantaneous, but not sustained, flow rates for use in flushing. Direct storage systems are not practical at high flow rates, since sizing the entire treatment system for these instantaneous flow rates leads to increased cost, footprint and utility requirements.

For projects requiring high flow rates, a second design referred to as cistern storage is often utilized. The main difference between direct and cistern storage is that in a cistern storage system, water is pressurized from the cistern through the treatment system to a clean water tank, which serves as a break tank. This clean water tank is considerably smaller than the cistern and is pressurized for use; thus the treatment system is independent of the building's use flow and pressure. Since building use is an instantaneous flow, the clean water storage tank can be constantly filled at a lower flow rate, which reduces the size of the treatment system.

Regardless of the system style, all treatment systems are designed to filter, sanitize and dye (if required) the water, with other treatment options available, depending on use, degree of contamination and local codes. Filtration integral to the treatment system is finer than that in the roof conveyance system pretreatment filters. The filters in a treatment system are designed to filter to the 50 – 10 micron range, depending on the application. The filtration is a step-down process, and the filters are duplexed to allow them to be replaced without shutting down the system. Filters are monitored by means of a differential pressure switch.

Filters are either cartridge or bag filters. On higher flow systems, using low-flow backwashable filters is common to avoid wasting water during the cleaning cycle. Multimedia filters are not common on water reclaim systems, due to their high backwash requirements. If the water is going to be used for potable uses, a one-micron NSF absolute filter is required.

The second step in the treatment process is disinfection. The two types of disinfection most commonly used in water reclamation are chemical and radiation (ultraviolet, UV, light). Chemical treatment uses chlorine or ozone. The main advantage of chlorine disinfection is its residual disinfection after initial contact. One disadvantage is its long residence time requirement before disinfection begins. It can take 20 – 30 minutes or longer for chlorine to start disinfection, because it is dependent on factors such as the pH of the water. It also requires agitation due to its differences in specific gravity with water. Another detriment of chlorine is that it does not treat common parasites such as Legionella, Giardia, and Cryptosporidium. Further, it cannot be used in applications where the reclaimed water will be used for irrigation or chemically sensitive equipment. Ozone has gained popularity over chlorine recently, due to its increased potency as well as to its easy removal with the use of UV destruct.

Due to the disadvantages of chlorine, UV is the more common form of disinfection used. UV used in rainwater reclaim systems is in the 254 nanometer range, and intensities range from 30,000 to 186,000 milliwatts per square centimeter, depending on the water contamination. UV has the advantage of instantaneous treatment as well as having no chemical handling or residual in the water to affect irrigation or sensitive equipment. Its only disadvantage is that it has no residual disinfection after initial contact.

Identification

In addition to treatment, these systems also utilize several technologies to identify the water as a nonpotable source (which is much more common than potable reclaim systems). This includes nonhazardous blue food dye injection, which provides a visual warning of the nature of the water. In addition, the system plumbing as well as field-installed plumbing is colored or painted purple to identify it as a nonpotable source for future occupants and contractors. Not all of these features are used on every system, and these requirements vary by region and local codes.

Figure 3. Combined rainwater/graywater system

Secondary water sources

One of the primary disadvantages of rainwater harvesting is a potential lack of volume and consistency, since rainfall itself is inconsistent. In commercial applications, this is not usually a problem when the water is used only for flushing fixtures. However, if used for high water demand applications such as cooling towers or irrigation for large landscapes, rainwater harvesting alone may not be able to provide enough supply. To compensate for this, other reclaim sources are typically combined with the reclaimed rainwater to meet the demand.

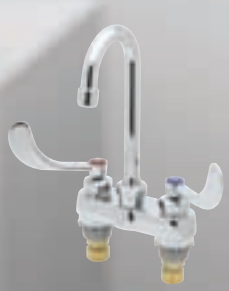
One of the most common secondary sources of reclaimed water is process water reject. This includes sources such as HVAC condensate, cooling tower blow-

Continued on page 52

RELIABILITY

I rely on T&S Brass because I know my clients will be pleased with the installation. It's reassuring to know that T&S products always work – no question. I also really appreciate how T&S is always up-to-date on the latest codes and standards, helping me make informed specifying decisions. And their range of water-conserving products are a great help meeting LEED certfication. I know I can specify quality T&S products and rely on them to last just about forever.

John Neal,
Senior Plumbing Designer
Design Strategies



For more than 60 years, T&S Brass has been leading the industry with high-quality foodservice and plumbing products. For reliable products and reliable advice, T&S is the best choice.

RELIABILITY BUILT IN™

1.800.476.4103 . www.tsbrass.com . twitter: @TSBrass

EXPERT TIP

In addition to Water Efficiency credits for LEED, T&S products can also help you earn points in Innovation in Design and Regional Priority. For more information visit www.tsbrass.com.

Circle 32 on Reader Reply Form on page 69

Continued from page 50

down, chiller condensate and reverse osmosis (RO) reject water. There are many advantages to combining these sources with rainwater. Water sources such as RO reject and cooling tower blowdown tend to have very high hardness and TSS/TDS levels, which can lead to scaling in reclaimed water systems and downstream components. When these sources are combined with the very low TSS/TDS concentration found in rainwater, a beneficial dilution effect can occur. These sources also do not possess the bacterial or chemical contamination found in other reclaim water sources.

The second most common secondary source is graywater (See Figure 3), or wastewater from domestic use such as laundry, dishwashing, bathing, handwashing and cleaning (but not sewage). In some jurisdictions, it is further categorized into two distinct types: light graywater and dark graywater. Light graywater is water as described above that has not come in contact with food preparation activities. Dark graywater is water that has come in contact with food preparation. The reason for the distinction is the level of additional bacterial contamination that is found in dark graywater. Unlike rainwater and reclaimed water sources, graywater has high bacteria levels and chemical contaminations, generally found in the form of phosphates, nitrides and chlorides, which are common in detergents. These contaminants, depending on the water use, generally require additional treatment beyond what is required for rainwater and process waters. Therefore, graywater is usually pretreated prior to being combined with the other reclaim streams.

It is worth noting that if you use a combination water system, the quality of the water will be the lowest quality water you are using. For example, if you combine graywater with rainwater, all of the water will be graywater. Most secondary reclaim sources such as HVAC condensate or RO reject will dominate the water you are reclaiming, as they are more consistent and, over time, will produce far more volume than the reclaimed rainwater.

It is also important to note that in most municipalities you cannot send secondary reclaim sources to a tank or cistern that can overflow to the storm drain. These secondary sources must be discharged to the sanitary system, and multiple storage tanks may be required.

Other treatment options

Besides filtration and disinfection, other treatment options are available, depending on the nature of the reclaim water. For very acidic rainwater and graywater streams, pH adjustment can be added to the system. This helps mitigate metal leaching and corrosion of piping and fix-

tures. In addition, membrane filtration is used to remove color, which can occur from metal leaching and groundwater contamination. This is also used on potable rainwater systems to filter viruses, pyrogens and metal ions.

In the event that the catchment surface is a parking lot or asphalt area, pretreatment for oil removal as well as emulsion breakers may be added to remove these additional contaminants.

If chemical contamination is a concern, such as from heavy organic contamination, an oxidation process can be utilized, as well as organic membranes and slow sand filters (often referred to as bio-sand filters), which utilize a schmutzdecke to remove organic and biological impurities. (Schmutzdecke is a biological layer that forms on the surface of a slow sand filter and aids in the water purification process.)

It is important in rainwater harvesting system design to understand upfront the source of the water as well as its end uses. This upfront knowledge will allow for proper system sizing to maximize the water that can be reclaimed and to identify the correct level of treatment for a safe and environmentally friendly system. ■

Resources

1. Macomber, Patricia S. H., Guidelines for Rainwater Catchment Systems for Hawaii, College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa, 2010.

2. Texas Guide to Rainwater Harvesting, Texas Rainwater Development Board, 2002.

3. Georgia Amendments to the 2006 International Plumbing Code, Appendix 1, "Rainwater Recycling Systems."

Mark Girgenti *(markgirgenti@burtprocess.com) is the lead sales and design engineer for Burt Process Equipment, an environmental process design and equipment firm. Mark has spearheaded the design, integration, project management and construction of water treatment equipment for rainwater harvesting, graywater and high-purity water systems in the governmental, institutional, and pharmaceutical industries, both in the United States and abroad. Mark has been a speaker at numerous green building and plumbing events across the country and was a presenter at the ASPE 2011 Technical Symposium. He holds a Bachelor's degree in Chemical Engineering from Rensselaer Polytechnic Institute and a Master of Science in chemistry. He is actively involved in academic circles as a professional member of the Graduate Advisory Committee for Southern Connecticut State University as well as serving as a volunteer faculty member.*

Piping Needs met on Federal Modernization Project

The Edith Green – Wendell Wyatt Federal Building in downtown Portland, Ore., is currently undergoing a massive modernization that will make it an operationally and economically efficient high-performance green building. The 439,000-square-foot high rise is operated by the U.S. General Services Administration (GSA) and houses offices of the Federal Bureau of Investigation, the Drug Enforcement Agency and the Internal Revenue Service, among others.

The building was commissioned in 1974. Many of its systems were at the end of their useful life and needed to be replaced. The $139 million modernization project, part of the 2009 American Recovery and Reinvestment Act, will make necessary upgrades to the aging building infrastructure, while achieving a 50% reduction in energy use from the existing building. The newly renovated building will include a number of efficient, sustainable and innovative technologies that are expected to achieve a LEED Platinum rating.

Pipe priorities

Interface Engineering, headquartered in Portland, with several offices worldwide, is serving as the project's plumbing engineer. Based on its reputation for idealism, ecological sensitivity, technical expertise and cost-efficient design over its 40-year history, the firm was an obvious fit for the project. According to the firm's Portland-based senior plumbing designer, Dennis Kangas, CPD, the original systems were old and were using more energy than updated systems would. He said that energy saving and sustainability measures were top priorities from the earliest stages of design. The typically overlooked aspect of green building, the plumbing, HVAC and rain harvesting pipe systems, play a large role in achieving those measures.

McKinstry, a full-service design, build, operation and maintenance firm, is serving as the project's mechanical and plumbing contractor. Project manager Eric Peterson explained that he wanted to improve the building's efficiency while keeping an eye on costs.

Continued on page 56

As of October 2011 McKinstry had installed Aquatherm pipe for the building's first eight stories or so for the domestic, radiant and harvested rainwater.

BLÜCHER®

STAINLESS STEEL DRAINAGE SYSTEMS

A Watts Water Technologies Company

Drainage by Design

When you're designing a drainage system, whether it's a commercial kitchen, resort hotel, or sanitary manufacturing facility, your specification can make all the difference. Every aspect, from surface drainage to piping, can contribute to the optimum design.

At BLÜCHER, we support the pursuit of efficient and effective specifications. That's why we fabricate all our drainage systems in stainless steel – a conspicuously superior material. BLÜCHER drainage systems combine functional durability and aesthetics to create classically flawless systems. And because BLÜCHER is now a Watts Water Technologies company, you can specify it with confidence.

Find drainage systems and all the inspiration you'll need at BLÜCHERdrains.com.

KEEPING UP THE FLOW

Circle 35 on Reader Reply Form on page 69

Continued from page 54

At the start of the project, Ridgeline Mechanical Sales presented Aquatherm to Interface. Because the project's goal was a LEED Platinum rating, Aquatherm's polypropylene-random (PP-R) piping was chosen to fulfill the structure's plumbing requirements. Interface principal, Jon Gray, was quite familiar with Aquatherm's highly engineered plastic pipe systems, which have been used around the world for nearly 40 years in a huge range of applications.

"We have been doing work overseas for many years, and I had seen Aquatherm used on jobs throughout Europe and the Middle East. I had also visited the Aquatherm factory in Germany and seen the product made. I've been sold on the product for many years and had been waiting for the market to ripen. It seemed like the Edith Green building was a perfect fit," Gray said. He explained that PP-R was ideal for a number of reasons. "With reclaimed/re-used water, using copper is not your first choice for rainwater distribution, because the copper will get eaten up by the soft water. With Aquatherm, we were able to use the same pipe material for potable and non-potable water, so you're not mixing piping materials in the system, which can cause a lot of problems. Also, the pricing came in about the same as copper."

It is estimated that more than 130,000 linear feet of Aquatherm PP-R piping will be used on the project.

The project needed to follow the Facilities Standards for the Public Buildings Service (P-100), which establishes design standards and criteria for new buildings, major and minor alterations and work in historic structures for the Public Buildings Service (PBS) of the GSA. The P-100 stated that no plastic was allowed, so Interface used a variance to allow for Aquatherm's use. "We explained that using this pipe instead of the other options was going to be to their advantage," Kangas added, noting that PP-R's

natural insulation value (a natural R-value of 1) was also a big selling point.

Heat fusion connects pipe systems

McKinstry used 1½-in.-diameter Aquatherm Climatherm® PP-R piping for the building's new radiant system. The Climatherm runs around the perimeter of the building; fusion outlets connect the perimeter piping into the rest of the system. The fusion outlets were huge labor savers, since they allow installers to simply drill into the supply pipe then heat fuse the fusion outlet fitting into place wherever needed.

Aquatherm's PP-R material and is recyclable, energy efficient and PVC-free.

All Aquatherm pipe is connected via heat fusion, a process often used in natural-gas piping because of its reliability. Heat fusion bonds both sides of a joint into a single, homogenous material without the use of chemicals or mechanical connections, which eliminates systemic weaknesses and fail-points in the pipe.

Because the Green-Wyatt building was the first project in which Howard S. Wright and McKinstry had used Aquatherm on a large scale, "the learning curve for installing it has been steep," said Bob Blodgette, McKinstry's plumbing supervisor. "We are getting more comfortable with it. It can be a bit time-consuming, but recently we have been seeing faster times."

For the potable water supply lines, McKinstry utilized Aquatherm's ½-in.-diameter Greenpipe® pressure piping, which is especially suited for hot and cold potable water and food-grade applications. Corrosion resistant Greenpipe is made with environmentally friendly Fusiolen

Continued on page 68

Legionnaire's Disease:
Have we learned anything?

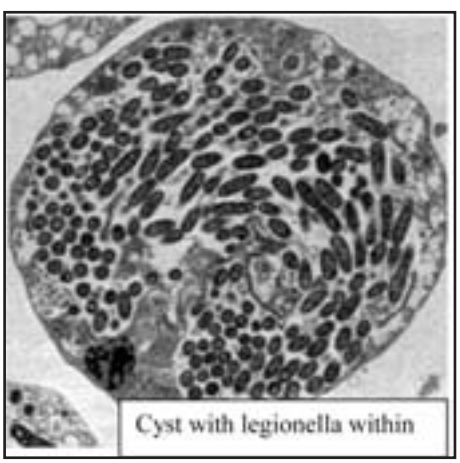
By Frank Rosa

In late December 2010, some patients at a central Ohio hospital came down with legionnaire's disease (LD). There were a total of 11 victims and one casualty. This was not the first time LD had visited this facility; there were cases in 2008 and 2009, indicative of a chronic LD problem.

Was the current outbreak negligence on the part of the hospital engineering staff or beyond its scope of responsibility or control? Can blame be laid at the feet of the general contractor, the plumbing or mechanical contractor or the consulting engineer? Can one ask why no one bothered to check or ask about the ongoing problem, if only to safeguard the health of construction workers? This will be answered as litigation winds its way through the Ohio courts.

Either way, it's a lose/lose situation for all: for the surviving plaintiffs because of the consequences of long term LD affects, for the family of the deceased because they've lost a loved one and for the defendants, as the cost of defense is high, and they face the looming specter of higher insurance fees for all.

Let's look at a 21st-century renovation of a health care facility and see how it could have been done to minimize, if not prevent, the problem. Too much is known about legionella for one not to consider a properly designed filtration system for the potable water mains at this stage (See filtration drawing). This is the first line of defense and should have been done after the first outbreak. A filtration system should be the first item installed after supply mains are violated. The next item should be an injection point for continuous chlorine feed during the "sterilization" procedure and perhaps beyond. This equipment insures that flush water is free of organic matter containing legionella and maintains chlorine at levels mandated by health authorities for potable water use. Flush water with 0.2 ppm free chlorine will not be free of legionella. UV use may provide stronger assurance for the potable cold and hot water, although not for the water used as makeup to a cooling tower or for decorative sprays or similar uses. The chlorine will kill free-swimming legionella but will not touch those within amoebic cysts and within clumps of dislodged slime mass. It has also been shown that, although UV inactivates legionella bacteria[1], exposure to light resurrects them. Free-standing chlorine dioxide systems appear to dislodge legionella after system commissioning.


Cyst with legionella within

Once this is accomplished, renovation of the building can proceed. Wisdom dictates that abandoned piping be cut as close to the supply as possible and capped. There must not be any dead ends with significant amounts of water. Once the system is completed, the piping pressure tested with clean, filtered and chlorinated water, strainers yanked and system inspected for leaks, it is time for commissioning with chlorine as per AWWA standards or the State sanitizing guidelines. This cannot be put off: Time is the enemy, as legionella divide on average every three hours. Most states adhere to AWWA C-601, C-651 and/or the Department of Health requirements for the "sterilization" of potable water lines. The AWWA method requires that one add sufficient chlorine to the system to attain a continuous 25 ppm (that's 25 lbs per 120,000 gallons water[2]) or more of free chlorine for a period of 24 hours at every faucet (hot and cold), ice machine, urinal, toilet and shower by test. After standing for 24 hours, the system must contain 25 ppm, or more, by test, at any faucet tested, or the process must be repeated at no charge to the owner. I have cleaned systems using this method, keeping 100 ppm- free chlorine for 24 hours as I did not want to repeat the process at no charge, in every faucet, urinal, toilet and shower, by test, insisting that the Clerk of the Works witness the testing before and after on random faucets.

While some methods may allow for "slug feeding" of chlorine, this is only a means to minimize labor and costs to the contractor. One would be hard pressed to scientifically defend slug feeding in court. The proper way to chlorinate is to feed chlorine continuously with a pump while flushing at distil ends and working back to the starting point, all the while testing the water.

In the case at hand, where did we fall short? The first LD incident in 2008 should have sounded the warning bell to address potable water issues involved at that time. We are not talking about something new; the issues have been understood since before 1993.[3, 4] The experts hired by the hospital, if they retained such help, should have so advised their client. The information is available in engineering[5], plumbing and HVAC journals, but unread and unapplied.

The hospital engineering staff should have been on top of the renovation and made sure that specs were being followed. They had ample warning of the LD potential with previous outbreaks. Yes, it is the responsibility of the Clerk of Works, but engineering has to live with the job long after the clerk and contractors have gone. The clerk should have shadowed the contractor or sub-contractor that was doing

Continued on page 60

ICC-ES PMG
LISTING PROGRAM

VISIT US AT KBIS

BOOTH #2454

APRIL 27–29 CHICAGO

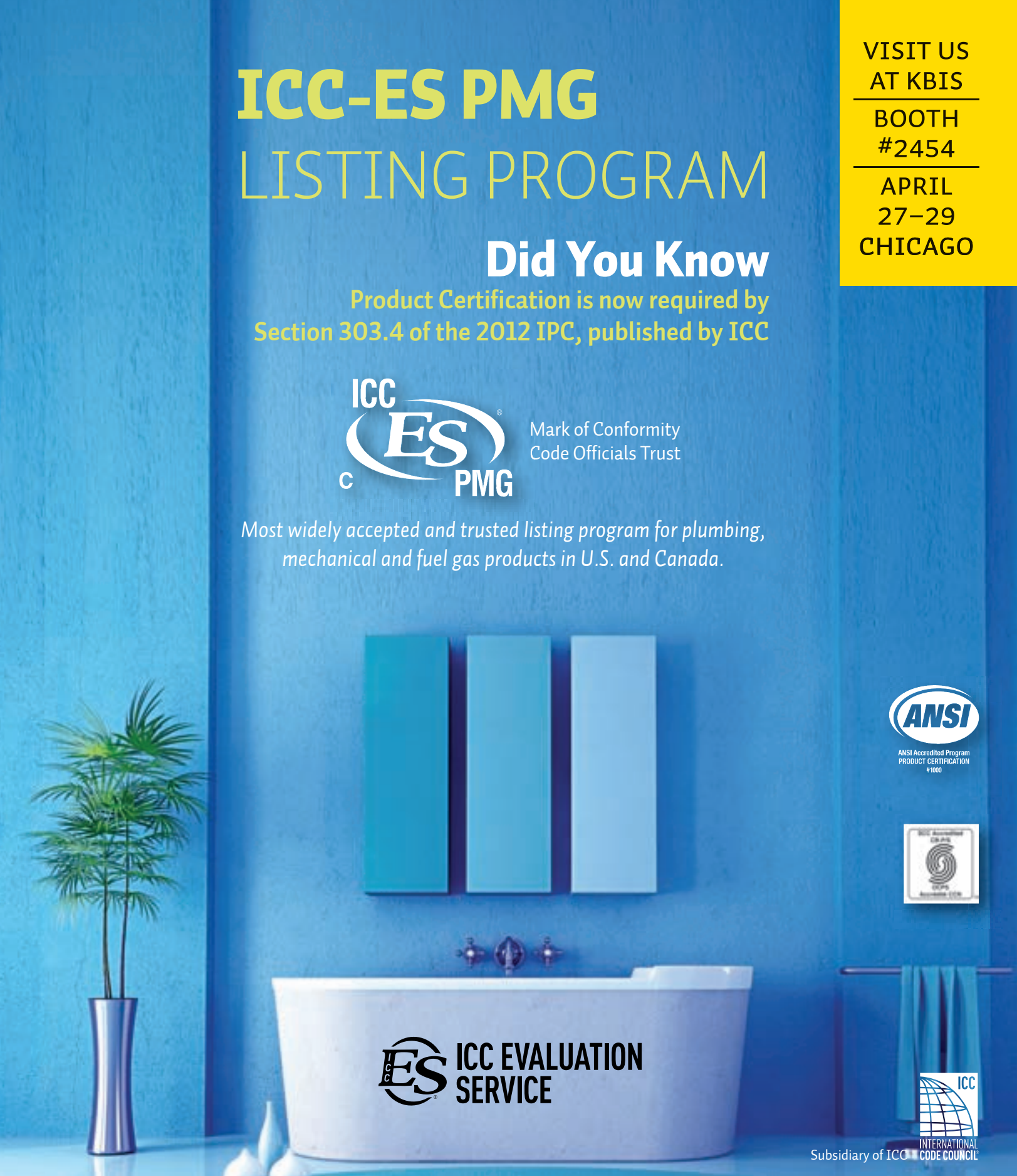
Did You Know

Product Certification is now required by Section 303.4 of the 2012 IPC, published by ICC

ICC ES PMG

Mark of Conformity Code Officials Trust

Most widely accepted and trusted listing program for plumbing, mechanical and fuel gas products in U.S. and Canada.



ANSI Accredited Program PRODUCT CERTIFICATION #1000

ICC EVALUATION SERVICE

Subsidiary of ICC INTERNATIONAL CODE COUNCIL

Circle 36 on Reader Reply Form on page 69

CONTACT US TODAY

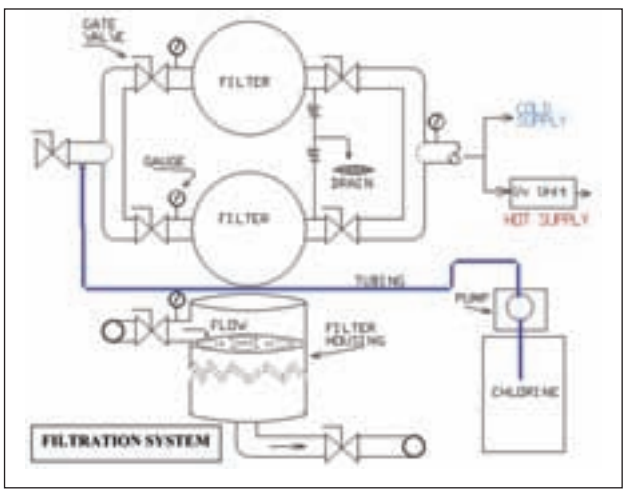
1.800.423.6587 x7643 | www.icc-es.org/pmg

11-05770

Legionella

Continued from page 58

the actual chlorination to make certain AWWA standards were met and the required testing done. The plumbing, mechanical or sub-contractor must follow AWWA or Board of Health specs to overcome legal challenges in court, should it prove necessary. The general contractor and the consulting engineer have to look at submittals and see who was following the standard boilerplate sterilization of the mains found in most, if not all, specifications. This assumes that the usual ten sets of submittals on the procedure were provided. This will come out in court, if it goes that far. ■



Frank Rosa *is the president of Aqua Technical Services Inc., Liverpool, N.Y., a water treatment consultant and an expert witness on LD cases. He is the author of the Water Treatment Specification Manual, 1983 McGraw-Hill, 2nd Ed. 1993, Legionnaires Disease, Prevention & Control, Alternative Water Treatment Devices and of numerous articles in many journals on water treatment for HVAC systems.*

References

1. Vol. 49, No. 4 Applied and Environmental Microbiology, Apr. 1985, "Photoreactivation of UV-Irradiated Legionella Pneumophila and Other Legionella Species" by G. B.Knudson
2. 25# of 100%, ≈ 200# of 12.5% sodium hypochlorite
3. http://bit.ly/zAUDCm
4. http://bit.ly/xTL0Lb
5. http://bit.ly/wb0bge

The views and opinions expressed in this article are those of the contributor and do not necessarily reflect a position of ASPE and TMB Publishing.

NFPA®
CONFERENCE & EXPO
JUNE 11-14, 2012 • LAS VEGAS, NV

Mandalay Bay Convention Center

Pre-Conference Seminars
June 9-11, 2012

REGISTER BY APRIL 27, 2012 AND SAVE!

THE PREMIER EVENT IN FIRE & LIFE SAFETY

FOR MORE DETAILS, GO TO NFPA.ORG/CONFERENCE

Top 10 Reasons to Attend

1 Get information you can use on the job immediately.
2 Learn directly from the leading authorities.
3 Gain up-to-date knowledge on current industry topics.
4 Select sessions for your specific needs.
5 Earn valuable continuing education credits.
6 Extend your training opportunities.
7 Make your voice heard.
8 Network with your peers.
9 Meet more than 300 top solution providers at the Expo.
10 Advance your career faster.

JOIN US IN LAS VEGAS AND

- **Learn from the code experts**
- **Choose from more than 130 sessions**
- **Earn valuable CEUs and more!**

Circle 38 on Reader Reply Form on page 69

Product News — Tankless

Gas-fired condensing tankless

EcoTOUGH™ series of gas-fired residential condensing tankless water heaters introduces the NRC83, an ENERGY STAR®-rated unit designed for smaller homes and multi-family dwellings. Available in both indoor (the two-pipe, direct vent NRC83-DV) and outdoor (NRC83-OD) models, the wall-mounted units have an energy factor (EF) of 0.92 for natural gas and 0.94 with liquid propane, approximately 30 points higher than that of a standard, storage tank-type, gas-fired water heater. **Noritz.**

Circle 100 on Reader Reply
Form on page 69

Condensing tankless

Bosch Therm tankless water heater models C 1210 ESC, C 1210 ES, C1050 ES and C 950 ES are the only condensing tankless series on the market that meets the new, stricter, NOx requirements passed by utility regulatory agencies in California and Vermont. The Bosch Therm line includes ENERGY STAR® rated models, powered by natural gas or propane, backed by an industry-best, 15-year warranty. **Bosch Thermotechnology.**

Circle 103 on Reader Reply
Form on page 69

Scale control system

This system helps ensure the performance and efficiency of Rinnai tankless water heaters used in areas with hard water. To safeguard a tankless unit from limescale build-up and corrosion, Rinnai's scale control system may be installed on a home's cold water line in front of or upstream of a tankless unit. Delivers consistent scale control by dissolving a special blend of compounds that prevents mineral deposits into the water stream. **Rinnai.**

Circle 101 on Reader Reply
Form on page 69

High efficiency condensing tankless

The PHH-32RDV high efficiency condensing gas tankless water heater supports three to four major hot water

functions. This unit uses condensing technology, making it the most efficient tankless water heating solution at 0.94 energy factor (EF). ENERGY STAR rated. Vents using PVC. Exclusive safety features. Temperature remote included. Easily convertible for commercial use. **WaiWela.**

Circle 104 on Reader Reply
Form on page 69

Hybrid water heater

The GU100 Eternal hybrid water heater is designed specifically for the

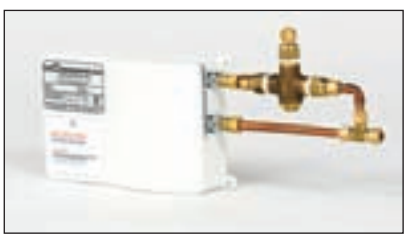
retrofit market and is the most affordable high performance, on-demand water heater on the market. It can support two simultaneous applications and provide endless and consistent hot water with minimal pressure drop. The GU100 has a self-cleaning stainless steel heat exchanger, is recirculation compatible, meets new low NOx requirements and comes with an industry leading warranty. **Eternal Hybrid Water Heater.**

Circle 102 on Reader Reply
Form on page 69

Micro Mix tankless

The Instant-Flow ® Micro Mix tankless water heater creates on-demand hot water at 99% energy efficiency. It uses a digital microprocessor for temperature control, the most energy efficient means of heating water. Proudly made in the U.S.A. **Chronomite Laboratories Inc.®**

Circle 105 on Reader Reply
Form on page 69



Electric tankless water heater

AHQ-TB32 electric tankless water heater is perfect for whole-house residential or commercial applications, such as high flow kitchen or mop sinks, eye/face wash stations and other applications that require automatic power and temperature control. Coilless technology® eliminates lime scale build-up, ensuring optimal energy efficiency, with virtually no maintenance. AHI offers a full line of coilless technology-enabled electric tankless with numerous unique patent pending features. The AHQ-TB32 is equipped with 2-in-1 capacity settings and serves 208 to 240V. **AHI Technologies.**

Circle 106 on Reader Reply
Form on page 69

Prestige™ series condensing tankless

Using condensing technology to create a .94 EF, the Rheem Prestige™ Series Condensing Tankless Water Heater is Rheem's most efficient tankless water heater to-date. Boasting an industry-best minimum flow rate of .26 GPM and a minimum activation flow rate of .40 GPM, homeowners using low-flow fixtures receive hot water without having to increase the flow. Units can vent with PVC piping, making installation faster, easier and cost-effective for contractors. **Rheem.**

Circle 109 on Reader Reply
Form on page 69

Tankless water heater enhancements

Takagi now includes a remote controller and power cord with all indoor residential tankless purchases. Due to varying installation regulations from state to state, outdoor residential tankless units will come with a remote controller only*. Until recently, these water heater accessories were an additional purchase.

** Tankless models ATI-110, ATI-310, ATI-510, ATI-320H and ATI-520H will come with the remote controller and power cord. Tankless models ATO-110, ATO-301, ATO-510 and ATO-520H will come with the remote controller only.* **Takagi.**

Circle 107 on Reader Reply
Form on page 69

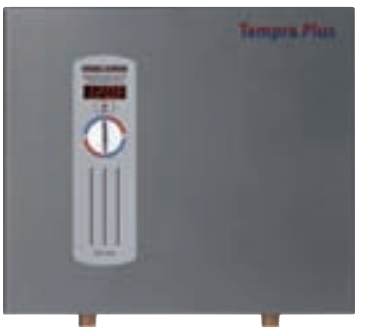
One-gallon electric mini tank

The EMT1 is the industry's first (and only) glass-lined, one-gallon electric mini tank water heater. The EMT1 fills a critical need in the marketplace; namely, for an instant hot water heater that fits easily in tight, cramped spaces. **Eemax.**

Circle 110 on Reader Reply
Form on page 69

Whole-house tankless

Tempra Plus® whole-house tankless electric (99% efficient) water heaters feature advanced flow control to automatically keep output temperature constant and provide unlimited hot water, 15 – 20% energy savings, water savings, space saving 17"×15"×5" and no-venting easy installation. Tempra Plus water heaters provide an ideal backup to solar systems when the sun needs a little assistance. **Stiebel Eltron.**



Circle 108 on Reader Reply
Form on page 69

Wall-mounted tankless

The ODW is a wall-mounted tankless water heater, available in four models ranging from 99,000 to 199,000 Btu/h. The revolutionary S line heat exchangers increase efficiency levels above 90% by using two heat exchangers, including a wet recuperative heat exchanger, manufactured from stainless steel. This reduces energy costs and enables the units to be vented in Schedule 40 PVC. **Quietside.**

Circle 111 on Reader Reply
Form on page 69

Condensing water heaters

Navien offers the largest selection of condensing tankless water heaters in the industry. With eight models to select, Navien has a product to meet any need from 150,000-199,000 Btus in either propane or natural gas. With Navien's simple mounting system, one person can easily install a tankless water heaters. All of the units are condensing and can be vented using 3" Schedule 40 PVC pipe to reduce installation cost. **Navien America.**

Circle 112 on Reader Reply
Form on page 69

Product News

Plumbing Engineer's Product of the Month

Fabricated systems

Skid mounted fabricated systems are available for both space heating and domestic water heating needs. Fabricated Systems are turnkey solutions, offering single source responsibility with all components engineered to perform together and maximize efficiency while minimizing risk. Individual components are factory mounted on a skid, piped and wired together to be delivered as a complete package. Our Fabricated Systems require only a single point electrical connection and connection to utilities, saving on installation time and costs. **Harsco Industrial Patterson-Kelley.**

Circle 115 on Reader Reply
Form on page 69

Commercial water heater

The ARMOR X2 combines stainless steel heat exchanger technology with modulating/condensing combustion to deliver thermal efficiencies as high as 96 percent. Available in models with 1.0, 1.3 and 1.5 million Btu/hr inputs, ARMOR X2 offers an efficient, advanced solution for a wide range of commercial applications. Designed to eliminate concerns about meeting hot water demand, ARMOR X2 is equipped with two independent combustion systems that consist of two 316L stainless steel heat exchangers, gas valves and combustion blowers designed to work in unison. **Lochinvar.**

Circle 116 on Reader Reply
Form on page 69

Ultra Setter control valves

Ultra Setter™ line of pressure-independent control valves feature a unique design that provides full stroke modulation, while maintaining 100% authority at all times. Together with a technologically advanced gpm adjustable dial, the Ultra Setter control valve provides more accurate flow control, eliminates valve hunting and improves energy efficiency in the entire HVAC/R system. **Bell & Gossett, a Xylem company.**

Circle 117 on Reader Reply
Form on page 69

Check valve & flow regulator

CV-FR flow regulating check valves come in compact 14 and 15mm cartridges, easy to insert directly into an application device. Available in flow rates from 0.5 to 4 gpm, they provide drip tight backflow protection and reliable pressure compensating flow regulation from 15 to 150 psi. Selected flow rates help meet the requirements of ASME A112.18.1M and CSA B125 (flow rate limits) and A112.18.3M (tightness in backflow conditions and endurance). All units are certified to ANSI/NSF 61. **Neoperl.**

Circle 118 on Reader Reply
Form on page 69

Fire protection for marine apps

The Marine ONYX systems provide fast, effective fire protection fit for virtually any nautical environment, including oil platforms, luxury yachts, support craft and ships of every kind. The systems feature added protection against airborne particulates, moisture and electrical RF (radio frequency) interference commonly found in harsh marine environments. With built-in scalability, ONYX systems can be used for basic applications to complex installations requiring large numbers of devices. Flexible programming capabilities enable NOTIFIER ESDs to customize ONYX fire protection to accommodate the special needs of various marine applications. **Notifier by Honeywell.**

Circle 119 on Reader Reply
Form on page 69

Plumbing Engineer's Product of the Month

Shower & bath products

Product lines include four full bathroom collections of plumbing fixtures — the Neo™ , Alexandria™ , Caspian™ and Rainier™ Collections are now available. The introduction of the new Shower & Bath products brings a number of new designs to Speakman's existing product line. Each ensemble of products includes a high performing Speakman showerhead, shower valve/trim and tubspout to complete the showering experience. **Speakman Co.**

Circle 120 on Reader Reply
Form on page 69

Water conditioners

Highly successful range of physical water conditioners that offer an alternative to conventional water softeners. The WK1-E has been specially tailored to meet the high power output of electric water heaters, especially when these are supplied by well water. Engineers looking for alternative water treatment can download a Specifiers Guide from www.aqua-rex.com. **Aqua-Rex.**

Circle 121 on Reader Reply
Form on page 69

Vacuum plumbing brochure

AcornVac introduces a new brochure — Vacuum Plumbing for Correctional Facilities, Jails and Prisons. Inside this 12-page color brochure, you will find cost, construction and security benefits of vacuum plumbing systems; clear images of products and installations; information on our Master-Trol electronic valve management system; and much more. **Morris Group Intl.**

Circle 122 on Reader Reply
Form on page 69

Pump protection panel

The Total Pump Protection System is an upgraded simplex system that is available for single phase or three phase pumps. The system offers maximum pump protection designed specifically to protect the higher end pump. This system is equipped with "Smart Board" technology that allows constant monitoring of pump status. The features available: no load lockout; overcurrent protection; cycle counters; elapse timers; and amp meters. Dry contacts for: high liquid alarm w/ oil & water indication; pump fault lights; and seal failure moisture indication. **SEEwater.**

Circle 123 on Reader Reply
Form on page 69

New trim-only kits

Moen Commercial provides increased convenience, flexibility and design options for commercial showering applications with its new trim-only kits. Sold separately, these kits offer heavy-duty, all-metal, vandal-resistant features. The durable Chrome finish stands up to harsh industrial cleaners. Trim-only kits are backed by an industry-leading five-year warranty. **Moen Commercial.**

Circle 124 on Reader Reply
Form on page 69

Macerating toilet

The new Ascent II macerating toilet system allows easy installation of a bathroom in areas where no gravity sewer lines may exist! Perfect for remodeling applications, the Ascent II eliminates the need for major construction or breaking concrete floors in basements to add a bathroom. Featuring a 1.28 GPF high efficiency

toilet, the system easily macerates sewage waste and other debris with new RazorCut™ technology and then discharges it through a small 1" diameter line up to 25 feet high and 150 feet horizontally. **Liberty Pumps.**

Circle 125 on Reader Reply
Form on page 69

Letters to the Editor

Onsite wastewater treatment

Ron George,

We are designing an onsite wastewater treatment system for a small stadium. What are the recommended flow rates…

- Per seat
- Per player
- Per employee

...so that we may adequately size the system?

Any other related information and sources of information would be appreciated.

Thanks for your continued assistance.

Ramdeo Maraj CPD

Ramdeo,

I am not sure what kind of stadium you are designing this for, but here are a few thoughts to maybe help you out.

As far as wastewater pumping goes, most of the stadiums I have designed were connected to the public sewer by gravity. Consider the old adage, "What goes in must come out." Waste flow rates tend to spread out over time, as the flow rate for a flush is between 25 to 35 gpm at a flush valve during the few seconds of a flush; a few hundred feet down the drain line the few seconds of flow can be spread out into about a minute of flow. But for pumping you should use the "goes into" and "goes out of" theory, or gozinta, gozouta.

I do forensic investigations of building failures. One of my investigations involved a stadium that had an existing sewer main located nearby that was significantly undersized. The nearest sewer large enough to handle the stadium effluent was more than a mile away in a major urban area. The cost of upgrading the public sewer was very high, and the decision was made to use a large holding tank to receive the waste effluent from the stadium during a typical two to three hour football game and pump it out at a lower flow rate that the sewers could handle. A concrete holding tank of approximately 750,000 gallons was constructed under the lower concourse. The waste flowed into this tank; duplex sewage pumps pumped the waste out of the tank and into the public sewer at about 800 gallons per minute.

The problem was that the use of the stadium changed beyond the design parameters. A concert promoter leased it for an all day concert that began at 11 a.m. and went until after midnight. The sewage tanks were only designed to hold sewage for from three to four hours of peak flow, with the pumps discharging through a sewage line one pipe size smaller than the public sewer. After a few hours, the tank filled up, sewage backed up into all the fixtures on the lower level and, as people on the upper concourses flushed, there was no place for the waste to go but out of the fixtures on the lower levels. The sewage ran down the concourses and the ramps to the field and started to fill the stadium bowl with three to four inches of sewage. As you can imagine, there were lots of lawsuits and millions in damages for repairs, replacements costs and loss of use of the facility.

In this case there was a control panel that turned on the lag pump and another level switch that turned on a high water alarm light on the panel, but it was not remotely monitored and it was not set to automatically shut off the building water supply when the sewage tanks were full. Something to think about if this is a possibility in your case. On a couple of recent stadium projects, I designed the plumbing, which again was connected to the public sewer by gravity. Using the "goes into" and "goes out of" theory, you can approximate the waste flows. The design included the booster pump packages for a 65,000 seat stadium for an [illegible] football team and a 45,000 seat major league baseball stadium. We had a quadraplex (four) booster pump package with four 900 gpm pumps. The pumps had controls to alternate the pumps for even wear. A hydro-pneumatic tank located on the opposite side of the stadium at the upper level concourse allowed for pump shutdown during periods of non-use. Each pump was sized for 900 gpm, for a total booster pump package flow rate of 3,600 gpm.

The football stadium had a 12-inch suction main to serve the domestic water and [illegible] pumps with a 14-inch discharge cold water main to a loop in the lower concourse, which was a 12-inch diameter, schedule 10 stainless steel inch pipe [illegible] three-inch, two-inch and 1 ½-inch branch connections to restrooms and concessions. The branches were welded on the water mains with stainless steel pipes with grooved connections on the other end to accept a shut-off valve and dielectric connections to copper pipe for the three-inch and smaller pipes. In this particular project, there was an adjacent high rise building with other multi-use functions that had a separate booster pump sized with the flow required for that area with a higher head pressure for that building in order to have adequate pressure at the top of the building.

I am not sure what type of stadium you are working on, but this should put you in the ballpark for a football or soccer stadium. Baseball stadiums should use about 0.06 gpm per seat, because many stadiums can be used for concerts or other events that might have higher peak demands.

The green solution is to consider the use of a hydropneumatic tank to allow no-flow shutdown and to consider variable speed pumping if the stadium will be used a lot. If the stadium will sit for long periods unused, consider just using constant speed pumps with pressure or current sensing controls to turn on additional pumps as demand increases.

Ron

Sprinklers in elevator machine rooms and hoistways

Sam Dannaway,

I have been a loyal reader of *Plumbing Engineer* magazine, including the FPE Corner. I read your article in the Feb. 2012 issue with reference to sprinklers in elevator machine rooms and hoistways. My experience is that

sprinklers are always required in the elevator machine room, regardless of NFPA 13 or ANSI/ ASME A17.1 requirements, because the building insurance underwriter requires them. As an example, fire marshal (FM) requirements are usually more stringent than NFPA's; FM always require sprinklers in the whole building. If you do not put them in, FM complains to Risk Management (RM) and RM goes to the Fire Marshal, and so on...!

Therefore, what sprinkler contractors normally do is install a heat detector in the elevator machine room that is set for 15 F lower than the sprinkler temperature setting. When energized, the heat detector disconnects the power to the elevator system prior to water flow and sends an alarm to the fire alarm panel. By the way, this includes sprinklers in the elevator controller room in case there is no machine room.

Therefore, sprinkler designers should not omit sprinklers from elevator machine rooms simply because NFPA does not require them.

Regards,
Tal Rabiah PE
DNJ Engineering

EX and the fire-sealant

Ron George,

We're trying to find what is approved and listed to seal around PEX pipe through rated penetrations in multi-family applications. Is there any issue with the permeability (or the toxicity of water being affected) of PEX when exposed to the foams or fire calks?

Thanks, Bob Adler

Bob,

Any plastic pipe passing through a fire wall must be seal with an approved firestop. This is not a caulk or mastic. Plastic pipes can burn away leaving the hole in the caulk. A firestop for a plastic material must be an intumescent material meeting the UL standards for a penetration and it must have a metal collar to force the intumescent material inward in a fire. The PEX piping manufacturer mus also approve of the firestopping materials so that they can confirm that the plasticizers in the tubing will not be softened by any chemicals or plasticizers in the caulk. Charlotte pipe requires foil tape on the outside of CPVC pipe when rubber pipe clamps or pipe supports intended to limit noise or vibration comes in contact with the piping. The bottom line is the manufacturer needs to answer that question of material compatability.

Ron

Waste and vent system

Ron George,

I applied a combination waste and vent system on several floor drains in a mezzanine mechanical room. The plumbing department head said I cannot use that system, since the maximum vertical member of a combination waste and vent system is only up to 8 feet. He was referring to the waste stack, which I connected to the sewer below.

Is he interpreting this code correctly?

Thanks,
Tony Leochico
Plumbing Designer

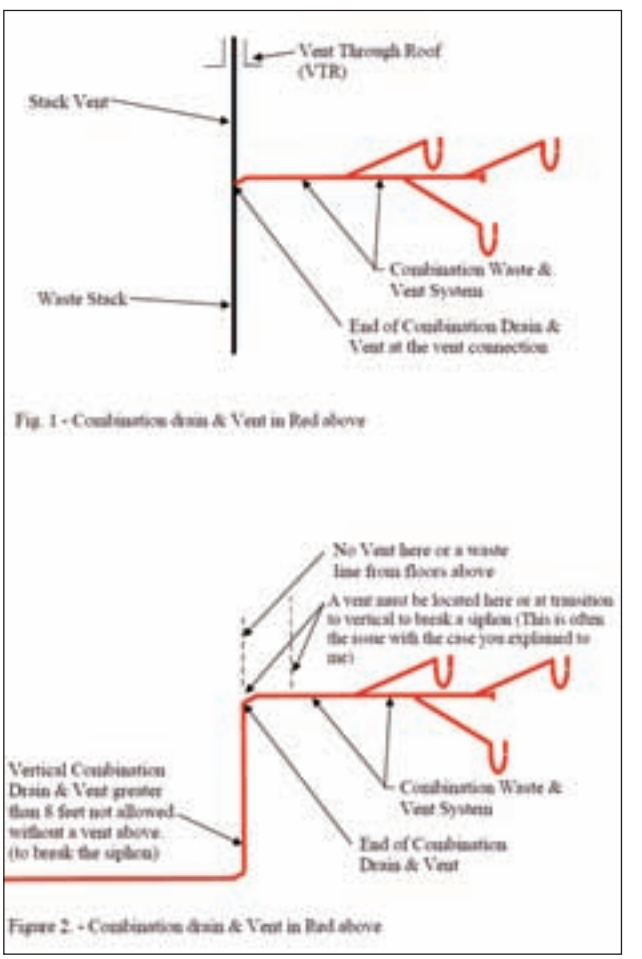
Tony,

The combination waste and vent system ends at the vented line that the combination drain and vent is connected to. If there are no other drainage fixtures above the stack where the system connects to the vertical waste stack and if the stack vent goes through the roof, then the combination drain and vent ends at the stack vent connection.

The vertical pipe is not part of the system after it gets to the vent connection. If there is no vent when the waste line turns down, then he is right: You cannot drop more than eight feet. But if he is counting the vented stack as part of the combination system after the sanitary tee at a vented stack connection, the vertical stack is not part of the vertical portion of the system.

Ron

See the illustrations below:



Classifieds

Piping

Continued from page 57

PP-R material and is recyclable, energy efficient and PVC-free.

Aquatherm's Lilac piping is colored to differentiate potable water use.

Using gray skies for good

Wright wanted to capitalize on the rain that soaks the Pacific Northwest every winter. While a graywater system was initially considered, it was determined that substantial water conservation could be achieved by harvesting the area's generous rainwater. Rainwater is gathered from the main building roof, the PV solar array and plaza level drainage. Initially, it was going to be stored in large tanks in the penthouse. That plan was switched to one incorporating a large storage tank in the basement, which had previously been the FBI's shooting range. The entire shooting range was used as a cistern that holds 150,000 – 160,000 gallons. The rainwater is UV sterilized and used in the reclaimed system, with Aquatherm's Lilac piping transporting it to low-flow toilets and urinals. (Lilac is the same PP-R material as the rest of Aquatherm's products but is colored to differenti-

Continued on page 70

Advertiser Index

Plumbing Engineer
A TME Publication

1 I wish to receive (continue receiving) **Plumbing Engineer** for **FREE**
☐ Yes ☐ No

2 I am engaged in plumbing engineering: ☐ Yes ☐ No

3 I am also engaged in the following kinds of engineering work:
☐ Piping (a) ☐ HVAC (b) ☐ Hydronics (c)
☐ Sprinkler/Fire Protection (d) ☐ Plumbing (e)

4 I am employed by one of the following:
☐ Architectural/Engineer (a) ☐ Mechanical Engineer (b) ☐ Building Owner/Engineer (c) ☐ Consulting Engineer (d) ☐ Contractor (e) ☐ Design–Construct Engineer (f) ☐ Architect (g) ☐ Manufacturer (h) ☐ Manufacturers Rep (i) ☐ Government (j)
☐ Mechanical Contracting (k) ☐ Other (x) _____

5 My title is: ☐ Construction Manager (c) ☐ Engineer (e) ☐ Owner (o) ☐ President (p) ☐ Specifier/Design (s) ☐ Vice President (v)
☐ Other _____

6 Do you design and specify products? ☐ Yes ☐ No

7 I belong to the following professional organizations:
☐ ASPE (a) ☐ ASSE (b) ☐ ASHRAE (c) ☐ NSPE (d) ☐ Other (e)

8 **Please fill out this form, sign and date below**

Name/Title

Company

Street Address Box No.

City State Zip

Telephone Fax

Email

Signature (required)

April 2012

Please fill out this Reader Reply form and fax it to us at 630.739.9700 to receive the information you have requested.

Please circle the number that corresponds to the information you' re interested in.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203

Subscribe online at
www.plumbingengineer.com

Continued from page 68

ate it from potable water.) Even though Aquatherm PP-R piping was relatively new to both the general contractor and installer on the job, "It has been a matter of staying with it," said Dave Lusher, sales representative for Harrington Industrial Plastics, the project's Aquatherm piping distributor. Ridgeline Mechanical Sales worked extensively with Harrington to present, train and shorten McKinstry's learning curve.

"Slowly but surely the old-school people came over and accepted that Aquatherm is a good alternative. It's one of those situations where the customers say, 'We've always used carbon steel.' It's a paradigm shift for them," explained Lusher.

McKinstry was also impressed with the piping system's warranty. When installed by Aquatherm-trained and certified technicians, the piping and fittings carry a 10-year, multimillion-dollar warranty covering product liability, personal injury, property damage and incidentals.

Rainwater is used in the reclaimed system, with Aquatherm's Lilac piping transporting it to low-flow toilets and urinals.

While the building will not likely be completed until sometime in 2013, as of October 2011 McKinstry had installed Aquatherm pipe for the building's first eight stories or so for the domestic, radiant and harvested rainwater. In all, the firm estimates that more than 130,000 linear feet of Aquatherm PP-R piping will be used on the project. ■

McKinstry utilized Aquatherm's ½-in.-diameter Greenpipe® pressure piping.

APOLLOXPRESS™

Your Single Source Solution for Press Technology

Small & Large Diameter Fittings	Ball Valves	Gate, Globe, & Check Valves	Water Pressure Reducing Valves	Backflow Prevention
				
Available in Sizes 1/2" to 4"	Available in Sizes 1/2" to 4"	Available in Sizes 1/2" to 2"	Available in Sizes 1/2" to 2"	Available in Sizes 1/2" to 2"

The APOLLOXPRESS™ Advantage

APOLLOXPRESS™ fittings are a proven heat-free method for joining copper tube and provide a clean, easy joining technique that saves time and money on installations.

The APOLLOXPRESS™ line of fittings and valves feature pre-lubricated seals and leak-before-press technology to ensure quick and confident connections. APOLLOXPRESS™ valves are available in both standard and Lead Free configurations, while all APOLLOXPRESS™ fittings are Lead Free.

Made in America in our American plants and foundries, our broad range of Press Technology products brings you the quality you have come to know and expect, all from one source.

APOLLOXPRESS™ is your single source solution for Press Technology.

BENEFITS OF THE APOLLOXPRESS™ SYSTEM

Heat & Flame Free
Reduces fire hazard - no need for heat and open flame.

Clean, Fast and Simple
No glues, fluxes or solder needed. Installs in less than a minute for most sizes.

Single Source
All the press you need, all from one single source.

For more information on the advantages of the APOLLOXPRESS™ system, contact:

"Apollo" Valves

SALES and CUSTOMER SERVICE
Phone: (704) 841-6000
Fax: (704) 841-6020
www.apollovalves.com

follow us on

Elkhart Products Corporation
For the perfect fit

SALES and CUSTOMER SERVICE
Phone: (800) 395-7313
Fax: (574) 264-0103
www.elkhartproducts.com

Circle 40 on Reader Reply Form on page 69

WHEN YOUR RETAIL SPACE'S AGING WATER SYSTEM CALLS FOR WHOLESALE CHANGES, ZURN LISTENS.

> *We strive to provide every customer with a positive shopping experience. Right down to the restrooms. So when we had to upgrade our facilities, we needed the most dependable products that could be installed quickly and easily. That's why we called Zurn.*

RETROFIT AND REPLACEMENT SOLUTIONS

High-efficiency toilets and sensor operated faucets and flush valves that conserve water and money. Lead-free backflow preventers and water pressure regulars that fit all current footprints and offer the lowest life-cycle cost. When shopping for the right fixtures and valves for your building's water system, there's only one name to consider. Zurn. For your next retrofit and replacement project, give us a call. We'll listen.


Z1231 EZR Adjustable Carrier


Toilet Systems


Sensor Faucets


375XLAR Lead-Free Reduced Pressure Principle Assembly

ZURN®

zurn.com

1.855.ONE.ZURN

Circle 41 on Reader Reply Form on page 69