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

Plumbing Engineer

A TMB Publication

ASPE
THE OFFICIAL PUBLICATION OF THE AMERICAN SOCIETY OF PLUMBING ENGINEERS

August 2012

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

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

Plumbing Engineer's 2012 Boiler Report

Boilers take *CENTER STAGE*

CHRISTMAS CAME EARLY THIS YEAR!

SURE SEAL

Water Goes In – Odors Stay Out!®

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

To receive your FREE GIFT simply visit www.TheSureSeal.com/pefg before September 30, 2012 and submit your sample request.

*Free sample limited to 1 person/company.

www.TheSureSeal.com/pe

800-405-7714

Circle 1 on Reader Reply Form on page 65

Digital Hot Water Innovation

Learn more at:
armstronginternational.com/brain

Armstrong

Circle 2 on Reader Reply Form on page 65

Plumbing Engineer®

A TMB Publication

THE OFFICIAL PUBLICATION OF THE AMERICAN SOCIETY OF PLUMBING ENGINEERS

Volume 40, Number 8, August 2012

INSIDE THIS ISSUE

FEATURES

ASPE REPORT

COLUMNS

DEPARTMENTS

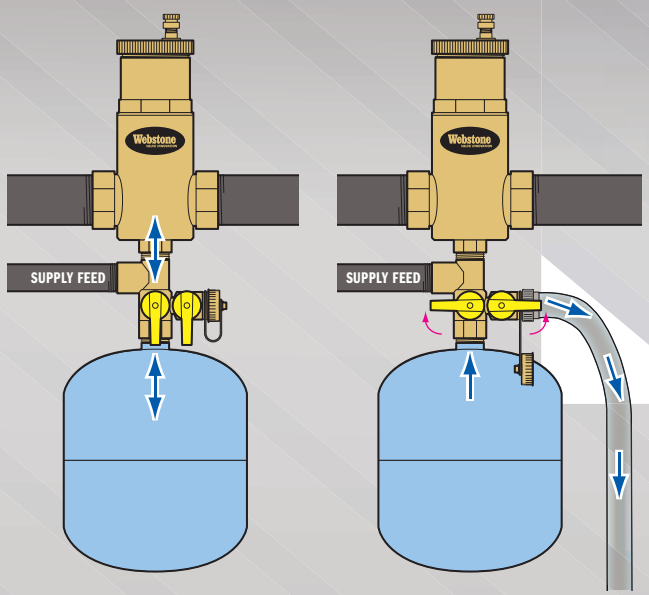
WHEN YOU COULD DO THIS!

PRO-PAL SERIES®

EXPANSION TANK PRO SERVICE VALVE™

- Easily install, isolate, drain & replace any expansion tank
- Quickly connect entire system to the cold water feed
- Ideal for use with the Webstone Air Separator

HANDLE OPERATION



Normal Operation

System Isolation & Tank Draining

Webstone
VALVE INNOVATION

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

GUARANTEED FOR LIFE

Circle 3 on Reader Reply Form on page 65

Editor's Letter

Jim Schneider, LEED AP, editorial director
editor@plumbingengineer.com

Weather or not

Hello there. Allow me to introduce myself; my name is Jim and I'm the new editorial director of *Plumbing Engineer*. I've worked in design and construction trade publishing for several years and am excited to join the team here at TMB Publishing. I can already see that *Plumbing Engineer* serves a vibrant, active industry and I'm looking forward to getting out and learning more about the people, firms and technology that make it tick.

I live in Chicago, and these days the weather is quite literally the hot topic of conversation. The entire Midwest is enduring a severe drought and record-breaking temperatures are causing trouble all over the country. In Chicago alone, we have had four days with temperatures over 100 F. I have lived here for 11 years and before this summer I had seen only one day with triple-digit temperatures. So in answer to that age-old, clichéd cornerstone of small talk: Yes, it is hot enough for me.

Having grown up on a small dairy farm in Wisconsin, I have a pretty keen awareness of how an uncontrollable force like the weather can have a very real, bottom-line impact on business. Too hot or too cold, too much rain or too little – on the farm, any of these factors would affect crop yields and have ripple effects all the way down the supply chain. With this year's drought, some farmers are already declaring major losses. Many are dipping into their savings and seeking government disaster assistance just to stay afloat.

It isn't just farmers that are impacted by weather. Our industry is certainly not immune. No matter how high-tech we get or how sophisticated the systems we manufacture and install, nature still will have its say. For example, we are coming off a winter that was unusually warm and dry in many parts of the U.S. That weather may have felt nice, but wasn't exactly great for those in the heating industry. With heating demand at a low point, it was a tough year for many.

No one knows for sure what this year's heating season will bring, but according to the responses we received from manufacturers in this year's Boiler Report, there is a good deal of optimism about the potential for business in the coming months. Check out the report on page 50 and learn more about innovations, news and forecasts from the boiler industry.

So like those farmers hoping for conditions that are not too dry, we can hope for a heating season that is not too warm. Part of doing business is learning to navigate uncertainty, and in an election year filled with economic turmoil, there is plenty of uncertainty to be found. It would be nice if the economy and the skies would provide us with a stable business climate, but it doesn't always work that way. As Mark Twain once said, "Climate is what we expect, weather is what we get." ■

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 8. *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
Jim Schneider, *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, *FPE Corner*
Ron George, CPD, *Code Classroom*
Dan Foley, *Modern Hydronics*
Winston Huff, *Sustainable Design*
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

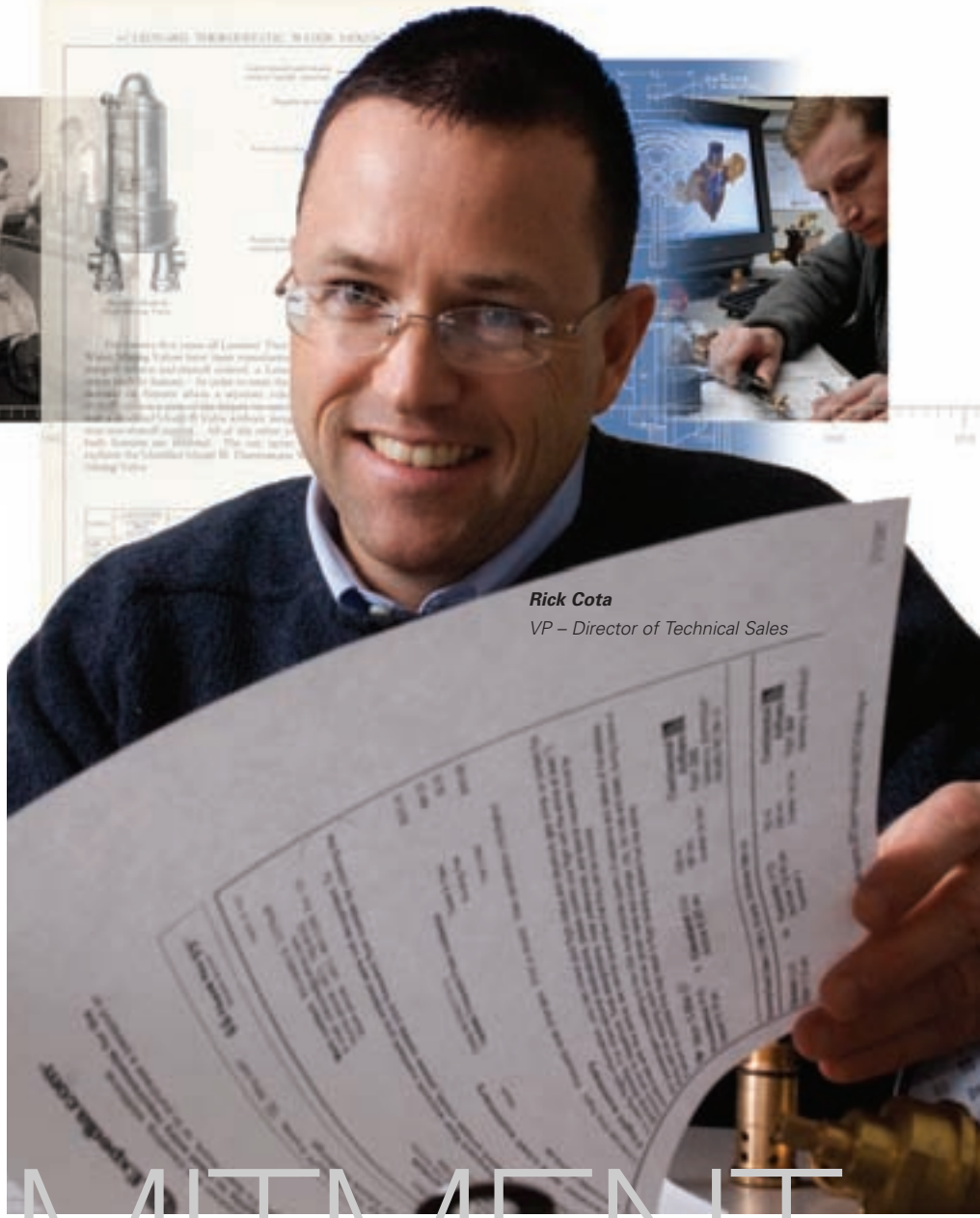
Diane Spangler
West, Texas and W. Canada sales
PO Box 9802, Fountain Valley, CA 92728 Phone: 714/839-6700
Fax: 714/839-6777
E-mail: diane@tmbpublishing.com

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

100 years ago, Frederick C. Leonard made a commitment.

In 2012, the company he founded has the same commitment.

Frederick C. Leonard



Rick Cota
VP – Director of Technical Sales

It's been awhile since Frederick C. Leonard pioneered the development of water temperature control valves for solving the problem of delivering safe, tempered water and set an entire industry in motion. And while designs have changed, 100 years later, one thing hasn't: Leonard's commitment. It's that commitment that puts Leonard ahead of other companies in the proven reliability of every Leonard mixing valve that we manufacture here in the United States. Mr. Leonard would be proud.

COMMITMENT

100 YEARS LEONARD

LEONARD®
WATER TEMPERATURE CONTROLS

leonardvalve.com
Leonard...the right mix.

Circle 4 on Reader Reply Form on page 65

Industry News

Students earn manufacturing scholarships

ROCKFORD, ILL. — Ten students seeking careers in manufacturing each earned $1,500 toward their trade school or community college education from Nuts, Bolts & Thingamajigs (NBT), the Foundation of the Fabricators & Manufacturers Association Intl. (FMA). FMA's outside processors council (OPC) will sponsor a $2,000 scholarship for one university-bound student.

This year NBT and OPC awarded manufacturing scholarships totaling $17,000. The 2012 winners are:

- Jay Brinegar, Bloomfield, Ind.
- Hunter Curfman, Toppenish, Wash.
- Pace Funsch, Fallon, Nev.
- Saul Garcia, Long Beach, Calif.
- Trevor Graff, Boardman, Ore.
- Justin Keith, Poplar Bluff, Mo.
- Andrew Klos Jr., Allenton, Mich.
- Colton Laughlin, Ferndale, Wash.
- Nicholas Maben, Grayland, Wash.
- Tyler McClish, Kokomo, Ind.
- Colt Petersen, Hinckley, Utah

"We are pleased to award scholarships to these 11 deserving young people and are happy to assist them in reaching their academic goals," said Edward Youdell, president of Nuts, Bolts & Thingamajigs. "These students recognize that skilled manufacturing careers can be rewarding financially and fulfilling personally and will help them be more competitive in the current job market.

"The most difficult U.S. jobs to fill today are those in the skilled trades and engineering," added Youdell. "With majors in machine tool and CNC technology, structural and pipe welding, sheet metal fabrication, engineering and precision manufacturing technology, these students will be prepared for the skilled labor openings that American manufacturers must fill."

To be eligible for the scholarships, applicants were required to be full-time students, meet a specified minimum GPA and be enrolled in an engineering or manufacturing-related course of study or a trade or technical program leading to a career in manufacturing. Students were responsible for submitting academic records and an engineering or manufacturing-related program description with each application.

Since 1990, FMA's foundation has awarded scholarships annually to students in courses of study that will lead to careers in manufacturing.

IAPMO online standards store now open

Ontario, Calif. — The International Association of Plumbing and Mechanical Officials' (IAPMO) online store is now offering IAPMO Standards for purchase in an instantly downloadable pdf format. The following documents can be downloaded as eBooks and viewed from any computer or Internet-enabled mobile device (smartphone or tablet) via the IAPMO online store (www.iapmomembership.org):

- IAPMO/ANSI Consensus Standards
- CSA/IAPMO Harmonized Standards
- IAPMO IGC (Guide Criteria)
- IAPMO PS (Property Standards)
- IAPMO TS (Trailer Standards)
- IAPMO IS (Installation Standards)

IAPMO eBook standards are Web-enabled and annotatable within such programs as Adobe Acrobat, giving users the ability to flag relevant sections and make notes within their stored digital documents.

The new IAPMO Online Store is easily navigated, with an improved search function that enables users to organize their standards search by name or release date — it's as easy as search, purchase, download. IAPMO members receive a 20 percent discount on all standards and other IAPMO publications.

Hydraulic Institute updates standard

PARSIPPANY, N.J. — The Hydraulic Institute (HI) has updated the 1997 edition of the ANSI/HI standard on allowable operating region for centrifugal and vertical pumps and published ANSI/HI 9.6.3 – 2012 Rotodynamic (Centrifugal and Vertical) Pumps – Guideline for Allowable Operating Region.

The updated guideline discusses the effects of operating a rotodynamic pump at rates of flow greater than or less than the rate of flow at the pump's best efficiency point (BEP). These effects influence the power consumption and life of pump components. Considering the operating rate of flow is essential to reliable, efficient pump operation.

The preferred operating region (POR) and the allowable operating region (AOR) are defined for rotodynamic pump types and related to specific speed. Factors that affect AOR are discussed and NPSH margin versus rate of flow is presented.

The guideline also indicates when stable or unstable operation may be expected, based on typical system head curves for pumps exhibiting a drooping head curve or a head curve with a dip. Considerations such as the robustness of a pump are also discussed.

The guideline is available for purchase at the HI eStore for $65.00 and is available in both hardcopy and pdf formats.

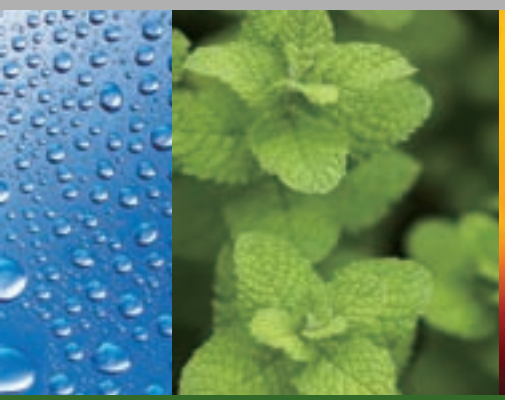
ACCA seeks applications for awards program

ARLINGTON, VA. — ACCA, the nation's largest association of indoor environmental systems profession-

More Industry News on page 10

KD NAVIEN®

Condensing Combi Gas Boiler/Water Heater



The New Green Solution for Domestic and Hydronic Heating!

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***

AHRI CERTIFIED® www.ahridirectory.org

[ASME Models are Energy Star Qualified]

NAVIEN Training Academy

Please Visit Our **Website** for a Complete List of **Training Classes** in Your Area!

www.NavienAmerica.com / 800.519.8794

Circle 5 on Reader Reply Form on page 65

Continued from page 8

als, is seeking nominations for its Contractors of the Year awards program. The application for the 2013 program is available now on ACCA's website and is similar to last year's to make it easy for contractors to nominate themselves for their innovative business practices.

The Contractors of the Year awards program provides ACCA members with a unique marketing opportunity for their businesses. Not only will the winning contractors be honored at the ACCA annual conference by their peers, but this is a great opportunity for them to tout their company's accomplishments and show their customers that they are recognized leaders in the industry.

All nominees will be evaluated, and six finalists will be selected; three residential finalists and three commercial finalists. Finalists will be asked to create informational profiles that describe the company and the unique aspects of the business for inclusion in the official judging packet. A panel of ACCA's past chairmen will serve as judges. The winners — one residential and one commercial — will be recognized on stage at the annual ACCA conference and will be profiled in the print and electronic versions of IE3 magazine.

Fill out the online form at www.contractorsoftheyear.com. Applications for the program will be accepted until September 21, 2012.

Nu Flow drives international growth with expansion in UK

SAN DIEGO —Following consistent international growth and success, Nu Flow has expanded its operations in the United Kingdom,

"I realized a gap in the UK market for a rehabilitation process for in-situ water pipe systems. There were very few options for corroding lead pipes, other than costly and disruptive replacement. Nu Flow's experience of building infrastructure rehabilitation and the unique ability to successfully reline all pipe diameters means we can offer a very unique service with the UK," said Darren Cameron, director of Nu Flow UK.

With this move, Nu Flow significantly expanded its position in the UK market with a distribution and licensing partner in Totton, Southampton. The partnership provides commercial, industrial, municipal and residential customers with a proven trenchless technology that can rehabilitate pipes without causing destruction, whether underground or within buildings.

"This partnership is an example of how Nu Flow's success is driving global demand for inside infrastructure rehabilitation technology," said Cameron Manners, CEO of Nu Flow. "We know our technologies are a perfect fit in the UK, as they rehabilitate pipe systems while preserving the architectural history of buildings."

Nu Flow UK recently completed their first job at King Harold School, with Nu Flow America with them on site to train.

M.A. Stewart & Sons opens new distribution facility

AJAX, ONTARIO — M.A. Stewart & Sons Ltd. a supplier of high quality valve products, has opened a new Ontario distribution facility. This new and expanded site will allow for superior customer service and the ability to distribute an expanded product offering. The facility is located at 40 Pugsley Court, Ajax, Ontario.

tekmar Launches Website Version 3.0

VERNON, BC. — tekmar is excited to announce the launch of the newly designed website, which goes live today and is located at www.tekmarControls.com. The site's homepage welcomes visitors with bold colors, a clean uncluttered design, easier navigation menus and featured content focused on offering the complete solution for hydronic system control.

The mission for the website remains the same, to provide customers with detailed and accurate

Continued on page 12

Schooling the competition for 25 years.

The Benchmark family of high-efficiency boilers.

Here's a history lesson for all the "so-called innovators" of modulating condensing technology–AERCO has been at the head of the class for 25 years. Our redesigned Benchmark 3000 high-efficiency boiler is a perfect example:

- 15:1 turndown
- Field-proven stainless steel construction
- A footprint that's 50% smaller than the competition
- A patented O_2 level monitoring system with real-time, remote monitoring via ModBus

25 YEARS 1987 - 2012
Condensing Firetube Designs

AERCO Benchmark Boilers. High efficiency with a higher IQ.
Watch our Benchmark video at www.aerco.com/BM10

AERCO

AERCO International Inc.
800.526.0288 • info@aerco.com

Circle 7 on Reader Reply Form on page 65

Continued from page 10

product information and share company knowledge, as well as their expertise on system control solutions in the HVAC industry.

The new site is divided into five main sections: SOLUTIONS, PRODUCTS, SUPPORT, NEWS & EVENTS and COMPANY. By moving to a simpler menu, they allow visitors to access information based on their own choice rather than sift through everything to decided what is of interest to them.

Customers will find detailed information about the products and services tekmar offers in the SOLUTIONS section. They can browse through promotional literature, articles and essays or use the design tools and drawings for pre-application selection.

The PRODUCTS section is a detailed account of the company's seven application groups and the products they offer in each group. Each product has its own product page filled with photos, features, specifications, technical literature, promotional media, accessories and more.

The comprehensive SUPPORT section offers FAQ's, a glossary of terms, product literature organized by type, training opportunities and how to contact your Local Representative for design, product selection and technical support.

Find out what's happening real time with the NEWS & EVENTS section. New product introductions, upcoming events, and industry & tekmar news are located in this section. The COMPANY section gives customers a sense of who tekmar is, where we've come from and what we value.

Taco "Do Your Best Work" contest winners chosen

CRANSTON, R.I. — One of the greatest forms of recognition for fine mechanical craftsmanship is peer review. So when Taco asked its broad, 16,000+ online FloPro community membership to submit photos of their best (mostly) hydronic work, 107 entries were received. About 2,000 participants cruised through the submissions while casting their votes.

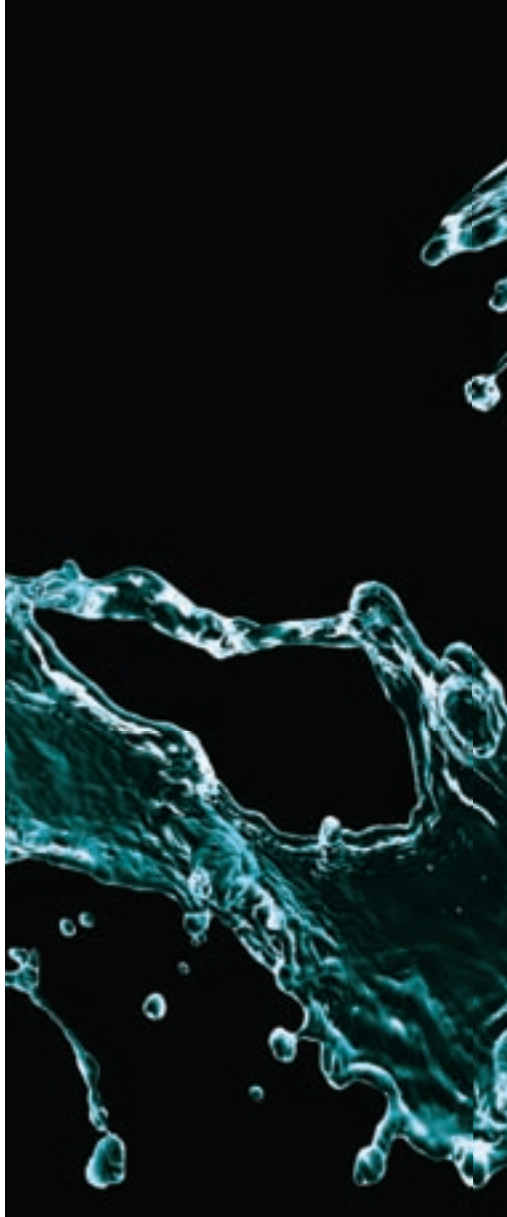
The top two winners of the Do Your Best Work contest, chosen by their peers, were Robert C. O'Brien, president of Technical Heating, based in Mount Sinai, N.Y., and Tim Reinhardt with Burnsville, Minn.-based Genz-Ryan Co.

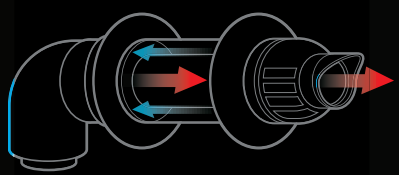
O'Brien's entry, an oil-fired system installed in a new home, was built by a team of 12 installers for a wounded veteran by the Long Island chapter of Oil Heat Cares, with components donated by Taco, Wales Darby and several

Continued on page 16

Circle 9 on Reader Reply Form on page 65

Why polypropylene?





Concentric structure allows hot exhaust to exit through polypropylene venting, while fresh air enters through the outer layer.

THE BETTER QUESTION IS: Why anything else?

Unlike our competition, we choose polypropylene venting for our condensing tankless water heaters. Our reasons are clear: Not only is polypropylene the safest, most reliable material for the application—able to withstand exhaust temperatures of up to 230° F (110° C)—it's also easy to install. The venting components snap together with no glue or cure time.

It's the perfect example of our commitment to delivering solutions you can be confident in. So why do we use polypropylene? Because to us, the absolute best option is the only option.

Learn more at www.rinnai.us/contractor

Rinnai®
TANKLESS WATER HEATERS

Circle 10 on Reader Reply Form on page 65

Continued from page 12

other companies. The systems included an oil-fired boiler and indirect water heater. The oil tank was also donated, and the oil was delivered free of charge.

The system that O'Brien helped with was a one-zone, hydro-air installation with priority to an indirect tank for domestic water. The installation included a Taco air separator, two 007 circulators with IFC isolation flanges and a Taco 329 pressure reducer.

The job that won Taco's recognition of Reinhardt was a parallel primary/secondary system installed after a storage tank to serve both radiant floor heating and pool heating. The primary heat source is a geothermal water-to-water heat pump. For fossil fuel backup, they installed a 97 percent AFUE natural gas mod-con boiler. They also installed four Taco VDT circulators and several zone valves, 10 "00" series circulators and three 2400 series pumps.

"Geothermal was chosen early on as the primary heat source for the 13 radiant in-floor heating zones throughout the home," said Reinhardt. "We also installed three zones of snow and ice melt and summer-time pool heating."

SunMaxx Solar collectors receive SRCC certification

BINGHAMTON, N.Y. — The Solar Rating Certification Corporation (SRCC) has completed testing of SunMaxx Solar's TitanPower and TitanPower Plus private-labeled glazed flat-plate collectors, which have received certification on the AA3 models.

The SRCC found the 4 x 8 TitanPower collectors to be the second most efficient on the market, with 36.5 K Btu per day under SCRR "C" conditions. The TitanPower AA3 and TitanPower Plus AA3 collectors are manufactured using noble materials and offer an unmatched level of efficiency, using a copper tube and aluminum absorber design. The new certifications continue to ensure SunMaxx customers that their solar investments will achieve the highest thermal efficiency and thermal stability, which will complete any residential or commercial application.

ICC, NFPA create coalition to advance public safety in the built environment

WASHINGTON — The International Code Council (ICC) and the National Fire Protection Association (NFPA) have formed the Coalition for Current Safety Codes (CCSC). The coalition will advance public safety in the built environment by advocating states and municipal jurisdictions adopt current building, fire prevention, sustainable, electrical and life safety codes.

ICC and NFPA will seek broad participation in the coalition from other SDOs, the construction and insurance industries, government and the private sector to raise awareness about the importance of and steps needed to provide up-to-date buildings where people live, work, play and go to school. The two associations are coming together to co-chair the coalition because of a mutual commitment to public safety and in an effort to create even broader support for the adoption of modern codes and standards.

Codes and standards are updated on regular cycles to benefit from new science, lessons learned from disasters and new technologies and products. Both associations are among a number of SDOs that provide support to government by engaging in public/private sector collaboration to develop codes that support health, safety and the environment. As a result, government does not take on the high cost of developing its own codes and benefits from code uniformity that enables safe and affordable construction growth. Learn more and join the coalition at www.coalition4safety.org.

Green homes continue to grow across the U.S.

WASHINGTON —The U.S. Green Building Council (USGBC) announced that more than 20,000 homes across the U.S. have earned certification through the LEED for Homes program, a national voluntary certification system that provides guidance and verification that homes are designed and built to be energy- and resource-efficient and healthy for occupants.

"There are green homes and then there are LEED homes. This milestone is evidence that the residential market is increasingly recognizing this fact," said Nate Kredich, vice president of residential market development, USGBC. "LEED for Homes is moving the residential market further and faster towards high-performing, healthy homes that save residents money."

The collection of LEED-certified homes is as varied as the whole of the residential market — from multi- to single-family, from market rate to affordable housing. Since the launch of LEED for Homes in 2008, more than 20,000 residential units have certified, with nearly 79,000 additional units in the pipeline. Over half of all LEED-certified homes are in the affordable housing category.

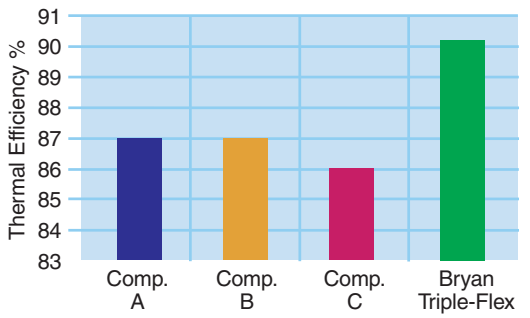
Recently-certified projects include the following:

- Eight LEED Platinum-certified affordable homes in the Coconut Cove development in Cape Coral, Florida, developed by Southwest Florida Affordable Housing Choice Foundation Inc., and built by Owen-Ames-Kimball Company
- AMLI at Escena, the first two LEED Gold low-rise multifamily buildings in Texas, built by AMLI Residential
- KAPSARC Villa B-19 in Riyadh, Saudi Arabia, one of the first LEED for Homes international pilot projects to certify. The LEED Silver home is one of 191 single-family production homes built by SK Engineering and Construction as part of Phase I for KAPSARC.

According to a 2012 McGraw Hill Construction study, green homes are expected to grow to 29% to 38% of the residential construction market by 2016, equating to $87 – $114 billion.

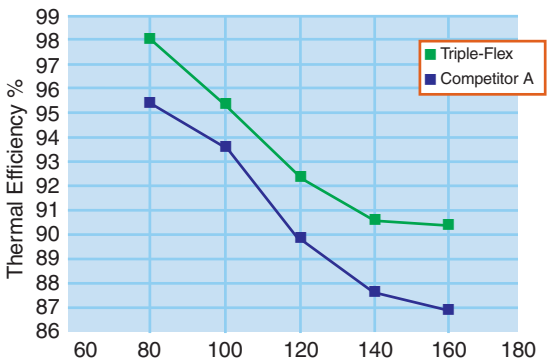
Continued on page 18

Competitive Condensing Boiler Comparison



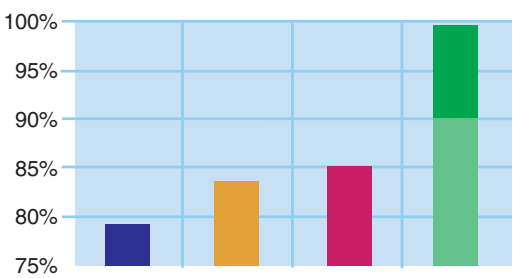
160° Return Water @ Maximum Input

Using a Competitive Boiler as a Benchmark



Return Water Temperature (20°F Rise) @ Maximum Input

Bryan Raises the Bar on Efficiency



- = Atmospheric Conventional
- = Forced Draft Conventional
- = High Efficiency Forced Draft Conventional
- = Min. Triple-Flex Ultra High Efficiency Condensing
- = Max. Triple-Flex Ultra High Efficiency Condensing

Chart shows Bryan's continual advances in efficiency improvements based on boiler type.

Looking for improved operating efficiencies?

BRYAN® takes you higher!

Only Bryan Triple-Flex™ boiler technology delivers minimum 90% operating efficiencies. GUARANTEED.

Now you can get the industry's highest condensing boiler operating efficiencies from the flex tube leader, Bryan. Competitors often talk about higher efficiencies in best-case scenarios with low water temperatures that occur with higher outside temperatures and reduced heating loads. Only Bryan Triple-Flex™ boilers deliver MINIMUM EFFICIENCIES of 90% in these demanding operating conditions –

Patent Pending

- 160 F. degree return water
- 180 F. degree supply water
- Maximum input

Triple-Flex boilers deliver up to 99% efficiencies in new or retrofit applications, even if the building heating system design does not meet the "typical" condensing boiler requirements. Plus these boilers feature easy-to-replace stainless steel flex tubes, a hybrid metal fiber burner with sub 30 ppm NO_x performance and Bryan's legendary rugged construction. Triple-Flex technology smashes the "old school" concept of boiler operating efficiencies.

Trust Bryan and Triple-Flex to help protect our environment by reducing our use of fossil fuels and reducing greenhouse gases.

Get the whole story now at bryanboilers.com

UL ENVIRONMENTAL CLAIMS VALIDATION
✓ MINIMUM 90% THERMAL EFFICIENCY AT 160 F. RETURN, 20 F. RISE, MAX. INPUT, TF150-300

Originators of the "Flexible Water Tube" design

BRYAN® TRIPLE-FLEX™

Bryan Steam LLC • Leaders Since 1916
783 N. Chili Ave., Peru, IN 46970 / Phone: 765-473-6651 / Fax: 765-473-3074 / E-Mail: inquiry@bryansteam.com / www.bryanboilers.com

Commercial/Industrial Steam and Hot Water Boilers, Boiler Room Accessories

Circle 11 on Reader Reply Form on page 65

Continued from page 16

GEO lauds New Hampshire thermal energy law

WASHINGTON — New Hampshire's new law (SB 213) adds thermal renewable energy sources to compliance measures that electric utilities can deploy to meet the requirements of the state's Renewable Portfolio Standard (RPS). Signed into law at the end of June, the law allows renewable thermal energy (such as that offered by geothermal heat pumps) to qualify for its RPS program, at least through 2025. It will offer renewable energy certificates (RECs) that are equivalent in value to those given for renewable electricity projects to geothermal, biomass and solar project developers. The RECs will be worth up to $29 per megawatt-hour of useful thermal energy produced.

GEO member and Northeast Geothermal Professionals president Martin Orio (Water Energy – Hampstead, N.H.) played an instrumental role in garnering interest and support for the bill by geothermal heat pump (GHP) companies across the region. "Though the legislation was aimed at the biomass industry," he said, "we saw its thermal energy credit as a big win for GHPs as a renewable and energy efficiency product."

The New Hampshire thermal energy program will be available to residential, commercial and industrial projects. Qualified projects can use revenue generated from the sale of the RECs that they earn to finance capital costs, helping to cut payback time on investment. The New Hampshire Public Utilities Commission will now forge administrative rulemaking to implement the law. Thermal projects will not qualify for the new REC incentives until after Jan. 1, 2013.

The Biomass Thermal Energy Council (BTEC) developed the concept and led efforts in support of the new law with the legislature, governor's office and the state Public Utilities Commission. "Now is the time for other states to consider New Hampshire's leadership. Thermal energy represents over a third of all energy consumed in America," said BTEC executive director Joseph Seymour. "Energy policy that only focuses on electricity or transportation fuels ignores the tremendous economic and environmental benefits of displacing our dependence on fossil heating fuels with renewable energy."

According to BTEC, "Some eight states (Arizona, Iowa, Massachusetts, Maryland, North Carolina, Ohio, Virginia and Wisconsin) have limited thermal provisions in their RPS programs, but they are generally narrowly restricted." Maryland passed a landmark thermal energy bill for geothermal and other sources into law in May. Other states, notably Massachusetts and Vermont, are considering expanding their RPS programs to include thermal sources. ■


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 13 on Reader Reply Form on page 65
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.

From the President's Pen

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

Summer is in full swing; as I write this article most of the country is sweltering in 90-degree heat. I hope everyone has been able or is planning to take advantage of this great summer weather and take some time off to enjoy this season with your family and friends.

Typically, during June, July, and August most ASPE chapters are on vacation, and not much business is conducted. In August, the chapters begin preparing for the first meeting of the new season and planning the presentations, programs, and events for the rest of the meetings and educational sessions to be presented by the chapters for the upcoming months.

August is also when the newly elected chapter board members begin their terms of office and become familiar with the specific duties and activities relating to their positions. The ASPE Policy & Operations Manual is used to help guide all of the chapter officers and explain the functions and duties relating to each specific office position.

The entire ASPE board of directors would like to thank all of the chapter officers for volunteering their time and for their dedication to the Society and their commitment to promote the success of the Society. We are looking forward to working with the chapters during the upcoming year.

Like the chapter officers, the ASPE board of directors and the staff continue to be busy planning activities, educational programs, and other events to help our members increase their skills in plumbing engineering. The main focus of Society activity during the summer months has been the continued planning and promotion of the upcoming ASPE Convention & Exposition. The City of Charlotte, North Carolina has thrown out the red carpet for ASPE and to all those who will attend the 2012 ASPE Convention & Exposition.

On October 29–30, the industry's top manufacturers will be showcasing their latest products and technologies at the Charlotte Convention Center. At the 350+ interactive exhibits, you will get hands-on experience with the newest plumbing design technologies, and product engineers will be on-site to answer all of your questions about the products you will be designing around, specifying, buying, or using during the next year. The Exposition is open to everyone within the plumbing industry: plumbing engineers, designers, contractors, inspectors, code officials, architects, other engineering disciplines, and especially students.

Best of all, entrance to the exhibit hall is FREE!

Registration is open online now at aspe.org/expo.

For those who are planning to attend the entire Convention, we are offering an array of quality educational seminars that provide CEUs to attendees. ASPE CEUs are approved by all states, including those states with special requirements. The ASPE Education Committee, Convention chairs, and staff have assembled an educational program to suit everyone's interests. From new engineers to the seasoned veteran designers, the Convention will offer topics that appeal to all attendees.

Visit aspe.org/expo to view the great selection of quality educational programs that will be offered.

If that is not enough, plan on attending the Sunday night festivities at the NASCAR Hall of Fame, which is included as part of your Convention registration.

An amazing amount of work, planning, and preparation goes into making an event such as this a huge success. ASPE's staff has gone out of their way to make this year's Convention & Exposition an educational event you will not want to miss.

Many other things are going on this summer, particularly by the ASPE Research Foundation. The roof drainage report is currently under a peer review of several organizations within the industry. The results of this study will be published by the Convention and will probably change the way we design roof drainage systems. The ASPE Research Foundation is also involved in several other research projects that will only improve our relationships within the plumbing industry. Stay tuned for news on several other projects by the Research Foundation that will help further promote ASPE and what we are all about.

Remember: make your reservations now to attend the 2012 ASPE Convention & Exposition. I would like the opportunity to see you in Charlotte and give you an even further update on what is happening with ASPE. ***ASPE***

New ASPE Members

Atlanta Chapter
Stephen W. Huff

British Columbia Chapter
Connor R. Burns, GE

Central Florida Chapter
John Paul Horan

Central Texas Chapter
Broc Thiele

Charlotte Chapter
Tracie Monfort

Chicago Chapter
Brian Matthew Salem

Denver Chapter
Richard Cisneros

Eastern Michigan Chapter
Mark H. Drow

Houston Chapter
Shane Emil Pechanec

Kansas City Chapter
Dan Blake

Los Angeles Chapter
John Richard Rush

Member at Large
Joshua Lee Catlett, PE
Rafael Enrique Watson, PE

Montreal Chapter
Pierre Guy Charette, P.Eng

Northern California Chapter
Ben Abrahamsen, PE

Omaha Chapter
Robert Paul Jones
Scott Michael Thraen, GE
Jeremy Wagener
Mike Wilkinson

Orange County Chapter
Andrew Killian Bussey, PE

Overseas Chapter
Sudarsan Kamalesan, GE
Helmi Murad, GE

Philadelphia Chapter
Joseph Walter Adams

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.

UCLA Extension and ASPE Announce Fall 2012 Plumbing Systems Design Course

This fall, offered online or at the UCLA campus, Plumbing Systems I: Code and Engineering Fundamentals will cover basic design and fundamental engineering practices for plumbing systems for both beginners and those who have prior experience but wish to update or supplement their knowledge. Taught by Haig Demergian, PE, CPD, FASPE, the course will discuss design requirements, selection and sizing procedures for the required plumbing fixtures and equipment, and the relevant codes governing each system.

Visit uclaextension.edu for more information about the course and to register.

From the Executive's Desk

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

ASPE is a member and strong supporter of the World Plumbing Council, and I am taking this opportunity to promote the 2013 World Plumbing Conference being hosted by our friends in India, the Indian Plumbing Association (IPA).

The tenth World Plumbing Conference will be held in New Delhi on November 14–15, 2013. IPA is expecting delegates from several countries to attend this prestigious global convention. The Conference will provide a platform to understand and evaluate the vast possibilities this country of 1.2 billion people can offer. The Indian plumbing fraternity is looking forward to meeting, interacting, and networking with their global counterparts during this event.

The theme of next year's Conference is "Environment, Health, and Hygiene," all three of which are major concerns in all developing and underdeveloped countries, large and small. India is quickly catching up with the developed countries in economic progress, but in the areas of environment, health, and hygiene, India still has a lot of work to do.

The World Health Organization (WHO) estimates that 80 percent of sicknesses in the world is attributable to waterborne diseases, which are preventable. Many other diseases are spread through poor hygienic practices. By improving sanitation and environmental conditions through educational programs and creating awareness, healthcare bills can be substantially reduced.

Environment, water, and sanitation on their own do not result in improved health, but the correct utilization of them does. A clean environment, safe drinking water, and better sanitation practices are critical components of a comprehensive healthcare program. An environment that enables and supports good hygiene should be ensured and promoted at all levels.

IPA expects that highlighting environment, health, and hygiene as the theme of the Conference will also give a boost to safe plumbing practices in India. It will help in creating awareness about the interrelation of better plumbing practices with the health and hygiene of citizens. The Conference is also expected to assist in spreading the message about energy efficiency and water management and conservation through improved plumbing installations. IPA hopes that the international participants of the Conference will share their experiences in all aspects of environment, health, and hygiene in their countries to encourage the upgrade of prevailing practices in India where needed.

The climate in India during the month of November is pleasant, and IPA and its event partner Akar InfoMedia Pvt. Ltd. have worked out various pre- and post-conference tours and cultural programs for the delegates and their guests. While I realize that travel to India may not be economically feasible for many people, I encourage ASPE members and other *Plumbing Engineer* readers to visit the Conference's website (wpc2013.in) for more information and to consider some form of participation. ***ASPE***

ASPE THANKS OUR GENEROUS SPONSORS

(as of 7/11)

Exclusive
Sunday Night Party Sponsor:

CHARLOTTE PIPE AND FOUNDRY COMPANY

Diamond

LEONARD® WATER TEMPERATURE CONTROLS

viega

Platinum
Bradford White Corporation
Moen

Gold
McGuire Manufacturing Co., Inc.
Zurn

Supporting Sponsor
A.O. Smith Water Products Co.
SyncroFlo

Bag Sponsor
Sloan Valve Company

Lanyard Sponsor
Watts Water Technologies

Registration Sign-In Pen Sponsor
Aquatherm, Inc.

ASPE®

Entrance to the Exposition Is FREE!

DON'T MISS THE YEAR'S BIGGEST TRADESHOW FOR THE PLUMBING PROFESSION!

DRIVE YOUR SUCCESS

2012 ASPE CONVENTION AND EXPOSITION

EXPO: October 29–30 | **CONVENTION:** October 27–31 | Charlotte Convention Center | Charlotte, NC

The ONLY show where you'll get hands-on experience with the latest engineering and design technologies

- ✓ 300+ manufacturers
- ✓ The largest display of plumbing design products and services available anywhere
- ✓ A truly educational experience with product engineers on-site to answer your questions
- ✓ 4,000+ networking connections with attendees from across North America
- ✓ Technical specifications available so you can instantly compare products
- ✓ CEUs available for time spent in the exhibit hall

Register now at aspe.org/expo!

Circle 14 on Reader Reply Form on page 65

Never attended an ASPE Convention & Exposition? ASPE is making it easier than ever!

ASPE is proud to announce a new and exciting program developed to encourage members as well as nonmembers—*who have never attended an ASPE Convention & Exposition*—to experience the premier educational and professional development event for plumbing engineers and designers. If you sign up, you can take full advantage of the 2012 ASPE Convention & Exposition, including more than 30 professional development seminars, all hospitality and special events, the two-day Exposition, and the chance to earn almost a year's worth of CEUs for your professional licenses and certifications.

Members, to learn more about our new First-Timer Program and to register for ASPE's 2012 Convention & Exposition, please contact your local chapter. (Local chapter officer contact information can be found at aspe.org/Regions). Nonmembers, please contact skidd@aspe.org or 847-296-0002, ext. 227.

Justification Toolkit

In addition to the First-Timer Program, ASPE has created a Justification Toolkit to help potential attendees quantify the return on investment of attending. If you need to convince your boss or justify sending your employees, the resources in our Justification Toolkit can help! In addition to the ROI worksheet, you'll also find a template justification letter, a fact sheet on the ASPE Convention & Exposition and how attendance benefits both employees and their companies, and a post-event report to take back to the office to share with your manager.

Just go to aspe.org/expo and click on "Justify Your Attendance."

Free Exposition

For those who simply can't justify or afford the cost of a full registration, we'd like to invite you to attend the Exposition on October 29–30 at the Charlotte (North Carolina) Convention Center. Entrance to the exhibit hall is free, so you can get acquainted with the newest products and services offered by more than 300 manufacturers for just the cost of travel.

To learn more about the 2012 ASPE Convention & Exposition, visit aspe.org/expo. ***ASPE***

Engineering excellence. **Applied.**

The P-K name is back. Look for it as a symbol of quality.

With over 125 years of industrial heritage, the P-K name has a tradition of excellence and innovation as a market-leading producer of heat transfer equipment. Our commercial water heaters and boilers are used in facilities for virtually all applications. When your project requires reliable, innovative products with outstanding customer service... look for the **P-K** to ensure nothing less.

Learn more about P-K, contact pkmarketing@harsco.com or visit www.harscopk.com

Insight onsite.™

HARSCO INDUSTRIAL
Patterson-Kelley

Circle 15 on Reader Reply Form on page 65


YOU DON'T
REACH THIS
LEVEL OF
MANUFACTURING
OVERNIGHT.

IT HAPPENS OVER THE COURSE OF 40,000 NIGHTS.

We've been perfecting the art and science of pipe and fitting manufacturing since 1901. Decade after decade, continuing to adapt, learn, advance and invent. It's an ongoing process of improvement that's simply built into the DNA of Charlotte Pipe and Foundry. Because long ago, we realized that perfection isn't really a destination. It's a journey. And we proudly suit up for it every day.

CHARLOTTE
PIPE AND FOUNDRY COMPANY

PERFECTING THE PROCESS EVERY DAY.

Circle 16 on Reader Reply Form on page 65

Designer's Guide

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

Circulation induced pipe corrosion

"The society which scorns excellence in plumbing as a humble activity and tolerates shoddiness in philosophy because it is an exalted activity will have neither good plumbing nor good philosophy… neither its pipes nor its theories will hold water."

— John W. Gardner (1912 – 2002)

Back in April, I wrote about copper pipe corrosion accelerated by water chemistry, mainly thought to be chloramines (and their byproducts) that the water utilities are using as a water disinfectant with growing popularity. The article noted that copper pipe corrosion can also be accelerated by design issues, one being water velocity and pipe sizing. This design issue is of particular concern when it comes to hot water circulation systems.

The most common type of copper tube failure is cold water pitting, also referred to as Type 1 pitting. The cause of Type 1 pits is the subject of much debate, but it is clearly a complex combination of water chemistry and is often attributed in part to fluxes used in the installation process. I am of the personal belief that it is more frequently the result of chloramines than fluxes, but much study needs to be done before that can be proven.

The second most common type of copper tube failure is erosion-corrosion caused by rapid turbulent pipe flow and aggravated by aggressive water quality. This type of impingement failure is more common in circulated hot water systems than in cold water piping.

Water velocity in hot and cold water distribution is fairly easy to control. Most codes are written around maxima of 8 fps for cold water and 5 fps for hot water. The reason the hot water velocity is less than the cold is because hot water is more aggressive than cold water. That is why it is better for cleaning. Since it is more aggressive, velocity-induced erosion-corrosion is more likely to occur.

When copper pipe systems are newly installed they begin to form a protective film of initial corrosion, which is sometimes referred to as a bio film. This film protects the tubing from further corrosion. When water velocities are elevated, the water can erode the bio film and make the pipe more vulnerable to further corrosion.

Figure 1: Erosion-corrosion in hot water circulation piping

It is quite uncommon for erosion-corrosion to occur in straight lengths of pipe where flow tends to be laminar at the relatively low velocities of domestic plumbing. More often, impingement occurs at changes in direction, where flow becomes turbulent, or in areas where irregularities in the pipe's inner surface cause turbulence. The turbulence erodes the bio film, allowing impingement damage to propagate.

Figure 1 is a typical example of erosion-corrosion in a 90-degree elbow in a hot water circulation system. The location of the impingement indicates that the water was flowing counterclockwise through this fitting. The turbulence occurs where the water exits the bend rather than where it enters the bend.

There are several reasons that erosion-corrosion is most common in hot water circulation piping. First, the water in hot water circulation piping flows constantly, 24/7, in most systems. In contrast, flow velocity in cold water piping is constantly changing from as little as zero fps to a theoretical peak of about 8 fps. This variance in velocity acts to protect the piping from experiencing continual turbulence in the exact same area.

Second, large circulated hot water piping systems are inherently difficult to balance. Installation conditions always differ from design conditions, and calculated circulation rates give way to rule-of-thumb practical minima. A system with 100 hot water risers might have a calculated circulation rate of 25 gpm, or about 0.25 gpm per riser. But in the field it is difficult, if not impossible, to balance a system and have it stay in balance with as little as 0.25 gpm flowing through each riser. A more practical flow rate per riser would likely be 0.5 gpm to achieve balance.

Third, the actual pump head required for the circulation pump of any large system is as difficult to calculate accurately as the system flow rate — and the two go hand-in-hand. Most engineers will add a factor of safety to the pump head. If in practice the pump requires less pressure than it is capable of delivering, then the pump will ride out on its curve and produce excess flow and, with it, excess velocity.

Fourth, the circulation piping is often sized for the same design conditions as the hot water distribution piping, i.e. 5 fps. This velocity is fine as the theoretical peak of the distribution piping, where flow increases and decreases as

Continued on page 30

LAARS® HEATING SYSTEMS
COMMERCIAL BOILERS, TANKS AND WATER HEATERS
RELIABLE & EFFICIENT WORKHORSES

PENNANT
85% Efficient Boiler, Pool & Volume Water Heaters

RHEOS+
93% Efficient Boiler, Pool & Volume Water Heaters

NEOTHERM
95%+ Efficient Boiler and Volume Water Heaters

UHE
95%+ Ultra Efficient Water Heaters

TANKS
Buffer
Storage
Solar

The Perfect Choice for Today's Demanding Applications

Laars boilers, volume water and pool heaters are everything a modern heater should be – easy to use, easy on the environment, powerful and compact. Laars has been providing innovative water heating and storage solutions since 1948 with commercial heaters ranging from 300 to 5,000 MBH at efficiencies from 82 to 95%+. ***Learn more at www.laars.com***

AHRI CERTIFIED™ www.ahridirectory.org

LAARS® Heating Systems Company
A subsidiary of BRADFORD WHITE® Corporation

MADE IN AMERICA

800.900.9276 **Built to be the Best™** **www.laars.com**

Circle 17 on Reader Reply Form on page 65

continued from page 28

Figure 2: Detail of erosion-corrosion

a function of fixture demand, but is excessively fast for the circulation mains where flow is constant. For circulation mains, a velocity of 2 – 3 fps would be more appropriate.

Fifth, since design flow is often underestimated and pump head is frequently overestimated, piping winds up undersized for the actual field flow conditions. A pipe sized for 5 fps might have an actual flow of double that when all is said and done. Couple that velocity with the increasingly aggressive nature of America's water supply, and it won't take long for erosion-corrosion to cause leaks in the copper tubing.

The designer should practice sound judgment and not use the factors mentioned in this article as cause to dramatically oversize hot water circulation systems; for example, many engineers shy away from using ½-inch water piping. But the example above of a system with 100 circulated hot water risers, each with a practical 0.5 gpm minimum, would be well served by ½-inch piping for each of its circulated risers. At 0.5 gpm, the velocity in ½-inch tubing is still well below the 2 – 3 fps maximum suggested. The key is to identify where the cumulative effect of flow, pump head, water temperature and water quality might give reason for caution when sizing the hot water circulation piping. ■

Timothy Allinson *is a senior professional engineer 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.*

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 19 on Reader Reply Form on page 65

Code Classroom

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

ASHRAE meeting update

The American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) summer meeting took place in the Texas heat and humidity, June 23 – 27, during a triple-digit heat wave in San Antonio. The heat was a reminder of the importance air conditioning plays in making the indoor environment comfortable and tenable. More than 1,500 people attended the conference, held along the San Antonio river walk.

The conference offered a technical program with over 270 presentations, eight educational courses, numerous networking events and more than 400 meetings of technical, standards and standing committees. I attended several of these meetings. Following is a summary of the standards.

ANSI/ASHRAE Standard 90.1-2010, Energy Standard for Buildings, Except Low-Rise Residential Buildings

Co-sponsored by the Illuminating Engineering Society of North America (IESNA), this standard is published in code-language format, so it can be adopted as a state or local energy code in many jurisdictions. Alternatively, a jurisdiction may choose to adopt the International Energy Conservation Code (IECC), which allows ASHRAE 90.1 to be used as a compliance path. Standard 90.1 is updated by addenda that are compiled every 18 months and is published in full every three years.

The original standard ASHRAE 90 was published in 1975 and there were multiple editions in subsequent years. In 1999, the ASHRAE board of directors placed the standard on continuous maintenance, which allowed it to be updated multiple times in a year. This was done because of the rapid change in technology and energy prices. The standard has now been renumbered to ASHRAE 90.1 and, since 2001, it has been updated every three years.

The standard includes the following language:

1. PURPOSE

The purpose of this standard is to provide minimum requirements for the energy-efficient design of buildings except low-rise residential buildings, for:

1. Design, construction and a plan for operation and maintenance, and
2. Utilization of on-site, renewable energy resources.

2. SCOPE:

2.1 This standard provides:

A. Minimum energy-efficient requirements for the design, construction and a plan for operation and maintenance of:

(1) New buildings and their systems,

(2) New portions of buildings and their systems,

(3) New systems and equipment in existing buildings,

(4) New equipment or building systems specifically identified in the standard that are part of industrial or manufacturing processes.

B. Criteria for determining compliance with these requirements.

2.2 The provisions of this standard do not apply to:

1. Single-family houses, multifamily structures of three stories or fewer above grade, manufactured houses (mobile homes) and manufactured houses (modular),
2. Buildings that do not use either electricity or fossil fuel.

2.3 Where specifically noted in this standard, certain other buildings or elements of buildings shall be exempt.

2.4 This standard shall not be used to circumvent any safety, health or environmental requirements.

Many states apply the ASHRAE 90.1 standard to buildings that are being constructed or under renovation. Most states apply the standard or equivalent standards for all commercial buildings, while others apply them for all government buildings. A couple of states use other energy conservation standards for all commercial buildings and a couple use a combination of the ASHRAE 90.1 standard for all government buildings and other energy conservation standards for their commercial buildings. Some states do not apply any energy conservation standards.

ANSI/ASHRAE 189.1-2011, Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings

Standard 189.1-2011 is co-sponsored by the U.S. Green Building Council (USGBC) and the Illuminating Engineering Society (IES). The standard provides a "total building sustainability package" for those who strive to design, build and operate green buildings. From site location to energy use to recycling, this standard sets the foundation for green buildings by addressing site sustainability, water use efficiency, energy efficiency, indoor environmental quality and the building's impact on the atmosphere, materials and resources.

Standard 189.1 serves as a compliance option in the 2012 International Green Construction Code (IgCC) published by the ICC, which regulates construction of new and remodeled commercial buildings.

The 2011 version incorporates many comments, including updated references to other related standards, primarily ANSI/ASHRAE/IES 90.1-2010 and ANSI/ASHRAE 62.1-2010, Ventilation for Acceptable Indoor Air Quality. Compliance with these provisions will result in further improvements to indoor environmental quality, while further reducing energy use and environmental impact through high-performance building design, construction and operation.

ASHRAE SPC 188P Prevention of Legionellosis Associated with Building Water Systems

The standard is in its final stages and the revised version should be out later this year. The last published draft had the following language:

Continued on page 34

BE IN THE KNOW

IAPMO's Uniform Code eBooks now available for instant download — anytime, anywhere

- 2012 Uniform Plumbing Code® (UPC)
- 2012 Uniform Mechanical Code® (UMC)
- 2012 Uniform Solar Energy Code® (USEC)
- 2012 Uniform Swimming Pool, Spa and Hot Tub Code® (USPSHTC)
- 2012 Green Plumbing and Mechanical Code Supplement (GPMCS)
- 2010 California Plumbing Code (CPC)
- 2010 California Mechanical Code (CMC)
- IAPMO Green Plumbers Reference Manual
- 2010 RPA Guidelines
- Backflow Prevention Reference Manual, 2nd Edition

Also available:

- 2009 Uniform Plumbing Code® (UPC)
- 2009 Uniform Mechanical Code® (UMC)
- 2009 Uniform Solar Energy Code® (USEC)
- 2009 Uniform Swimming Pool, Spa and Hot Tub Code® (USPSHTC)
- 2010 Green Plumbing and Mechanical Code Supplement (GPMCS)

- **Instantly downloadable to any smartphone, tablet or computer**
- **Web-enabled and annotatable**
- **Pocket-sized portability**

For more information on IAPMO's eBooks direct your Web browser to www.iapmomembership.org.

IAPMO®

Circle 20 on Reader Reply Form on page 65

Code Classroom

continued from page 32

Purpose: The proposed standard seeks to present practices for the prevention of Legionellosis associated with building water systems.

Scope: 2.1 This standard provides various methods of risk management for the prevention of Legionellosis associated with centralized industrial and commercial building water systems.

2.2 This standard applies to human-occupied buildings, excluding single-family residential buildings. While this is not specifically intended for non-centralized or single-family residential building systems, some of the information contained within the non-mandatory appendix may be useful for these systems.

2.3 This standard is intended for use by those involved in the ownership, design, construction, installation, (including commissioning), management, operation, maintenance and servicing of centralized industrial and commercial building water systems.

Anyone who owns, designs, builds, installs, commissions, manages, operates, maintains and services centralized industrial or commercial building water systems will be affected by ASHRAE 188P, will be held accountable for safeguarding potable water and utility water systems and should comply by following these steps:

1. Survey the water systems to determine the risk level. (This does not mean testing for legionella.)
2. Develop a risk management plan (HACCP).
3. Document the plan.
4. Monitor.
5. Validate.

This applies to both existing and new buildings. The following buildings and water systems are covered by the standard:

- Human-occupied buildings, excluding single-family residential structures.
- Potable hot and cold water systems, including showers, cooling towers and evaporative condensers, whirlpool spas and decorative fountains, as well as other water features and aerosol generating air coolers, humidifiers and washers.

Hazard Analysis Critical Control Point (HACCP) requires facility managers/owners to assemble a risk management team of knowledgeable or qualified Legionella prevention experts to:

1. Identify uses of potable and utility water.
2. Create diagrams of water systems.
3. Identify control points and determine critical control points, establish monitoring procedures and corrective actions and verify the hazard (Legionella) is controlled.

ASHRAE 188P will have a significant impact on the design and maintenance of building water systems. Design engineers will need to be more aware of dead legs, storage temperatures, distribution temperatures, return temperatures, etc. Pipe mains will need to be routed closer to the fixtures or

Continued on page 66

FPE Corner

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

New 2013 edition of NFPA 13, 13R and 13D, Part 2

As predicted, the NFPA membership voted to approve the 2013 editions of NFPA 13, 13R and 13D at the June Las Vegas technical sessions. The document will now go to the NFPA Standards Council for approval and should be available to the public later this year. The changes I identify are not official yet, so keep that in mind. Also, where paragraph numbers are included they are based on the 2010 edition and may change in the 2013 edition.

Last month I looked at some of the more significant changes (again thanks to NFPA's Matt Klaus' fine article in *NFPA Journal*). In this column, I will continue to present some of the changes to NFPA 13 that, though not earth shattering, may have some interest to the reader or are somewhat cool in nature.

Definitions

A definition for control valve will now appear in 13, extracted from NFPA 25, along with associated annex material.

3.3.7 Control Valve. *A valve controlling flow to water-based fire protection systems.*

A. 3.3.7. *Control valves do not include hose valves, inspector's test valves, drain valves, trim valves for dry pipe, preaction and deluge valves, check valves or relief valves.*

The definition of dwelling unit was revised to indicate that it is intended for use by the standard.

3.3.8 Dwelling Unit (for sprinkler system installations). *One or more rooms arranged for the use of one or more individuals living together, as in a single housekeeping unit normally having cooking, living, sanitary and sleeping facilities that include, but are not limited to hotel rooms, dormitory rooms, apartments, condominiums, sleeping rooms in nursing homes and similar living units.*

HVLS Fans are now defined.

3.3.11 High Volume Low Speed Fan. *A ceiling fan which is approximately 6 – 24 feet in diameter with a rotational speed of approximately 30 –70 revolutions per minute.*

Also, as a result of recent research conducted by the NFPA Research Foundation, criteria applicable to use of HVLS fans in sprinklered buildings has been included in Chapter 11, Design Approaches and in Chapter 12, General Requirements for Storage. Both chapters contain similar requirements, including language limiting fan size to 24 feet, requiring three feet of clearance between blades and sprinklers and requiring automatic fan shutdown upon sprinkler operation.

3.9.1.6 Clearance to Ceiling. *The distance from the top of storage to the ceiling above.*

Along with how this distance is to be measured are included in Chapter 12 to clarify how this distance is measured to ceilings consisting of corrugated sections or with insulation attached to the roof. Also in Chapter 12, the term "clearance" has been changed to "clearance to ceiling" throughout the chapter for clarity.

Continuous Obstruction. *An obstruction located at or below the level of sprinkler deflectors that affects the discharge pattern of two or more adjacent sprinklers.*

Non-continuous Obstruction. *An obstruction at or below the level of the sprinkler deflector that affects the discharge pattern of a single sprinkler.*

3.11. X Seismic Separation Assembly. *An assembly of fittings, pipe, flexible pipe and/or couplings that permits movement in all directions to accommodate seismic differential movement across building seismic separation joints.*

• **Shadow areas.** Last month we indicated that proposals to include the concept of shadow area being added to NFPA 13D were rejected by NFPA 13, since NFPA 13 already has an extensive set of obstruction rules. However, in recognition of the attractiveness of the "shadow" concept NFPA 13 will include an Annex note that states:

"A.8.1.1(3) *Notwithstanding the obstruction rules provided in Chapter 8, it is not intended or expected that water will fall on the entire floor space of the occupancy. When obstructions or architectural features interfere with the sprinkler's spray pattern such as columns, angled walls, wing walls, slightly indented walls and various soffit configurations disrupt water discharging from a sprinkler and shadowed areas can occur. Where small shadowed areas are formed on the floor adjacent to their referenced architectural features, these shadowed areas are purely on paper and do not take into account the dynamic variables of sprinkler discharge."*

• **Reuse of sprinklers.** *During the ROP meeting, the Sprinkler System Installation subcommittee of NFPA 13 voted to permit reuse of sprinklers that were removed to allow internal inspection of piping. During the ROC stage, however, the TC reversed itself and rejected this proposal. It remains that anytime a sprinkler is removed, for whatever reason, it must be replaced by a new sprinkler.*

• **Concealed spaces filled with insulation.** Provisions will be added recognizing that a maximum two-inch gap will be permitted to allow for the settlement of insulation materials

• Relief valve downstream of floor control valves on combined systems. A requirement for a relief valve downstream of the required check valve on floor control valves connected to combined system risers has been added to allow relief of any excessive pressure trapped downstream of the check valve due to fire pump operation or fire apparatus system pressurization.

•Additional control valves for preaction/deluge risers. NFPA 13 will now clearly permit the installation of an additional control valve on the riser above a preaction or deluge riser to make it easier to trip-test to the valves.

• **Prohibiting sprinklers in elevator machine rooms/spaces serving occupant evacuation elevators**

Continued on page 38

Circle 23 on Reader Reply Form on page 65

FPE Corner

Continued from page 36

and first responder use elevator. A GSA proposal was accepted to prohibit the installation of sprinklers in these areas.

• **Minimum exposed barrel length of dry pendent sprinklers.** The standard will contain tables indicating required minimum exposed barrel lengths for dry pendents based on ambient temperature at the sprinkler and ambient temperature of the exposed barrel.

• **Closets less than 400 ft^3.** Closets used for storage and for mechanical equipment that have a volume less than 400 ft^3 may be provided with a single sprinkler, and the sprinkler may be installed without concern for obstructions or minimum distances to a wall. This is a good idea. My dear AHJ friend in Frostbite Falls will now be up at night fretting the loss of yet another club to beat me over the head with.

• **Obstructions against the wall less than 24 inches deep and more than 18 inches below the sprinkler.** A new provision will permit this type of obstruction as somewhat of a corollary to the same provision for 48-inch-wide obstructions which would have sprinkler coverage on both sides.

• **Back-to-back sidewall sprinklers on a soffit or lintel.** The standard will now limit the maximum lintel or soffit width to 16 inches without requiring a pendent sprinkler below the lintel or soffit.

• **Open gratings.** Open gratings are now considered an obstruction and will require protection underneath the grating regardless of the "openness" of the grating.

• **Straddle areas.** A novel concept to address calculations for those small pockets of OH1 or OH2 areas in a larger Light Hazard or OH 1 area. being calculated using the Density/Area method. The following two provisions will need to be complied with:

22.4.4.1.1.4 *Where the available floor area for a specific area/density design criteria, including any extension of area as required by 11.1.2 and 12.3, is less than the required minimum design area, the design area shall be permitted to only include those sprinklers within the available design area.*

22.4.4.1.1.5 *Where the total design discharge from these operating sprinklers is less than the minimum required discharge determined by multiplying the required design density times the required minimum design area, an additional flow shall be added at the point of connection of the branchline to the cross main furthest from the source to increase the overall demand, not including hose stream allowance, to the minimum required discharge as determined above.*

• **C-value for galvanized pipe.** The c-factor for galvanized piping in dry pipe and preaction systems has been reduced from 120 to 100. The c-factor for wet pipe and deluge systems remains at 120.

• **Table summarizing signage requirements**. A new table will be included in the annex of Chapter 6

Continued on page 40

FPE Corner

Continued from page 38

summarizing sign location and information requirements.

• **Waterflow signal for high-rise buildings.** Here is an example of a correction that was needed to require what we all thought the standard did already. Following is the verbatim proposal with revised text. New text is shown with underline and removal of existing text with strikeout. The changes are subtle so you may have to read it twice (Don't you just love code language?).

8.17.1.6(1). ~~*Where e*~~*Each sprinkler system on each floor is shall be equipped with a separate waterflow device*~~*.*~~ ~~*it*~~*The waterflow device shall be connected to an alarm system in such a manner that operation of one sprinkler will actuate the alarm system, and the location of the operated flow device shall be indicated on an annunciator and/or register.*

• **Water supply data.** Rather than accepting ROP Proposal 4-473 which proposed to provide the designer some leeway regarding the 12-month age limitation on flow test data in cases where it may not be possible to have data that recent (it would have permitted the use of older data with an additional safety factor if approved by the AHJ), the SSI committee created its own proposal (ROC 13-472) leaving it entirely up to the AHJ, under the presumption that most AHJ's know best their water systems and any needed safety factors. I fear that some do, but many do not.

Last month we noted that there will be a new definition of "Sprinkler System." Expect this definition to continue to cause controversy and expect it to be changed in the 2016 edition.

SFPE Notes

The conference brochure is now available for the 2012 Annual Meeting: Professional Development Conference and Exposition, October 14 – 19, 2012, at the Hyatt Regency Savannah in Savannah, Ga. It has all the latest information, from who will be presenting at the Engineering Technology Conference to what professional development seminars are being offered. You can take a look at the conference brochure by visiting http://bit.ly/NFLJEl. ■

***Samuel S. Dannaway**, PE, is a registered fire protection engineer and mechanical engineer with bachelor's and master's degrees from the University of Maryland Department of Fire Protection Engineering. He is past president and a Fellow of the Society of Fire Protection Engineers and president of S. S. Dannaway Associates Inc., a 15-person fire protection engineering firm with offices in Honolulu and Guam. He can be reached via email at SDannaway@ssdafire.com.*

C US

The One Mark You Want to See

The CSA mark on plumbing products is all the assurance you need that those products meet U.S. and Canadian standards. You can specify, install, and accept products with confidence when you see the CSA mark. Because no other testing laboratory can match the knowledge, experience, and qualifications of CSA Group.

CSA Group has earned accreditation and recognition from ANSI, HUD, IAS, NIST/NVLAP, OSHA and SCC. We test and certify plumbing products to applicable North American standards and codes, including those published by ANSI, ASSE, IAPMO, CSA, ASME, ASTM, and NSF. And we are knowledgeable and experienced with IPC and UPC requirements. No one is more knowledgeable of the standards, and no one is more experienced in testing and certifying plumbing products than CSA Group.

The Mark of Leadership

CSA marks are found on products from the industry's leading manufacturers – products found on the shelves of North America's major retail chains and inventoried by product distributors coast to coast. But we define leadership more broadly than that. That's why CSA Group is also at the forefront of important industry initiatives to simplify testing and certification, and make it easier for you to identify products that meet standards for safety, performance, and health effects.

Learn More...

Learn more about CSA Group, certification services, CSA marks, and the products that display them. Visit us at **www.csagroup.org** for listings of products certified by CSA Group. Or call toll free: **1-866-463-1785.**

CSA Group

www.csagroup.org

NORTH AMERICA • EUROPE • ASIA

Circle 27 on Reader Reply Form on page 65

Sustainable Design

By Winston Huff, CPD, LEED AP BD+C

The 2030 Challenge and commitment for plumbing engineers

Reducing fossil fuel usage and greenhouse gas emissions are important goals for our industry; however, they are difficult to achieve and measure. Designers, contractors, owners and operators start with good intentions, but many new buildings ultimately have minimal energy-efficiency improvements over the buildings they replaced.

Buildings are major consumers of energy. To decrease greenhouse gas emissions and fossil fuel consumption, the building industry must have an energy plan. Two years ago, Architecture 2030 took a bold, proactive step and developed a challenge for those in the building profession. The 2030 Challenge sets goals with target years for reducing the use of fossil fuels in buildings. With goals and endpoints in place, the building design, construction, operations and manufacturing teams will have time to adapt and develop practices, methods and products to reach the goals.

The Challenge defines a performance standard of 60 percent below the average for the building type. At first this would seem to be a difficult task. In reality, technologies and methods are available to achieve this standard in most building types. The Challenge includes existing buildings and encourages them to be renovated.

The targets include a timeline in which buildings achieve a 70 percent performance standard in 2015. Every five years the standard increases, with the goal of being 100 percent carbon neutral by 2030. This means using no fossil fuel or other greenhouse gas-emitting energy to operate. Since this challenge was introduced, new buildings in design and in operation have met the 100 percent challenge.

High-performance buildings

A new demand for high-performance buildings has appeared as a result of this challenge and other forces in the marketplace. These buildings use less fossil fuel than other buildings of the same type. Because owners and developers are using financial models to make the buildings profitable, this trend should continue.

With this demand in the building industry comes a need for high-performance building design (HPBD) practices. Building designers are finding ways to incorporate elements with the potential to meet the operational energy goals of the building owner. Design architects and engineers are looking at new technologies, strategies, procedures and methods to help buildings have a better chance of meeting these goals.

"To reach our goal of carbon neutral buildings by 2030, there is a crucial need for design experts to apply their experience, innovations and talents to current practices that will lead to significant reductions in the use of natural resources, nonrenewable energy sources and waste production," said former AIA executive vice president/CEO Christine McEntee in an article in *Building Design + Construction*.

HPBD is resulting in new methods and technologies for contractors to construct buildings. Many plumbing training programs are helping installers understand the new methods and develop procedures to ensure that high-performance features are installed and operate properly.

The new technologies in HPBD also are changing the way buildings are operated. These buildings include new systems and tools for operators, so it is important for operators to know how to keep the new technologies working to realize the improvements in energy efficiency. The best designed and equipped facility means little if the operator does not know how to keep it running to its full potential. Thus, the building operator should be included in the early schematic phase of design to give the design team direction when the energy model is being developed.

Energy modeling

In May, AIA EVP/chief executive officer Robert Ivy, FAIA, said, "Integrating energy modeling into the design process is the best way for architects to implement strategies to reduce energy consumption in their projects and educate their clients of the potential for savings on utility costs over the entire life cycle of the building."

In the past, the energy model was created by the HVAC engineer to design the HVAC system after the building was designed. Other building team members, such as the architect or operations manager, offered little input. However, with HPBD it is important for all of the design and operating professionals, including the plumbing engineer, to be part of the whole building model.

Cooperation has the best impact in the schematic phase of a project. Adding elements after the schematic design can increase costs and frustrate the design, construction and operations teams, and such elements are at a greater risk of being eliminated from the project.

Continued on page 44

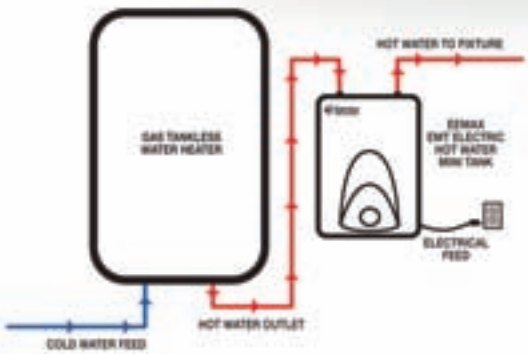
2030 Challenge

Architecture 2030 issued The 2030 Challenge to encourage the global architecture and building community to adopt the following targets:

- All new buildings, developments and major renovations shall be designed to meet a fossil fuel, greenhouse gas-emitting, energy-consumption performance standard of 60 percent below the regional (or country) average for that building type.
- At a minimum, an equal amount of existing building area shall be renovated annually to meet a fossil fuel, greenhouse gas-emitting, energy-consumption performance standard of 60 percent of the regional (or country) average for that building type.
- The fossil fuel reduction standard for all new buildings and major renovations shall be increased to 70 percent in 2015, 80 percent in 2020, 90 percent in 2025 and carbon neutral (using no fossil fuel or greenhouse gas-emitting energy to operate) in 2030.

Visit bit.ly/hoYgRn for more information.

Eemax has the CURE for the COLD WATER SANDWICH!



Eliminate the number of dissatisfied customers by integrating the Eemax® Mini Tank line of Water Heaters.

Gas tankless water heaters are susceptible to the annoying **cold water sandwich effect**. Remove it by connecting an Eemax EMT tankless water heater to the gas heater's hot water outlet. Eemax mini tanks blend the cold water sandwich within the compact hot water tank – so you get ideal hot water temperature.

Eemax
Hot Water Solutions Made Easy

Electric MINI-TANK Water Heaters

EEMAX MODEL	GALLONS	AMPS	WATTS	VOLTS
EMT2.5	2.5	12	1440	120
EMT4	4.0	12	1440	120
EMT6	6.0	12	1440	120

Smart, Simple, and Cost Effective.

SMARTPHONE PRODUCT APP
If you don't have ScanLife App, text **SCAN** to **43588** for your FREE App code reader. Then scan this code to learn more about the Eemax Mini Tanks.

Circle 28 on Reader Reply Form on page 65

Continued from page 42

How plumbing systems can help

Energy models using the whole building concept are changing the way plumbing systems are designed because they highlight how plumbing systems contribute to a building's energy use. For example, in buildings with food-service dishwashing demands or dormitories with extensive shower demands, a large percentage of the building's energy usage is from plumbing and water systems. Building modeling can show how water efficiency brings energy efficiency. Reducing the flow of water in showers can reduce the energy load on both the water heater and the pumping system.

Building pumps can use large amounts of energy, so pumps with energy-efficient motors and operational controls or with variable-frequency drives are required in high-performance buildings. Accurate sizing of the pump is crucial, because oversized pumps can waste energy during the life of the building. The piping design also is important. The pumps should be located in the overall system where they provide the most efficient operation.

Water heater designs are changing as well. Condensing-type HVAC and domestic water boilers are taking over a larger percentage of the water heater market. Energy modeling is looking at water heating and space heating as one system. Because of this, plate and frame heat exchangers are now viable options in many building types. Controls are improving, and more sizing options are available. Energy modeling is showing that efficient heat pump water heaters also are a viable option.

When energy modeling is used and options are evaluated, many building owners are discovering that thermal solar-powered systems can be used to work with the space heating or the domestic water heating system. When compared to photovoltaic solar systems, solar thermal systems can generate more energy in a smaller footprint for less cost.

Now is the time for plumbing engineers to develop ways to design plumbing systems that meet or exceed the 60 percent target. Plumbing engineers should be familiar with the energy-efficient elements, technologies and strategies of other trades so they know how the plumbing system can help reduce the overall energy load of the building. They will also need to know how these systems will be installed by the contractors and operated by the building staff. They should also plan for the carbon-neutral target and should be asking important questions: are there any non-fossil fuel alternatives for plumbing systems available? And when is it more efficient to have photovoltaic solar panels and an electric water heater or to use a solar thermal water heating system? These are questions we will need to answer. ■

***Winston Huff**, CPD, LEED AP BD+C, is a project manager, plumbing fire protection designer and sustainable coordinator with Smith Seckman Reed Consulting Engineers in Nashville, Tenn. 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.*

AIA 2030 Commitment

The American Institute of Architect's 2030 Commitment is a voluntary program for firms to apply the principles of sustainable design. Firms take steps in recognition of the commitment to establish leadership, implement an operational action plan, develop a sustainability action plan and report annual progress.

The commitment changes the way a firm operates its offices so they walk the walk of sustainability. Firms that join the initiative commit to implementing four action items to reduce the environmental impact of the firm's operations in the following areas: energy use, waste, transportation and meetings. Suggested action items include purchasing Energy Star-rated equipment, instituting a firm-wide recycling program, providing incentives for employees who walk or ride their bike to work, and encouraging virtual meetings.

Visit bit.ly/MLpoj8 for more information.

AXION MSR™...

MEDICALLY SUPERIOR RESPONSE

AXION MSR™ is the only eyewash system that operates in concert with standard healthcare protocols and the natural function of the human eye, flushing injured eyes from the inside corner of the eye outward to help prevent contaminants from entering the nasal cavity.

The AXION™ line is featured on the majority of Haws' emergency equipment, from eye/face washes, to barrier-free pull downs, to combination showers. Visit **www.hawsco.com** to see the full line of the Haws AXION™ products.

axion™ by HAWS

www.axionmsr.com/pe :: 888.640.4297

Circle 30 on Reader Reply Form on page 65

Solar Solutions

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

Bristol's Six Principles for Good Solar Hydronic Design

#49: Case Study: Solar combi 101 – summer data snapshot

The typical solar-hydronic combisystem in our region is composed of (1) a bank of flat-plate solar heat collectors, (2) a gas boiler backup, (3) a domestic water heater (DHW) and (4) a radiant heated floor. I call this popular application "Combi 101" and typically connect the components together in a standard way using a primary loop piping configuration. In late 2011, a system just like this was installed as a retrofit at a home in Canoncito, N.M. The installed solar combisystem includes all the important and innovative features mentioned in previous articles, including:

- Radiant masonry floor winter heating and summer cooling using flat-plate solar panels;
- DHW heating in both winter and summer;
- Room-by-room, two-stage temperature control using distributed heat storage in the mass floors;
- Solar DHW and tank cooling (tank overheat prevention);
- DHW recirculator control by time, temperature or demand switch;
- Solar collectors with self-cooling thermosyphon fins.

The same glazed flat-plate solar panels are used for heating and cooling applied to both the space heat and the

DHW tank. Heating or cooling provided by the panels is distributed to the masonry radiant floors and the DHW tank using a hydronic primary loop piping configuration. A single backup hot water boiler provides conventional heat to both the floors and the DHW automatically whenever needed.

This solar home heating system has been outfitted with a SolarLogic integrated controller (SLIC), which provides all the control functions and connections in a single control box. The SLIC control system includes the capability for continuous data recording as a standard feature, which can be observed and downloaded via the Internet. This permits me to download fresh data from the field on demand, to illustrate the performance of this well-behaved solar combisystem. The data presented here is from two hot summer days just prior to the 4th of July, when both hot water and space cooling are desired and reliable overheat protection is imperative.

Case Study: Summary and description

The single-story house has just over 2,000 square feet of heated space and is well-constructed, with high ceilings in the center. It has passive solar features, including interior masonry walls and floors and roof overhangs providing summer shading to help moderate the temperature swings in the building. The original hydronic heating system included four heating zones with separate room thermostats and four zone valves feeding a total of 1,250 square feet of masonry radiant floors. The only heating fuel available is propane, and a Knight WBN106 hot water boiler with an AFUE rating of 95.5 percent provides the backup heat. The DHW tank is an 80-gallon Triangle Tube indirect water heater tank that can be heated by solar or boiler using its tank-in-a-tank heat exchanger.

The collectors are the SS16 model made by Solar Skies, as seen in Figure 49-1. A total of 256 square feet (gross) of collectors is used by the control system to automatically provide solar heating by day and night sky radiant cooling (NSRC) by night.

The climate at this location is that of a high-altitude arid mountain region at over 6,800 feet elevation. It can be extremely sunny and dry for months at a time, but in winter there is often snow, and when it rains there can be flash floods. Nighttime temperatures during clear weather can be 30 to 40 F colder than the daytime. The original house and the heating system retrofit were designed to take energy advantage of these climate conditions.

The control system is designed to allow DHW to be solar heated by day, while the masonry floors can be cooled at night. This is a standard feature built into every SLIC control system. When no heat is needed in the afternoon, the collector piping and controls allow for self-cooling.

I would like to remind the reader that this is not an experimental solar heating system, but rather a consumer installation similar to dozens of installations deployed over the past five years. The design, installation and control methods used here can be quickly and easily duplicated in retrofits and new construction in a wide variety of climates.

Data snapshot: highlights of summer performance

The weather was very hot during the two days of this case study period, with some occasional scattered clouds and light rain, which can be seen to cause the outside temperatures to rise or fall suddenly. Figure 49-2 shows the temperatures recorded between July 1 and July 3, 2012. The control functions can be seen as temperature responses on the data graphs, which I have labeled for easier identification. Following is a brief explanation of the data highlights.

Continued on page 48

BE › THINK › INNOVATE ›

With Grundfos in, you get more time out.

Quality components that require fewer callbacks. AUTO*ADAPT*™ technology for easy installation and set up. These aren't just features of our energy efficient circulators. They're ways we can help you spend less time in the field and more time on the mound. Demand the pumps that always go to bat for you. Demand Modern Comfort.

To learn more, visit: moderncomfort.grundfos.us

GRUNDFOS®

Circle 31 on Reader Reply Form on page 65

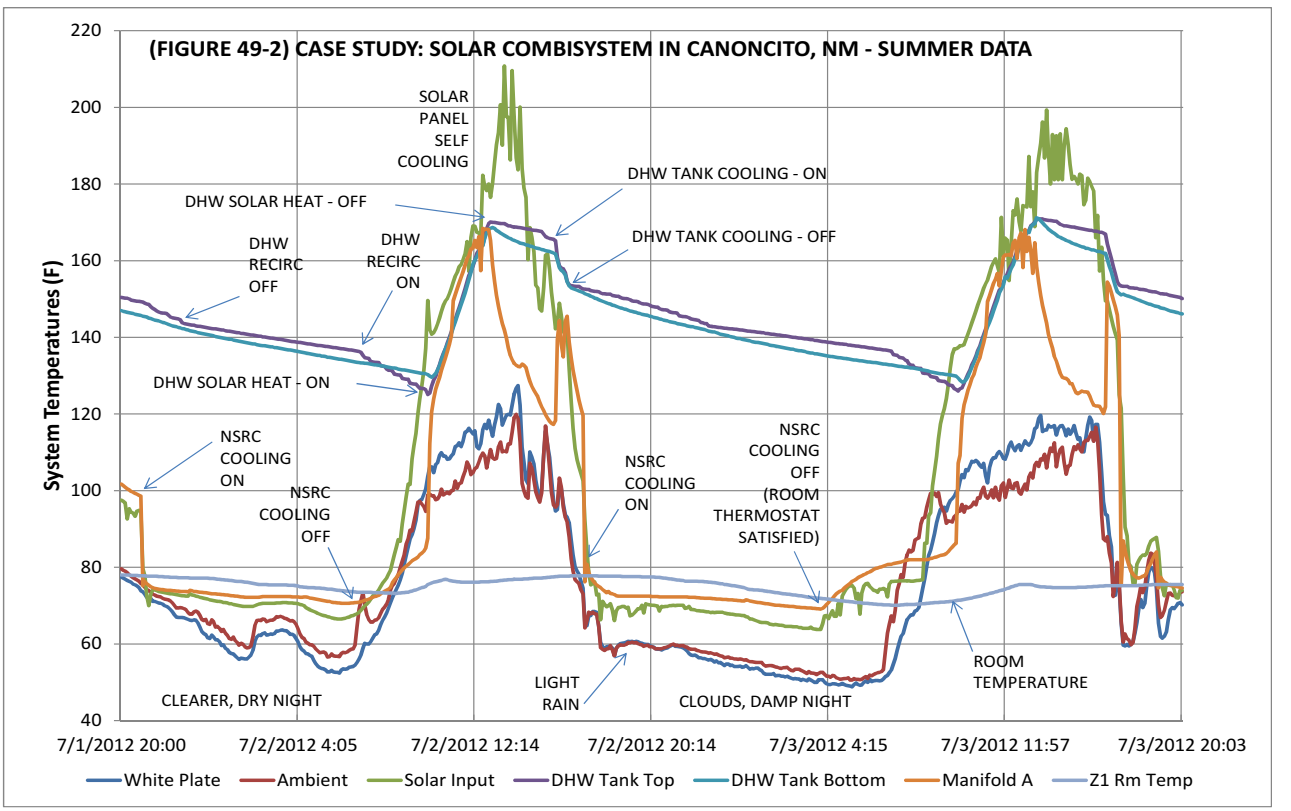
Continued from page 46

• **NSRC cooling on/off:** The space cooling system turns on and off in response to the availability of cold night radiant temperatures and calls for cooling from room thermostats. On the first night, the cooling system circulates all night long and provides a final room temperature of 73 F. On the second night, it shuts off early in the morning when the target temperature of 72 F is achieved in the rooms. The homeowner has set the room thermostats to cool only two of the four possible zones, thereby concentrating the night cooling in the most important rooms. This is done by setting the "solar" switch on the SLIC room thermostat.

how sunny it is when the sun heats it well above the air temperature.

• **DHW recirculation on/off**: This function is built into the SLIC control system so that energy consumed by recirculation can be monitored and controlled. The homeowners have this set to run only at certain times of day. When it is running, there is an obvious rapid drop in temperature at the top of the DHW tank.

• **Solar panel self-cooling:** The control system constantly delivers heat from the solar panels to the boiler room whenever available during the day. When there is no



• **Manifold A — fluid from the floor:** At night, the warm fluid from the floor can be seen passing through Manifold A. When compared to the cold fluid available for cooling seen as the solar input temperature, we can verify that the NSRC fluid is indeed cold enough to help chill the floors. Heat is drawn out of the masonry floors overnight while the fluid temperature in Manifold A drops steadily from a starting point of over 76 F to below 70 F by early morning.

• **Outdoor temperatures:** Ambient and white plate sensors are in a very hot location above a metal roof. The ambient (outdoor air) sensor tends to read higher than the official weather report. During this test period, we are scorching on the roof by day, with sensor temperatures hovering around 120 F while a nearby weather station reports a high of 96 F. At night, the white plate indicates that the coldest possible NSRC temperatures are in the 50s and 60s F. The plate sensor is used by the SLIC system to signal when potential cooling is available to activate it. During the day, the white plate shows a crude indication of

demand for heat, the solar circulation pumps turn off and thermosyphon cooling fins keep the collectors from making steam. This passive cooling system continues to work normally even during a power failure. When self-cooling, the data shows the solar panel temperature to be hovering above and below the 200 F mark.

• **DHW tank heating/cooling:** Each day, the temperature in the DHW tank can be seen to rise from 120 F to the operating high limit of 170 F, using only solar heat. The control system is capable of shedding heat from the DHW tank when the water in the tank reaches a high temperature limit. This heat dissipation function is adjustable, and in this installation it is currently set to allow the tank to absorb heat up to 170 F. It then cools it to about 155 F after sunset, using the NSRC cooling function, but at a much higher temperature than space cooling. At these high temperatures, the tank can be cooled very quickly by pumping the solar collectors "in reverse." The controls are set to provide plenty of solar hot water at reasonable temperatures while using little or no backup heat from the boiler in summer.

Room temperature results

The whole point of NSRC is to enhance comfort cooling in the indoor rooms during warm weather. This subtle effect can be seen in the room temperature data as it drifts upwards by day and is pulled down slowly overnight. The room temperatures fluctuate between 78 and 70 F during this test period. There are no A/C or evaporative coolers in this building. And, in case you are wondering, the solar collectors did successfully provide heat for the building during the past cold winter. But that is another story.

Final Notes

All of the components and control concepts presented above have been defined and discussed in greater detail in earlier episodes of this series of articles. Archives and links to past articles can be found on the websites of TMB Publishing and SolarLogic LLC.

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.

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 SolarLogic LLC online at 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 and 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.*

Plumbing Engineer's 2012 Boiler Report

Boiler Market Struggles to Regain Normalcy

Let's face it: the warm winter/spring was welcomed by many, but those in the boiler industry felt its impact. Couple that with expiring government incentives, the boiler market is struggling in 2012. But there is hope. As you'll see in the reports below, many of the manufacturers we talked with seem to be optimistic about 2013.

The manufacturers appear in no particular order. Information can be attributed to each company's marketing department.

U.S. Boiler Co.
www.usboiler.net

The ESC's G3 cast iron heat exchanger provides efficiencies of up to 85.5%, and delivers long-lasting performance – even in low temperature ranges. The G3 heat exchanger is constructed of BC25-HSi high silicon cast iron to ensure the highest quality, and exceptional performance.

Company News: U.S. Boiler Company, manufacturer of Burnham brand products, has introduced more new, high efficiency products over the last several years than any other company. From new ENERGY STAR® certified, gas-fired residential boilers to high efficiency oil-fired boilers including advanced-design, three-pass, cast iron boilers, along with the industry's only, 3-pass, oil-fired, steam boiler and the only American-made, atmospheric gas boiler, the ES2, boasting 85% AFUE. Together, the expansive lineup of Burnham heating products boasts the highest average efficiency, exceeding 85% with maximum efficiencies over 95%.

U.S. Boiler Company is continuing to develop new products, new capabilities and innovations that will keep it and its customers at the forefront of the best heating available. Burnham continues to be the leading brand in hydronic heating with the most complete and advanced product lineup, and the one that's made in America.

The ESC condensing boiler features the IQ Boiler Control System, which provides operating controls and constantly monitors the ESC boiler to help maximize operating efficiencies.

Bryan Steam
www.bryanboilers.com

Bryan Steam LLC Triple-Flex™ (patent pending) Ultra-High Efficiency Condensing "Flexible Water Tube" Boilers with guaranteed minimum thermal efficiency of 90% in worst case condensing boiler operating conditions, such as 160° return water, 180° supply water at maximum input.

History: Bryan Steam, originators of the Flexible Water Tube design, provides gas, oil and dual-fuel fired boilers. Electric boilers, Low NOx and knockdown boilers and indirect water heaters for a variety of commercial, industrial and institutional applications. Boilers are available in sizes from 250 MBH to 25,200 MBH input. The "Flexible Water Tube" design provides fast, natural internal circulation for maximum heat transfer and operating efficiency. Bryan also offers a variety of related equipment and accessories including feedwater deaerators, boiler feed systems and boiler blowdown separators and tanks.

Company News: Condensing boilers continue to offer energy savings in the commercial boiler market and the Bryan Triple-Flex boiler out performs all others with minimum 90% efficiency with 160 F return water. Bryan Steam is offering a universal communications gateway from our boiler products to most building energy management systems.

Boiler Forecast: We are starting to see improvement in the commercial/industrial market and expect greater growth it 2013.

HTP, Inc.
www.htproducts.com

The Elite FT heating boiler from HTP features an exclusively designed stainless steel heat exchanger with superior heat transfer and less exposure to corrosion and scale buildup.

History: HTP was established in 1974 as a designer and fabricator of heat exchangers for the boiler and solar industries. It is enjoying its second generation of family leadership under CEO Dave Davis and is a full-fledged manufacturer on the cutting edge of energy and efficient space and water heating technology. Product categories include: modulating condensing commercial and residential high efficiency boilers, indirect water heaters, high efficiency gas fired water heaters, solar hot water systems, combination space and water heating and electric water heaters.

Company News: This year HTP has released two new residential boiler products to date: the Elite FT with a unique fire tube design, and the Elite Plus with gas adaptive technology. We have also announced the launch of three great new commercial water heaters which will be available before the end of the year.

Boiler Forecast: In the short term, we see a drop in boiler sales. As government initiatives have ceased and the cost of energy continues to rise we will see increased demand for energy efficient boilers. There is going to be a greater need for retrofit units in older homes as homeowners search for newer ways to save on fuel and energy costs.

Helping the Contractor: HTP offers the convenience of working with an onsite technician straight to your mobile phone through the launch of the HTP mobile app. Contractors can interact directly with HTP by downloading the mobile app for free now in the iTunes Store, Android Play, and BlackBerry App World.

Designed specifically with convenience in mind, the new HTP mobile application gives contractors access to everything they need on site in order to get the job done. With the click of a button or a swipe of the screen, users can access essential tools for any HTP product installation. View parts drawings and installation manuals, images, specifications, stream videos and more. In addition, you can easily locate your nearest sales representative or contact HTP directly for technical support or a sales quote.

Triangle Tube
www.triangletube.com

Prestige boiler

Company History: Triangle Tube is part of the ACV group, which has been committed to innovation in hydronic heating for the past 90 years. ACV developed the unique stainless steel tank-in-tank indirect fired water heater over 30 years ago. Triangle Tube was one of the first companies to bring indirect water heaters to the North American market. In the 1980s, Triangle Tube brought one of the first combination heaters to the market and in 2003 Triangle Tube introduced the revolutionary Prestige Boiler. The Prestige Boiler, with its unique fire-tube heat exchanger quickly became the most popular residential high efficiency boiler in North America.

Company News: Triangle Tube's Prestige Condensing Boilers have been re-launched with a new and unique TriMax control. This new control is the most powerful, yet easiest to use boiler control available. The TriMax control provides two reset curves for multi-temp systems, controls 4 circulators, and can cascade up to 6 boilers with a unique auto-detection system. The most popular innovation for the TriMax is the 60 second EZ set-up feature. This allows the TriMax control to be set up, both heat and hot water, in less than 60 seconds. Keystone Condensing Boilers are available with inputs from 399 to 850 MBH and Keystone Condensing Water Heaters are available with inputs from 199 to 850 MBH.

Boiler Forecast: Growth in the high efficiency residential boiler market has slowed in 2012 due to low natural gas prices and the elimination of most government incentives. While we expect natural gas prices to increase from here, the increase will be slow and not significant enough to cause a dramatic change in the market. The good news behind the low natural gas prices is that conversion from oil heat to natural gas makes more sense than ever, and many homeowners will see the long term benefits of high efficiency products. In a slow growth market more than ever, companies with broad, innovative products that provide significant value to their customers will be the most successful.

Boiler Report continued on page 52

Boiler Report

continued from page 50

Noritz
www.noritz.com

Company News: The NH150-DV and NH199-DV tankless hydronic boilers are ideal for constant room temperature comfort for various heating choices, such as panel radiators, baseboard flooring and radiant floor heating. Significantly smaller in size than conventional hydronic boilers, the direct-vent units appear similar to tankless water heaters and weigh only 66 pounds versus a conventional boiler at 300 pounds. Featuring a gas-consumption range of 55,500 BTU per hour to 150,000 BTUh for the NH150-DV and up to 199,900 BTUh for the NH199-DV, the units are ideal for residential or light commercial applications. They also offer nine temperature settings (140-180 F) for hydronic heating applications. Each unit has a high-flow capacity of 14 gallons per minute with a three-speed Grundfos Pumps circulator, providing multiple pump curves, rather than the one-pump curve of a typical single-speed pump. The multiple pump curves make it easier to correct flows and pressure losses, allowing the hydronic boilers to better adapt to changing demand in a heating system. The units also include an outdoor reset control (ORD).

Slant/Fin Corp.
www.slantfin.com

The Lynx Modulating Condensing Gas Boiler is a hot water boiler heating system which is compact, powerful and agile. Slant/Fin's new Lynx sealed combustion gas boiler operates at 93% AFUE maximizing fuel savings. Compact, light weight for easy handling. Advanced design aluminum heat exchanger sets a new standard for reliability.

Company History: Slant/Fin was founded by Mel Dubin in 1949. It was started in the back of a bakery in Coney Island, N.Y. When the company started, its focus was commercial grade element and the original design was a locked, slanted fin, hence the name Slant/Fin. One of Mel's favorite stories is about how small the original work area was. When they were making 10-foot element they had to manufacture half the element at a time, then open the back door to turn it around to finish. Slant/Fin is now America's largest manufacturer of baseboard heating equipment. It is also one of the top manufactures of gas and oil boilers. Since 1949, heating contractors, engineers and builders have depended on Slant/Fin for products of the highest quality.

Company News: Slant/Fin is putting the finishing touches on its new website. The new site is very easy for even the Internet novice to navigate. We have covered the social media bases with Facebook and a blog. The training facility in Greenvale, N.Y., has undergone a major facelift. The new training center has five live-fired boilers, as well as the newest in classroom training technology. Slant/Fin also will be announcing a new line of modulating condensing gas boilers for 2012.

Boiler Forecast: The boiler market will continue to be very competitive. With new competition entering into this already crowed arena we must exceed the expectations of our customers by excelling in areas including but not limited to customer service, on time and accurate shipping, quality control and product mix.

ClimateMaster
www.climatemaster.com

The new Trilogy™ 40 utilizes variable speed technology to provide an extremely wide range of heating and cooling capacities, with the ability to perfectly match loads to as low as 30% of maximum.

Company History: ClimateMaster emerged from the marriage of several water-source heat pump companies in a blending of strengths to form a focused organization. For over 50 years, we have been focused on enhancing business and home environments around the world. Our mission as the world's largest and most progressive leader in the water-source and geothermal heat pump industry reveals our commitment to excellence - not only in the design and manufacture of our products, but in our people and services. All of ClimateMaster's 610,000 square feet in facilities operate in Oklahoma City, Oklahoma, which means ClimateMaster units are manufactured in the United States using American labor.

Boiler Forecast: The 30% tax on installation costs is definitely helping increase sales in the geothermal industry. With incentives being offered on the state level, this will only add to the awareness of the product.

Helping the Contractor: ClimateMaster created cmdealer.net to help HVAC contractors develop a successful geothermal dealership. The dealer Marketing Area is designed to allow you to order promotional items, signage and trade show graphics. Print-ready advertisements, high-resolution logos, and unit photos are available for download on this site. This website was created specifically for ClimateMaster dealers.

The Residential Marketing Manual is a guide for HVAC contractors to develop a successful geothermal dealership. The marketing manual contains marketing plans, information on branding, sales literature, sales tools, information on federal tax credits and pricing/warranty information.

Utica Boilers
www.uticaboilers.com

The new UB90-100 II now has a Honeywell 2012 compliant control.

Company History: Utica Boilers is an ECR International brand. ECR designs, manufactures and markets HVAC equipment including boilers, water heaters, hydronic system controls and furnaces in modern plants at Dunkirk and Utica, New York. ECR has been located in New York State since 1928 when Earle C. Reed established manufacturing facilities for cast iron boilers and radiators in Dunkirk and Utica, New York. ECR was formed in 1999 as a merger of The Utica Companies (Utica) and Dunkirk Radiator Corporation and named in his honor. ECR is a strong supporter of local charities and is proud to be a founding sponsor of Utica's famous 15K (9.3 miles) Boilermaker Road Race.

Company News: Our boiler line has been redesigned to meet 2012 DOE Compliance requirements. Highlights include the new UB90-100 Series 2 and the TriFire TRB.

The new UB90-100 II now has a new Honeywell 2012 compliant control. The UB90-100 II also features temperature display, direct spark ignition for increased reliability and a boiler water reset that does not require an outdoor sensor. The TriFire TRB now has a Hydrolevel Fuel Smart Hydrostat with temperature display and dial-type settings. The TriFire TRB also has a boiler water reset that does not require and outdoor sensor, along with a LWCO and a new well.

Locally, we're preparing for the 35th anniversary of the Utica 15k Boilermaker Road Race. We co-founded the race to celebrate our 50th Anniversary and give back to the local community, and now the race has grown to an international event featuring 14,000 participants.

Laars
www.laars.com

NeoTherm® LC condensing boiler is a fully packaged, 1 million BTU, space-saving hydronic solution that offers 94% thermal efficiency.

Company History: In 1948, engineer Avy Miller formed Laars Engineering as a company dedicated to the concept of heating water quickly by passing the water through finned copper tube heat exchangers. Miller realized that moving water at high velocity through "low-mass" heat exchangers such as finned copper tubing could heat water up to nine times faster than through cast iron vessels. Miller designed specialized manufacturing techniques to support this new concept, and the "low-mass" technology found a warm U.S. reception.

Today, Laars Heating Systems operates as a subsidiary of the Bradford White Corporation with manufacturing in Rochester, N.H. and a distribution center in Mississauga, Ontario, Canada.

Company News: Laars Heating Systems announced the opening of a new, state-of-the-art customer training center in Rochester, N.H. The center is designed to educate contractors about hydronic systems and Laars current and next generation of heating technology. The new training facility seats up to 70 people, has 2 live fire stages, which can fire up to 2 million Btu/hr, and an advanced audio visual system for in-room use and is capable of streaming live video over the Internet.

Boiler Forecast: Residential markets have weakened compared to 2011 due to sluggish new home starts and the removal of most residential tax incentives and utility rebates. The commercial market has seen more quotation activity, and projects are still on longer lead times with a higher rate of postponement or cancelation that would be seen in a strong growth economy.

Bosch Thermotechnology
www.buderus.us

The Bosch Greenstar™ series, available in configurations ranging from 57.2 to 151.6 MBH, utilize condensing technology and can offer efficiency levels of up to 98.7 percent

Trends: In North America, Bosch Thermotechnology is a leading source of high quality water heating and comfort heating systems. In particular, the company offers BOSCH tankless, point-of-use and heat pump electric water heaters, Bosch solar thermal systems, Buderus floor-standing and wall-hung boilers, FHP geothermal systems, as well as controls and accessories for every product line. Bosch Thermotechnology is committed to reinventing energy efficiency by offering smart products that fit together and work together as integrated systems that enhance the quality of your life in an ultra efficient and environmentally friendly manner.

Company News: Buderus-Bosch Group is rolling out multiple new product upgrades in 2012, including a completely new line of electric, point-of-use tankless water heaters called the Tronic series. Our other products, including the industry's only ENERGY STAR-designated complete geothermal line, continue to be a major focus point. Solar, geothermal, tankless and high efficiency boiler products from Bosch are capable of 98 percent efficiency as stand-alone products (i.e. Bosch Therm tankless water heaters) so a combined system offers an attractive option for price conscious consumers. In turn, professionals offering our entire integrated portfolio can tap into new revenue areas working with Bosch – a global brand consumers know and trust.

Boiler Report continued on page 54

Boiler Report

continued from page 53

The Aruba IV (AWR) is a gas-fired hot water boiler built for reliability, efficiency and performance. It is designed for use with residential and small commercial applications with an approved chimney. The AWR has an Annual Fuel Utilization Efficiency that varies from 82.8% to 83.3% and the heat exchanger comes with a Limited Lifetime Warranty.

Crown Boiler Co.
www.crownboiler.com

Company History: Starting in 1949 as Crown Industries, today's Crown Boiler Co. has grown into an industry leader offering the latest in Hydronic heating technology. Crown's product offering includes residential and commercial oil and gas fired cast iron boilers as well as residential and commercial cast aluminum condensing boilers. Along with this extensive offering of boilers our product line includes stainless steel indirect water heaters, Hydronic air handlers and warm air furnaces.

Company News: With the new DOE residential regulations taking effect on September 1, 2012 increasing the minimum AFUE and mandating controls with a means to adjust boiler water temperature based on load conditions on products, Crown will be updating our residential boiler line to comply. This includes releasing three completely new products to our line. We are introducing the Aruba 4 gas fired hot water boiler this year, as well as two new 3-pass oil boilers, both a hot water and a steam model. We will also be introducing online training for these new products as they become available in Crown Boiler University, our online learning center. This is going to be a very exciting year for Crown, and we are really looking forward to rolling these new products out.

Boiler Forecast: Although the lack of cold weather has softened the market over the past year, we're still feeling good about the 2012-13 heating season. With the new 2012 DOE regulations coming into play, we feel very confident that the market is going to turn around. The regulation changes are going to increase the incentive to upgrade to new, compliant equipment for better energy savings.

Helping the Contractor: We offer multiple channels through which contractors can learn about our products. We have opened a training center at our office in Philadelphia, Pennsylvania, and have vans with fully functioning equipment for mobile training. Crown Boiler University also offers many online classes on our products so contractors can train at their own pace, on their own time. We want to make sure that contractors have the knowledge to get the job done.

CSA certified at up to 96% efficiency and delivering actual net thermal efficiencies to 99%, the ultra high efficiency of the MACH® boiler helps reduce fuel bills by as much as 80%. All MACH® boilers now feature our exclusive ENVI® control system.

Harsco Industrial
Patterson-Kelley
www.harscopk.com

Company History: Harsco Industrial Patterson-Kelley traces its industrial heritage to Benjamin F. Kelley & Company founded in 1880. One of the company's first products was a feed water heater with a "U" tube bundle. The company moved to its current location in East Stroudsburg, Pa. in 1919. Since then, the company developed new products for the water heater industry and expanded into adjacent markets such as cement linings for storage tanks, chemical process equipment and commercial boilers. In the 1960s, Patterson-Kelley revolutionized the water heating market by introducing the first completely "packaged" water heater. These water heaters included operating controls, insulation and outer coverings bundled into a fully assembled package. Today, the company has taken this bundling to a new level by offering fully engineered and assembled heating plants called fabricated systems.

Patterson-Kelley joined Harsco Corporation in 1974. In the late 1980's, business expanded into the commercial boiler market when the PK THERMIFIC® gas fired boiler was introduced. These modular boilers provided heat for schools, dormitories, nursing homes, and apartments. As the market evolved to higher efficiency equipment, Patterson-Kelley introduced a new technology, the first cast aluminum heat engine as part of the MACH® condensing boiler. Today, this ultra high efficiency condensing boiler continues to be one of the major growth platforms for the company.

Company News: New MACH n'Roll™ engineered system combines high efficiency space heating and domestic hot water in a compact footprint. These systems are customized to fit and perform in each unique application. In the spring/summer, we will launch our MACH® condensing boilers with dual fuel (natural gas and propane) capabilities. For facilities, such as hospitals and some schools, where emergency backup is often required, our dual fuel boilers change from natural gas to propane by simply flipping a switch.

Boiler Forecast: Natural gas prices declined making the value argument for significant cost savings and quick return on investment more challenging. Yet we still see our fair share of retrofit and renovation projects that are driven by potential cost savings rather than failed equipment. As financial incentives from the government and utility companies expire, we may see this trend decline.

Weil-McLain
www.weil-mclain.com

Loaded with a winning combination of features, Weil-McLain proudly introduces the WM97+ Boiler. The WM97+, is a wall mount boiler that comes in 70,000 and 110,000 BTU input models, both at a AFUE rating of 97%. The WM97+ offers a unique condensing stainless steel heat exchanger, built in boiler circulator and a built in primary secondary option.

Company History: Founded in 1881, by Benjamin & Isadora Weil, Weil-McLain has been an industry leader for 131 years. Today, Weil-McLain has a state-of-the-art assembly facility in Eden, North Carolina and a foundry in Michigan City. The Michigan City facility houses the Weil-McLain Product Engineering team, recently enhanced Engineering lab and customer service department.

Company News: This May, Weil-McLain, in partnership with sister company Marley Engineered Products, is opening a new Division office in Burr Ridge, Illinois. The new division office will house the executive team, along with the Marketing & Finance departments. The Division office will also include the Central & Western Area Sales team and three new product training rooms for customer training events.

Weil-McLain has recently introduced three new products: the GV90+, a 90+% AFUE efficient cast iron gas boiler that can vent with PVC pipe material; the WM97+, a 97+% condensing, stainless steel wall mount boiler; and the Aqua Plus, a new line of indirect-fired water heaters.

The Fulton Companies
www.fulton.com

The Caliber™ boiler is a condensing, lightweight commercial hydronic boiler with ultra low emissions of CO and NOx. The product line features a high quality, full stainless heat exchanger suitable for hydronic heating in sizes from 300,000-850,000 BTU/hr.

Company History: Fulton specializes in custom engineered industrial and commercial heating systems featuring steam boilers, hot water and hydronic boilers, thermal fluid (hot oil) heaters, temperature control units and a full range of ancillary equipment. Since its establishment in 1949, Fulton has continuously improved and expanded its capabilities, both in production as well as customer service. Fulton's continued growth has led to the development of new product lines and manufacturing facilities to meet the needs of a growing customer base.

Company News: Since the 112,000 square foot expansion of the company's headquarters was completed in November 2011, Fulton has been moving into its all-new space, which includes a 82,000 square-foot manufacturing space and 10,000 square-foot dedicated Research and Development space, as well as a 20,000 square-foot office space. This expansion has allowed for manufacturing process efficiencies and product line expansions. Fulton is offering a brand new line of condensing, lightweight commercial hydronic boilers with ultra low emissions of CO and NOx.

Hydrotherm Boilers
www.hydrothermkn.com

The all-new KN-Series boilers will incorporate an enhanced Tru-Flow air/fuel combustion control process allowing for increased venting lengths at decreased sizes while maintaining optimum combustion and operating efficiencies.

Company History: Hydrotherm Boilers has been manufacturing American-made, high-efficiency boilers for more than 65 years. Hydrotherm is known for three major game-changing product introductions beginning with the introduction of the modular boiler concept. The MR Series of cast-iron boilers took the boiler marketplace and changed it considerably by packaging smaller residential-style boilers into multiple boiler configurations under a single jacket and stage-firing them to meet heating demands across a broader spectrum when compared to traditional on/off boilers thus increasing operating efficiencies and decreasing the equipment footprint.

Hydrotherm also pioneered the Pulse boiler. Hydrotherm received the first-ever patent on Pulse boiler technology and produced a condensing boiler with unprecedented operating efficiencies at over 92% in the late 1970s and continued producing Pulse boilers until early 2002.

In 2002, Hydrotherm introduced another industry-first on the heels of the Pulse boiler. With operating efficiencies of up to 99% at full modulation, the KN-Series boiler is the most durable and energy-efficient boiler available today.

Boiler Report continued on page 56

Boiler Report

continued from page 55

Lochinvar
www.lochinvar.com

CREST boiler

Company History: Lochinvar's heritage of excellence dates back to 1939, when the company was founded. The introduction of the PowerFin product line in 1986 revolutionized the industry and helped establish Lochinvar as the leader in advanced hydronics and water heating technology. Through the years, Lochinvar's continued investment in research and development has produced many of the industry's most innovative products and technology. Today, with company headquarters in Lebanon, Tennessee, Lochinvar is the leading manufacturer of energy-efficient water heaters, boiler, pool heaters and commercial solar thermal systems.

Company News: The ARMOR X2™ commercial condensing water heater combines stainless steel heat exchanger technology with modulating/condensing combustion to deliver thermal efficiencies as high as 96 percent. Boasting a turndown ratio of 10:1 and 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 provide a simple, cost-effective means of integrating solar energy into any application, StratoTherm+ offers the functionality of a solar thermal storage tank, indirect water heater and hydronic buffer tank in a single, space-saving unit.

• The fully modulating CREST Condensing Boiler features a low-NOx combustion system with a stainless steel heat exchanger and a highly unique, patent pending dual-system burner design with up to 25:1 turndown.

• The 2012 Lochinvar University courses are now in session. All Lochinvar University courses take place at company headquarters near Nashville, utilizing Lochinvar's state-of-the-art training facility.

• In December 2011, Lochinvar opened a new distribution center in the Chicago area.

Boiler Forecast: The boiler business has struggled in recent years in the traditional low- to mid-efficiency range products but has enjoyed nice growth in high efficiency offerings. This trend is sure to continue as energy costs rise and facility owners look for new ways to invest with the greatest ROI. Investing in facility upgrades that lower operating costs within the buildings that their businesses already occupy, in many cases offers a quicker and more substantial return on their capital investments than if they invested those same funds in actions that would help them grow their businesses. Until construction in the U.S. gets back to "normal," the win–win scenario will be with energy upgrades and retrofitting of lower efficiency products in the residential and commercial arenas.

Energy Kinetics
www.energykinetics.com

The 90+ Resolute™, combines our industry leading low idle loss technology with a 90.4% AFUE integrated heat and hot water system for best in class delivered efficiency.

Company History: Energy Kinetics was founded in 1979 and has grown to become the nation's leading manufacturer of innovative, high-efficiency heating and hot water systems. The company's core philosophy of helping heating professionals succeed using practical application of energy efficiency has resulted in growth with these business partners. Our core technology is capable of reducing energy consumption up to 40%, with further gains from integration with solar and other renewable energy sources. The company's flagship product, System 2000, is manufactured in the USA with exacting, world-class standards and is sold direct to professional heating installation contractors. Energy Kinetics is an ENERGY STAR Partner and a leading manufacturer of ENERGY STAR heating equipment.

Company News: Energy Kinetics' latest oilheat product introduction, the non-condensing 90+ Resolute™ , combines our industry leading low idle loss technology with a 90.4% AFUE integrated heat and hot water system for best in class delivered efficiency. An additional benefit is that this product uses nearly all commercial, off the shelf technology, for ease of installation and peace of mind for contractors and consumers. The Resolute will be available later this year in natural gas and propane, operating with a simple burner change to migrate between oilheat and natural gas or propane.

Combination heat and hot water systems continue to increase market share as consumers and contractors become more aware about consistent energy savings of 20% to 40% with low idle loss designs, and System 2000 leads the way. AFUE does not apply to combination systems. Even in a challenging economic climate, as consumers and contractors realize the benefits of impressive energy savings, exceptional comfort, and virtually unlimited hot water, demand will continue to increase into 2012.

Helping the Contractor: Energy Kinetics offers ProTrain™ Technical Service Training courses which cover established principles that help with installing and servicing all heating equipment and efficient heating system design, as well as System 2000 basics, applications, installation, tune-up, and service. Other heating professional courses include training with powerful tools to communicate savings benefits, system design, and fast and accurate job estimates. All instructors are seasoned professionals with decades of hands on experience to make the most of attendees valuable time.

Navien
www.navienamerica.com

Company History: KD Navien, Navien America's parent company, was founded in 1978 and has headquarters in South Korea. A recognized world leader in condensing technology and boilers, KD Navien has expanded globally into China, Europe, Russia and North and South America.

KD Navien introduced their condensing tankless technology to North America in 2008 and, by bringing to the market highly efficient and easily installed hydronic heating products, has quickly become the largest provider of condensing combination gas boilers and tankless water heaters in North America

Company News: Navien's combination boiler and water heater is currently involved in a number of projects around North America. Recently, Navien combination gas boilers were installed in 128 apartments on the campus of Oakland University outside of Detroit, Michigan. The new Navien combi units are replacing 40-gallon waters heaters that were tied into air handler units and will provide hot water for every unit and heating to each apartment. The project is specifying the CH-240-ASME natural gas unit, so it fires up to 199,999 Btu. Navien also offers a CH-210-ASME (180,000 Btu) and a CH-180-ASME (150,000 Btu). All of these models come in either natural gas or liquid propane.

Market Forecast: With their ultra-high efficiency and easy installability, condensing boilers have been gaining popularity at the expense of non-condensing models. This trend has accelerated over the last 10 years because of the many rebates offered by gas companies and homeowners' desire to use more efficient products to heat their homes.

Condensing Combi gas boiler/water heater

Sales of wall-hung condensing boilers have doubled over the last five years, while during this same time sales of all other boilers combined have declined by over 25%, according to BRG. In order to respond to this growing trend, KD Navien is going to expand their already strong product lineup of combination condensing boilers with differentiated products and features to provide enhanced benefits to the end user and installer.

Navien America is also implementing a variety of marketing communication tools to inform their channel partners about their ongoing training courses, innovative marketing programs and robust product features.

Helping the Contractor: Navien Training Academy is offered at their three North American training facilities, located in Irvine, Calif., Cherry Hill, N.J. and Vaughan, Ontario. These facilities provide training courses on live fire units and opportunities for contractors and engineers to work in a hands-on environment with both condensing tankless water heaters and condensing combi gas boilers. Professionals may find information and schedules on these training courses, as well as register for a course, at www.NavienAmerica.com to become a certified Navien installer, referred dealer or Navien Service Specialist.

In response to such dramatically increased demand, Navien has also recently invested over a quarter of a million dollars in their call center to respond more quickly to customer calls and boost the reponse rate. The average wait time now is less than a minute.

AERCO
www.aerco.com

Company History: Founded in 1949, AERCO originated tankless water heating, introduced the first modulating and condensing gas-fired unit for the commercial market and helped pioneer the high-efficiency boiler category. AERCO embraces the principle of continual process improvement, and over the years has revolutionized the industry with advanced boiler and water heater technology.

Since its founding, AERCO has adopted state-of-the-art manufacturing methods, disciplined product development and rigorous quality-management programs to ensure its products are delivered on time and with premium service. In 2011, AERCO relocated to a 156,000 square-foot facility in Blauvelt, N.Y., to consolidate all existing operations into one building. This allows improved communication, efficiency, technological innovation and continued growth.

Company News: AERCO recently introduced a number of new products, most notably the redesigned Benchmark BMK3000 boiler and new BMK6000 boiler, which is half the size of any other 6 million BTU/hr boiler on the market. The company also launched the Innovation 1350 tankless water heater and Esteem 399 wall hung boiler with TriMax Control.

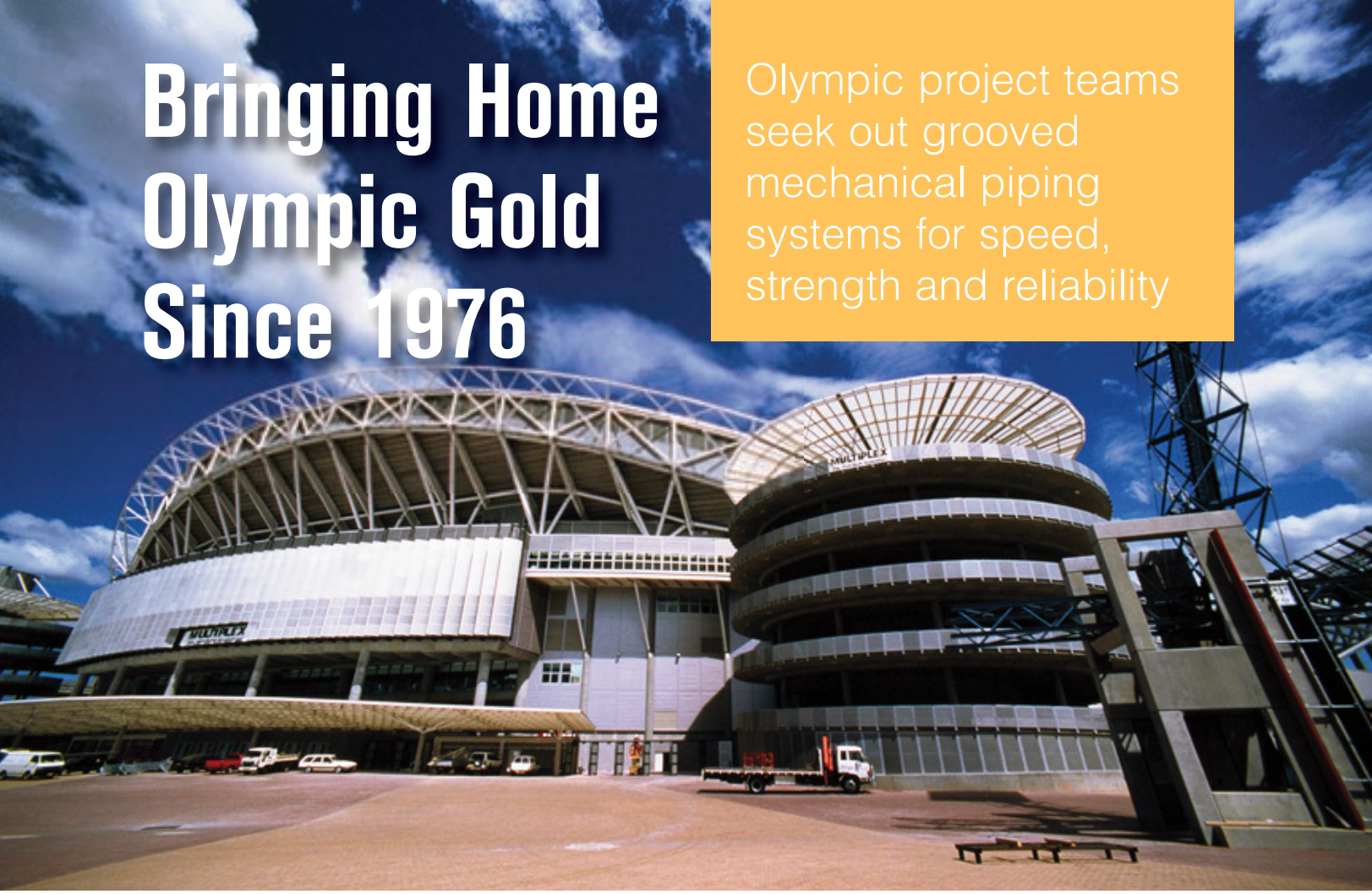

The BMK6000 features 15:1 turndown for energy efficiency and high reliability in a compact footprint that is half the size of any other 6 million BTU/hr boiler. It has an efficiency of 92.5%, and comes with AERCO's patented Oxygen Level (O2) monitoring system.

To offer a cost-efficient method of updating assemblies and equipment, AERCO started an Equal-to-New (E2N) refurbishment program. E2N assemblies and equipment provide the same functionality as a new model; offering facilities management a more economical manner to maintain their boilers and hot water systems. By the end of this year, AERCO will also introduce an onboard Water Heater Management System (WHM) and proprietary O2 monitoring system.

Helping the Customers: AERCO provides technical documents and specifications for each product in our Rep Intranet on www.aerco.com, which also has functionality for reps to manage each project. To further support its reps, AERCO hosts training and education seminars.

Bringing Home Olympic Gold Since 1976

Olympic project teams seek out grooved mechanical piping systems for speed, strength and reliability



The Olympic Games are a time of national and global pride. They gather athletes, fans and officials in world-class cities to compete, celebrate and partake in history-making sporting events. This convergence of the athletic world doesn't come together easily or without thoughtful planning. It takes multiple committees, numerous public and private partnerships and a host city ready to hit the ground running. These groups need to work together to plan, build, renovate and upgrade their facilities and infrastructure to successfully meet the needs for the athletic events and the influx of people from around the globe.

Plans begin before a city has even been chosen to host the Olympics. Cities compete against one another to gain global recognition and receive an infusion of capital projects to boost their local economy. Cities hope to show the world the beauty of their country, showcase their engineering prowess and prove that they are a world-class city worthy of the international spotlight. Once selected, however, the grandeur of the event comes with many challenges for the host city.

Crunch time

Since the Sydney Olympic Games in 2000, the International Olympic Committee (IOC) put in place a master schedule to ease the development and construction projects needed for the event. The schedule provides a general timeline for the completion of new projects and for facility upgrades to keep plans on task. Housing accommodations, media venues, Olympic-worthy stadiums, athletic fields and pristine aquatic facilities often must be built or upgraded to meet the needs of the thousands of attending athletes, visitors, fans and members of the media.

For example, the development process for the 2012 London Olympic Games began in 2005. Watchful eyes and global scrutiny fell on the developers of the Olympic Village. Tight deadlines, development and construction were not their only concerns. The modern Olympic Games must endure 21st-century challenges that include politics, tight budgets and providing security against potential terror attacks.

With the event creating an obvious deadline, facility planning and construction faces a significant time crunch. Facilities must be built in record time to be ready for testing, training and, most importantly, for the illustrious opening ceremonies. Time is critical on Olympic builds, so reducing work hours wherever possible is essential. Victaulic has supplied mechanical pipe-joining systems to Olympic structures since the 1976 Winter Olympic Games in Montreal, Quebec, Canada. The combination of Victaulic grooved piping systems' simplicity of installation, elimination of hotworks and ability to construct in any weather condition helps offer a dramatic reduction in the construction schedule.

Compressed schedules

It's important to maximize efficiencies to save on manpower. This can be done in a number of ways, including the often-overlooked areas of pre-planning, material handling and onsite field services that can quickly add up to create significant time savings.

Piping systems account for as little as five percent of total installed costs on a project. In many cases, little

Continued on page 60

BUILT TO LAST

The Invincible eF Series®

Our durable eF Series® ultra high efficiency commercial water heaters are time-tested tough. These proven performers offer the installer, building manager and business owner the ultimate in reliability. With unsurpassed thermal efficiencies you get incredible delivery and lightning fast recovery.

UP TO 99.1% ***Still the Highest Efficiency Commercial Water Heater You Can Buy!***

When your business depends on reliable performance, depend on the eF Series® from Bradford White.

BRADFORD WHITE®
WATER HEATERS

To Find A Wholesaler Call
800.523.2931

Built to be the Best™

www.bradfordwhite.com

Circle 33 on Reader Reply Form on page 65

Olympic Projects

continued from page 58

For the LEED Silver Richmond Olympic Oval, the use of Victaulic couplings, valves and fittings on the HVAC and domestic water applications made these systems easier and safer to install.

thought is given to the fact that piping installation can eat up more than 30 percent of all man-hours in the field. A number of challenges can occur during construction, including labor shortages, hot work permit delays, lengthy weld times, welding rework and weather delays. Any of these can break the compressed project schedule.

When Sydney needed to construct a new 100,000-seat stadium for the 2000 Summer Olympic Games, time was of the essence. Delays in construction were simply unacceptable. To compress the build time, the Olympic project team selected Victaulic grooved piping systems for the stadium's hot water, chilled water and fire protection systems. The fast, flexible and dependable piping systems helped reduce project calendar days for the premiere athletic venue.

"Man-hours are key. Everyone is looking for any edge they can get to reduce man-hours and shorten the schedule," said John Rutt, director of the construction piping services division at Victaulic.

Trimming man-hours is possible by pre-planning, taking advantage of jobsite inventory coordination, project management services and by seeking flexible and efficient construction solutions. "Manufacturers offer a whole range of value-added services that can have a significant impact on shortening schedules and reducing costs," said Rutt. "By taking advantage of these services, engineers, contractors and EPCs can gain the competitive advantage they need to bring compressed project schedules in on time and on budget."

For example, the Vancouver Convention Center, one of the largest convention centers in Canada, needed to triple its available space so it could serve as the international broadcasting center for the 2010 Olympic and Paralympic Winter Games. On-time completion of this expansion project was paramount, given the magnitude of the event, combined with the tight schedule and desire to design to the U.S. Green Building Council's LEED Gold standards. Mechanical contractor Fred Welsh Ltd. employed 3-D modeling technology to understand the complexity of the steel structure and designed a Victaulic grooved piping system that would accommodate a wide variety of loads and seismic movement.

Joining the 18-inch (457-mm) chilled and condenser water pipes was simplified by using the complete line of Victaulic advanced groove system (AGS) couplings, valves and fittings for the HVAC system, which utilizes the harbor's seawater to heat and cool the building. Featuring a two-piece housing design and only two bolts, AGS couplings significantly improved productivity on the job compared to welding or flanging and enabled the contractor to prefabricate large-diameter headers on the mechanical room floor. This saved countless hours and helped meet the strict deadline.

In addition, Victaulic's commitment to environmental responsibility complemented the building's LEED Gold design, since all its products are made from natural and recycled resources, and its grooved joining method helps eliminate waste, emissions and noise during construction and installation.

Making it possible

Olympic projects often seem to strive for the impossible: to create world-class, groundbreaking structures in very short periods of time. With the help of continuous research and development, Victaulic's systems were helpful in building many iconic Olympic structures on tight schedules, as standard grooved couplings install five times faster than welded joints and three times faster than flanged. In addition, patented, installation-ready couplings can be installed in less than half the time of standard couplings; they also reduce material handling. This allows contractors to better manage labor risk by optimizing their crew sizes and decreasing required man-hours.

The International Broadcasting Center in Athens, Greece, is a case in point. It was the center of the broadcasting operations and responsible for sending the official international signal that would reach 2.5 billion people via 200 stations located around the planet. It was the first building to be handed over to the Olympic committee prior to the start of the games in 2004. Failure to complete this project on time would have been a major blow to the Olympic Committee and to all contractors involved. The project team met its deadline by using efficient building solutions and working closely with experts, suppliers and manufacturers.

More than a dozen new facilities, including the International Broadcasting Center, had to be completed on an extremely short schedule. In addition to fast installation, the grooved piping systems helped ease the seismic concerns for engineers working on the Athens Olympics. Victaulic piping systems offer superior performance under seismic conditions and accommodate piping system movement such as thermal expansion and contraction, deflection and settlement.

Along with seismic conditions and system movement, many Olympic structures present unique design challenges that piping systems must accommodate. In Beijing, the opening and closing ceremonies of the 2008 Summer Olympic Games were held in the National Stadium, which

was nicknamed "The Bird's Nest" for its unique architecture. The design of the 100,000-seat stadium posed significant challenges to designers and contractors. Project contractors and members of the Beijing Olympic Committee specified Victaulic mechanical pipe-joining systems for the stadium's HVAC system because of their ease of installation and alignment. The flexible couplings allowed HVAC pipes to be installed at unique angles and meet the various deflection requirements of the stadium.

Victaulic systems also played a role in improving seismic stability and protecting the stadium's piping system from wind- and weather-related occurrences and earth movements, which are common in China. The flexible couplings enable the pipework to move with the building, as well as to expand and contract with thermal changes.

Flexible couplings were also important in helping construct London's Wembley Stadium. The 90,000-seat venue with sliding roof served as the largest host of the soccer tournament at this summer's games. In order to accommodate the retractable roof design, the project team required an innovative piping solution capable of handling changes in temperature. The Victaulic grooved system was chosen for chilled, condenser and heating water lines due to its good performance with thermal expansion and contraction capabilities and allowance for building movement. The use of flexible couplings enabled the team to design the piping to follow the curvature of the stadium.

Building for the future

Building green and leaving the smallest possible carbon footprint isn't the only benefit of using mechanical pipe-joining solutions manufactured from natural and recycled resources. Easy maintenance, future expansion and demountability were key reasons for the selection of grooved piping systems for 2012 London Olympic facilities.

Many Olympic venues have to be deconstructed or altered dramatically after the games to ensure workable, profitable venues to meet UK requirements that facilities meet the future needs of the citizens of London. For example, the London Olympic village dormitories will be modified and transformed into apartments after the 2012 Summer Olympics, improving the economic viability of the project.

For decades, Olympic contractors have sought Victaulic grooved systems to help build some of the world's most iconic Olympic facilities in record time. The systems also were chosen to help reduce long-term maintenance, ease seismic and thermal concerns, provide reliability and meet demanding design challenges so countries can welcome the world with confidence. ■

Product & Lit News

Plumbing Engineer's Product of the Month

Water-conserving metering faucets

3500 Series faucets save water with a 0.5 gpm (1.9 l/min) outlet. The self-closing MVP metering cartridge provides precise water flow and shuts off automatically. MVP mechanism is easy to adjust, and spare parts are readily available. Solid ECAST® brass, chrome-plated body provides unmatched durability while meeting local requirements for the reduction of lead in plumbing fixtures. Preinstalled, flexible, stainless steel hoses connect to standard water supplies. Internal temperature control is accessible above the deck for easy adjustment. **Chicago Faucet Company**.

Circle 100 on Reader Reply Form on page 65

Grinder system

Designed for residential and commercial applications where the sewer line or the septic tank sits above or away from the structure, The SANICUBIC 1® simplex grinder system handles waste from multiple fixtures with no need for below-grade storage and the costly, risky digging it requires. Capable of pumping up to 50 gpm from toilets, sinks, tubs and showers, dishwashers, washing machines and much more. Featuring a one-horsepower motor and a fast-rotating stainless steel cutting blade, the SANICUBIC 1 minimizes the possibility of clogs by quickly reducing solids in the wastewater streams to a slurry that can be pumped up to 36 feet vertically or 328 feet horizontally through a 1.5-inch, rigid pipe. **SFA Saniflo Inc**.

Circle 101 on Reader Reply Form on page 65

Valve system

The Pro-Pal Purge & Fill is a 7-in-1 valve assembly consisting of a main ball and two hi-flow hose drains that serve as purging and filling connections. When the main ball is closed, and the purge and filling valves are opened, new fluid may be introduced through one of the hose connections. Doing so displaces the old fluid in the system by flowing through the system and out the second hose drain. Any hydronic system can now be easily emptied and filled from one spot in a fraction of the time. What was formerly a four-step process can now be completed in one easy single step — with a valve that installs more quickly and with fewer leak paths than the fabricated method. **Webstone**.

Circle 102 on Reader Reply Form on page 65

Press fittings for steel pipe

FASTLOCK, a complete line of malleable iron press fittings for Schedule 10 – 40 black and galvanized steel pipe, install quickly and easily with FASTLOCK press jaws, which are compatible with most press tools on the market. There's no need for threading dies, pipe sealants or pipe wrenches. Because they connect without wrenches, FASTLOCK fittings reduce stress on joists and hangers during installation. Available in 1/2 – 2 inches, IAPMO and NSF 61-4 certified for use with water, HVAC and compressed air. **Cimberio Valve**.

Circle 103 on Reader Reply Form on page 65

Commercial flush valves and lavatory faucets

Selectronic® hands-free technology offers exposed flush valve power options and lavatory faucets with integrated electronic controls. A hard-wired AC transformer allows high efficiency flush valves to run on AC power, eliminating the need to change batteries. Exposed flush valve design makes them easier to install and maintain than concealed flush valves. This hard-wired configuration is also available with a multi-AC power option, allowing specifiers to daisy-chain up to 15 faucets and/or flush-valves off a single UL-approved transformer. Selectronic hands-free integrated commercial lavatory faucet offers simplified installation by combining the sensor and all electronics in the spout, so that no control box is required below deck. **American Standard**.

Circle 104 on Reader Reply Form on page 65

MAGNA Brochure

The MAGNA is an innovative member of Grundfos' family of high-quality circulators for use in multi-family buildings, schools and hospitals. With the MAGNA, you can stop worrying about complicated pump settings. Simply install the pump and leave it on AUTOADAPT. The MAGNA will automatically analyze the heating system, find the optimum setting and continue to adjust its operation to changes in demand. **Grundfos**.

Circle 105 on Reader Reply on 65

Hydro-Core Boiler Compatibility Matrix

Hydro-Core now offers boiler installation kits for over 180 different models from 22 different boiler manufacturers. The Hydro-Core Boiler Compatibility Matrix highlights Webstone's full offering of completely fabricated supply/return lines or prepackaged component kits. Shave hours off any boiler installation with expert looking results. Designed specifically for hydraulic separation, pump isolation, and purging the near boiler piping or secondary circuit loops. **Webstone**.

Circle 106 on Reader Reply on 65

Hot water schematics

A.O. Smith and Watts are proud sponsors of ATS and the new hot water schematic. This tool allows engineers and specifiers to build a complete hot water system specification from point of entry of domestic cold water to system distribution ensuring all components are compatible. The ATS rule-based system ensures that only building code complaint and compatible fixtures and fittings can be selected based on their project sizing requirements and applications. Once finished, users can download the complete specification package in multiple formats including CSI and Division 22, with all available Revit files ready to insert into their BIM project. **ATS**.

Circle 107 on Reader Reply on 65

Classifieds

FLUSHOMETER STORY

"Tiger in the Tank" by Bruce Martin is the story of the flushometer-tank that revolutionized North American toilet design and water usage. It is available online at Amazon.com; Yahoo.com; InfinityPublishing.com; Barnes & Nobel.com or your local bookseller. Soft cover - $16.95 + S&H; e-Book [for Kindle, etc.] - $9.95.

Circle 36 on Reader Reply Form on page 65

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) _____

August 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 34

equipment to minimize the dead legs. Additional temperature gauges may be needed as well. Soon we will likely learn about locating temperature gauges to be able to properly diagnose a system.

Treatment methods for Legionella

ASHRAE 188P does not contain complete details for effective prevention and disinfection and control of Legionella in building water systems. It provides a uniform practice for surveying, developing a risk plan, monitoring and validating that these functions are taking place. ASHRAE Guideline 12 should more thoroughly cover the prevention, disinfection and control of bacteria in the water systems.

Some methods of disinfection mentioned in the 188P standard often fail to control Legionella. That's why it's important to obtain competent advice from a legionella or water treatment specialist and review current publications for Legionella control. Make sure you investigate all treatment options before you take the word of a water treatment salesperson.

The 188P committee had discussions about the committee membership and size, noting that the committee currently has three membership categories and that membership must be balanced, so it is difficult to add individual voting members and still maintain balance. An equal number of members from each membership category needs to be added at the same time. Discussions were held to make sure everyone has the correct member category on their committee application and bias forms. There were also discussions about adding member categories to help with the situation.

A committee member asked whether Standard 188P would be delayed until Guideline 12 is ready to publish. The answer was no. The two documents, while both addressing Legionellosis associated with building water systems, can be published independently of each other. Most likely, the 188P standard will be published in 2012.

Thomas E. Watson took office as ASHRAE's 2012 – 2013 president. His theme for the year, "Broadening ASHRAE's Horizons," emphasizes the role of ASHRAE members as leaders in the application of sustainable design and practices in our communities worldwide.

ASHRAE's 2013 Winter Conference takes place in Dallas January 26 –30, 2013 and is held in conjunction with the AHR Exposition, Jan. 28 – 30, 2013. Be sure to save the date on your calendars. ■

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.*

NORITZ® COMMERCIAL

Intelligent,

Meet intelligence.

Introducing *the most intelligent commercial water heating system in the engineering community.*

- No Storage - no cycling, no heat loss
- Perfect load tracking for ultimate efficiency, up to 545:1 turn down ratio
- Redundancy for unbeatable reliability
- Versatile installation to fit any project
- Units ranging from 199,000 Btuh - 380,000 Btuh, up to 13.2 GPM
- Systems ranging from 199,000 Btuh - 9.1 million Btuh, up to 316 GPM

(866) 986 - 6748
www.noritz.com/commercial

Circle 38 on Reader Reply Form on page 65

WHEN YOUR BUILDING'S FIRE SPRINKLER SYSTEM CALLS FOR NFPA CODE COMPLIANCE, ZURN LISTENS.

FIRE PROTECTION SOLUTIONS

Zurn Wilkins' fire protection product package provides the building owner with complete fire protection solutions. Our backflow prevention products assure consistent test results due to our fully approved, technologically advanced compound checks® designed to deliver lower overall pressure loss/drop without sacrificing Zurn Wilkins industry leading lowest life-cycle costs. Our Pressure-Tru™ Automatic Control Valve and Fire Valve line controls pressure to ensure compliance to fire sprinkler code requirements. The new Stainless Steel bodied Double Check Backflow Preventer is designed for years of trouble-free performance. When you absolutely need first-pass performance to fire sprinkler codes and annual testing, there's only one name to consider. Zurn Wilkins. For your fire protection needs, give us a call. We'll listen. Lives depend upon it.

WILKINS®

ZURN®


350ADA Double Check Detector Assembly


ZW209FPG Pressure Reducing Automatic Control Valve with Low-Flow By-Pass


ZW4004SS Pressure Reducing Fire Sprinkler Control Valve


350ASTBGVIC Stainless Steel Double Check Assembly

zurn.com

1.855.ONE.ZURN

Circle 39 on Reader Reply Form on page 65