



B A L T I M O R E

Monthly Newsletter



FEBRUARY 2020

## **Upcoming Meeting**

**Date:** February 26, 2020

**Time:** 6:00pm to 8:00pm

**Place:** Olive Grove Restaurant

**Topic:** Importance of Fire Protection  
Hydraulic Calculations

**Speaker:** Professor Ken Isman, UMCP

### Meeting Format

6-6:30 Social

6:30-6:45 Announcements and Table Tops

6:45 Dinner Served

7:00-8:00 Speaker



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2018-2019

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## **MEETING LOCATION**



**Olive Grove**  
Restaurant & Lounge

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Linthicum, Maryland 21090  
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Please Contact [Jason Eagles](#) or [Jeff Edwards](#)

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**Jeffrey W. Edwards, CPD ,GPD  
President**

## President’s Report

I’m sure most of us have experienced a “stuff happens” occurrence. Our January technical presentation wasn’t able to start at our scheduled time. Terry McShane, our presenter, was tending to a family matter and was delayed getting to our meeting. When Terry did arrive, he gave us his condensed version of his presentation and apologized. We hopefully will be able to schedule Terry to come back and give us his full presentation next year.

Speaking of January’s meeting, all who attended and signed-up an ASPE CEU certificate will be getting one. When so many non-ASPE members request the certificate, it takes Matt Obenchain a little longer to coordinate everything with ASPE Society who then issues the certificates. Please be patient.

Our AYP event is scheduled for Wednesday, February 19th, Be sure to read the AYP flier in this month’s newsletter for additional information. Niki Patel, our chapter’s AYP liaison, has scheduled a fun time with golf, food and drinks. Please note attendance is limited to ASPE members aged 35 and younger.

On Friday, February 14<sup>th</sup>, the Baltimore ASPE chapter board will be making our second Engineers Week presentation to approximately 80 high school and middle school students at the Baltimore Engineers Club. Our chapter’s Education Chair, Chris Imhoff, spearheads this great event with a power point presentation to present the engineering and the plumbing industry professions to the students. Lunch and tabletop presentations will also be provided to everyone attending.

If there is anything you’d like to discuss with me regarding our chapter, please don’t hesitate to contact me.

Best Regards,  
Jeff Edwards, CPD, GPD  
President-ASPE Baltimore Chapter

<b>Mueller Associates, Inc.</b> Consulting Engineers	<b>Jeffrey W. Edwards, CPD, GPD</b> Chief – Plumbing & Fire Protection
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**Membership Award Presentations**  
**March 25, 2020**

Dedication is defined as a solemn commitment of your time to a cherished purpose. It is a loyalty or allegiance to a cause. We cannot think of a better term that defines many of our members. Being a member of this society is a choice and often involves hours of time devoted to the local chapter. The Baltimore Chapter would like to recognize the following members for their dedication to our chapter. Please spread the word and join us as we celebrate these milestones during our March meeting.

**10 Year Awards**

Brian Crisp  
Andrew Cahill  
Patrick Giordano  
George Wilburt  
Abbas Lohrasbi

**20 Year Awards**

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Brent Inners

**30 Year Award**

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If you are receiving an award and attending this meeting, please RSVP on the website [www.baltimoreaspe.com](http://www.baltimoreaspe.com). The Baltimore Chapter would like to cover this expense to further show our appreciation. Please RSVP for the meeting online and use the bypass payment option when prompted. You will need to click on Member Ticket \$35 and follow the steps to payment where you can bypass payment.

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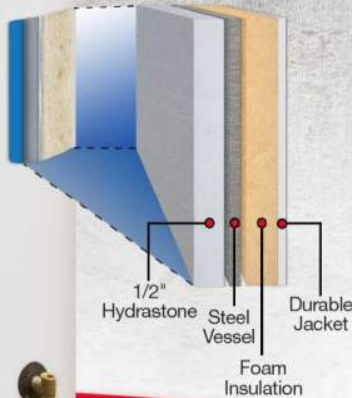
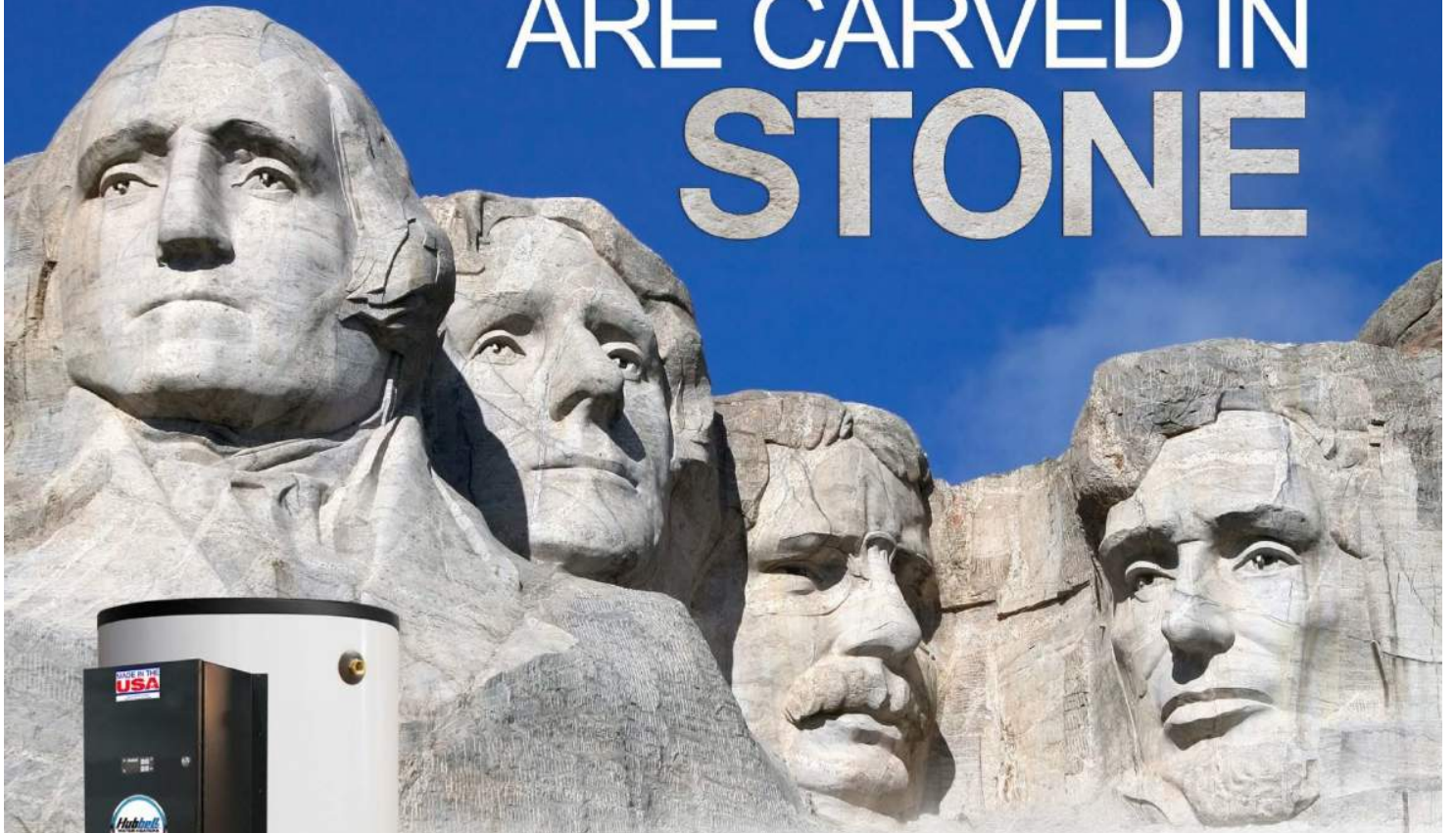
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**Nikita Patel, EIT, MBA**  
AYP Liaison

## AYP Report

Hello and welcome to the new year! If you thought last year was a blast, just wait until you see what we have in store for you over the next few months. Last year, we began a project that I've had a lot of fun helping out with, our Member Spotlight Series on LinkedIn. Each week, we interview a different member of our chapter and learn something new about them. If you don't follow us, you can find us at <https://www.linkedin.com/company/aspebaltimore> to read these stories.

I am delighted to announce we have successfully planned our Young Professionals outing for next month. I hope our younger members will be able to join me next month, February 19<sup>th</sup>, from 6-8PM at Five Iron Golf in Baltimore. A registration link will be sent out shortly. We will be practicing our golf swings with their state of the art technology in anticipation of our Annual Golf Outing at The Timbers at Troy. You are welcome to bring your own clubs or use the clubs they provide. Food and drinks will be provided. I look forward to seeing you there!

Thanks,  
Niki

**Nikita Patel, E.I.T., M.B.A.**  
Sales Engineer

**Phone:** (215) 340-5300  
**Cell:** (570) 899-9090  
**Fax:** (215) 340-5305  
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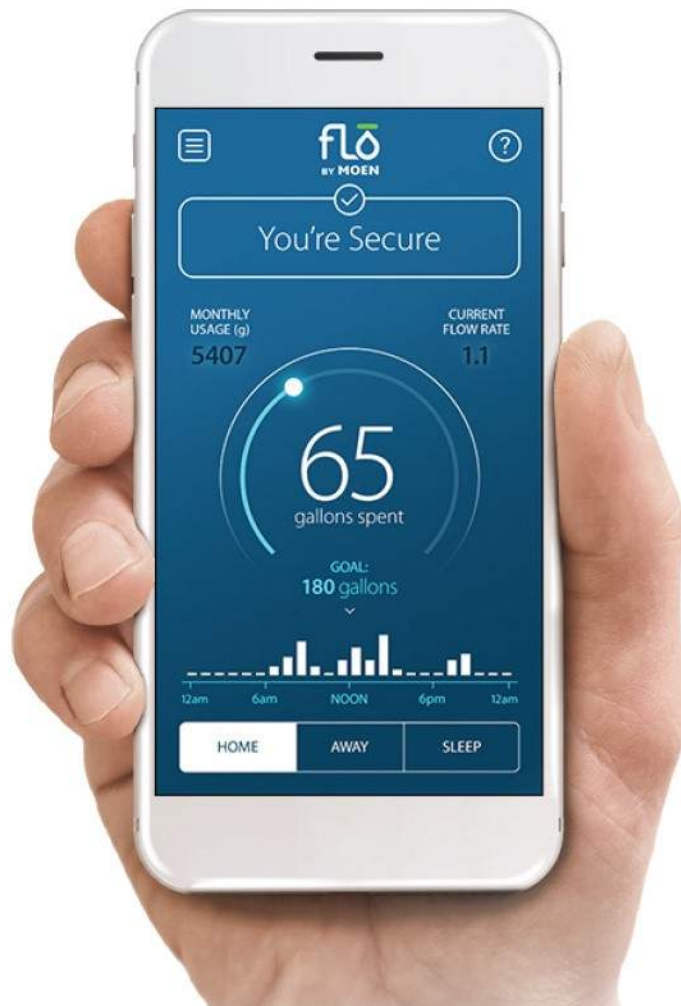
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**Chuck Swope, PE, CPD, LEED AP BD+C**  
**Vice President—Technical**

## Technical Report

For those of you that joined us in person this January, thank you for your understanding during our technical difficulties. We began our technical topic by asking our members and attendees to stand in front of the audience and discuss contract issues that came up and how they were resolved. Terry McShane of McShane PC was gracious in accommodating the remaining time we had, considering his personal hardship. Our presentation was quite unorthodox but showed how strong our membership truly is by being willing to put oneself out there and sharing their experiences. I can assure you that the Continuing Education Units are still forthcoming, so please watch your inbox and let me know if you don't receive them by our next meeting. I promise that next meeting will be just as exciting, but hopefully more predictable!

Our speaker for February is Ken Isman, Clinical Professor in the Fire Protection Engineering department of the University of Maryland. Ken holds a Bachelor of Science degree in Fire Protection Engineering and a Master of Science degree in Business Management, both from the University of Maryland. After graduation, Ken worked for 28 years in the fire sprinkler industry helping to design water-based fire suppression systems, performing research in developing new products and design techniques for the fire sprinkler industry, and representing the industry in the national and international development of codes and standards that affect the industry. In 2014, Ken returned to the University of Maryland as a professor to teach classes in fire protection systems design, life safety analysis and entrepreneurship. He is a Professional Engineer (licensed in Connecticut) and has been elected to the level of Fellow in the Society of Fire Protection Engineers. He has received both the NFPA Standards Medal, for lifetime service to the NFPA Codes and Standards process and the SFPE Harold Nelson award for lifetime service to the SFPE.

Ken has served on one or more of the committees responsible for NFPA 13 (Fire Sprinkler Systems), NFPA 101 (Life Safety Code) and NFPA 20 (Fire Pumps) since 1987 as well as 14 other NFPA committees including the NFPA Standards Council (2000-2006). A noted author and lecturer, Ken co-authored the books *Pumps for Fire Protection Systems* (NFPA) and *Layout, Detail and Calculation of Fire Sprinkler Systems* (NFSA). He wrote chapters of both the *NFPA Fire Protection Handbook* and the *SFPE Handbook of Fire Protection Engineering*. His latest book, *Standpipe Systems for Fire Protection* has been called, "the most comprehensive book ever written on that subject."

Best Regards,  
Charles J. Swope, PE, CPD, LEED AP BD+C  
Vice President - Technical



## Choosing the right sprinkler

Exploring the variables that go into selecting fire sprinkler systems.

November 4, 2019

[Victoria B. Valentine, P.E.](#)



Fire sprinklers have been around since the 1800s, with Henry Parmalee often credited with developing the first modern sprinkler to protect his piano factory in Connecticut. Much refinement has occurred since the very first models arrived on the market. Now there are so many options that selecting the best one for a project is not always straightforward.

First, there are three types of configurations for operating sprinklers. One is an open sprinkler. This means there is no operating device and when water flows, it will come through all the open sprinklers. The water flow would be triggered by another device, such as heat detectors.

There are two styles for closed sprinklers. The first is a solder-link model. In this style, the solder is made to melt at a specified temperature, the components clear from the orifice and then water can flow through the sprinkler. The second is a glass bulb sprinkler. Here, a glass bulb is filled with a liquid. A small air bubble expands when heated and bursts the glass bulb at the desired temperature rating. The bulb clears out of the way and the water can flow through the sprinkler.

Fire sprinklers are divided into categories based on their response time index (RTI), a laboratory-measured value that determines how long a fire sprinkler will take to operate under known conditions of hot air moving by the device. The RTI value allows the sprinkler to fall into one of three groups: standard response, special response or fast response.

Very few sprinklers are listed with a special response category. However, there are many models in standard response and fast response. RTI values above 80 (meter-seconds)<sup>½</sup> are classified as standard response. Those less than 50 (meter-seconds)<sup>½</sup> are considered fast response.

This article originally appeared in *Plumbing Engineer*, a TMB Publishing publication. For more articles like this, please visit [www.phcpros.com](http://www.phcpros.com).

Standard response sprinklers can include standard spray, extended coverage, control mode density area and control mode specific application sprinklers. Fast response sprinklers can consist of quick response spray, extended coverage, early suppression fast response and residential sprinklers.

Each sprinkler has a temperature rating for operation. These are coordinated into ranges that allow the user to select a model accommodating the maximum anticipated ceiling temperature in the space. These ranges allow for a sprinkler to activate quickly when a fire is present but not open unnecessarily in normal working conditions for the space.

Ordinary temperature sprinklers permit for ceiling temperatures up to 100 F. Intermediate temperature sprinklers allow for ceiling temperatures up to 150 F. These ranges continue to increase up to ceiling temperatures of 625 F. Not every model sprinkler is available in every temperature rating, but there are plenty of options to handle most situations.

### **Style considerations**

Next, we can look at style options for sprinklers. There are upright, pendent and sidewall sprinklers, which are named for their orientation of installation. An upright sprinkler is installed above the piping, a pendent sprinkler is connected below the piping and a sidewall sprinkler is mounted to the side of the piping.

Some applications may readily lend themselves to a particular style, such as spaces with drywall ceilings that would rarely use an upright sprinkler as the ceiling also can conceal the piping for aesthetics of the compartment when a pendent is selected. Other applications may be open to choice.

The deflector on each of the different orientations helps to disperse the water over the given area of coverage. When fire sprinklers were first developed, it was thought that a third to a half of the water coming from a sprinkler needed to be thrown to the ceiling to achieve appropriate cooling in the compartment. Now, this type of sprinkler is called an old-style sprinkler.

Through the study of water distribution and testing with different fuel loads, it has been demonstrated that as long as the sprinkler is close to the ceiling (usually considered within 12 inches (300 mm)), all the water can be thrown to the floor and the sprinkler can still control the fire.

In addition to the direction of the water, deflectors also impact the water droplet size as the stream of water from the pipe hits the deflector and breaks apart into droplets. More substantial water droplets can be beneficial in high-challenge fire applications, such as protecting storage. Big water droplets allow travel through the fire's rising hot gases to reach the fuel so it can be cooled and the fire controlled.

This article originally appeared in *Plumbing Engineer*, a TMB Publishing publication. For more articles like this, please visit [www.phcpros.com](http://www.phcpros.com).

The next variable to discuss with fire sprinklers is the K-factor. This is the measurement of the orifice size in the sprinkler. The K-factor is used to calculate the needed water for the specific sprinkler used. It is determined empirically in a laboratory as it is a relationship between flow and pressure for the particular device.

Nominal K-factor values start at 1.4 [gpm/(psi)<sup>1/2</sup>] and go up to 28.0 [gpm/(psi)<sup>1/2</sup>]. These nominal values are used in the hydraulic calculations for a fire sprinkler system. The larger the number, the more water that can pass through the outlet. Standards put some limitations on which K-factors can be used for different scenarios, but selecting the best K-factor for the job can help to make a cost-effective system by working with the available water supply.

Most sprinklers are rated to work with pressures inside the pipe up to 175 psi. If a situation presents itself where higher pressures are used within the pipe, then devices, including sprinklers, will need to be rated for higher pressures. High-pressure sprinklers are typically rated up to 300 psi and are readily available.

Existing systems also can be a challenge because many sprinklers may be suitable for a job, and if one has activated and needs replacement, the details of the original sprinkler need to be known. This has led to detailed requirements about maintaining a stock of spare sprinklers. Yet, what happens when there are no spare sprinklers at a specific building?

In 2001, the industry implemented sprinkler identification numbers (SIN). The goal behind the SIN is to have the means to identify the sprinkler and the pertinent characteristics. Those characteristics include K-factor, deflector characteristic (orientation), pressure rating and thermal sensitivity. Although many sprinklers were installed before 2001, the SIN system has helped to ensure that sprinklers are replaced, when needed, with a model that works with the original installation.

There are a variety of characteristics to consider when selecting a sprinkler for a specific project. The options allow the user to be able to choose which model is the best for the job. When you take all the possible variations on the characteristics of fire sprinklers discussed here, there are more than 1,000 combinations. Understanding the variables can assist in making the choice easier.

## References

- Isman, Kenneth E., "Layout, Detail and Calculation of Fire Sprinkler Systems, 2nd Edition," National Fire Sprinkler Association, Patterson, NY, 2010.
- Approval Standard for Automatic Sprinklers for Fire Protection, Class Number 2000. FM Approvals, Norwood, MA, 2018.
- NFPA 13 Standard for the Installation of Sprinkler Systems, 2019 Edition, National Fire Protection Association, Quincy, MA, 2018.
- UL199 Standard for Automatic Sprinklers for Fire-Protection Service, Underwriters Laboratories, Northbrook, IL, 2017.

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**Brian Crisp, CPD**  
**Vice President - Membership**

## Membership Report

Hello again Folks!

We have two new members this month. You know the drill, welcome them into the fold.

Rosa Flickinger – BKM

Chris Hayward – Victaulic

We currently sit at 112 members. Just a reminder, you can renew your membership before the month that it expires. The expiration date is based on when you joined, so don't be afraid to renew early and avoid the stress :)

If you or anyone you know is interested in joining, or at least hearing about the benefits of membership, please don't hesitate to reach out to me. You can also join directly at <https://www.aspe.org/join>.

Thanks, and see you at the meetings!

Brian Crisp, CPD  
Vice President, Membership

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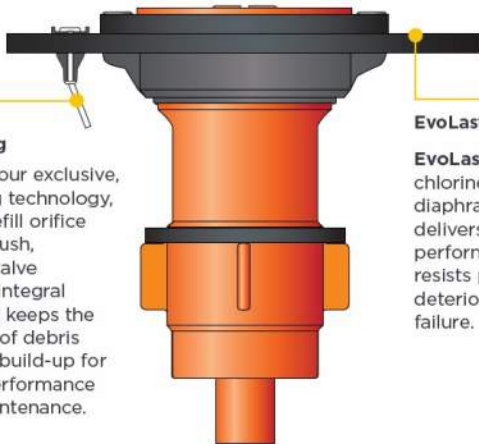
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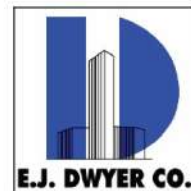


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**Christopher Imhof, PE, CPD**  
**Education Committee Chair**

**Domestic Water Distribution Pipe Sizing by Material**

By Chris Imhof, PE, CPD

During the 1950s, copper tubing replaced galvanized steel pipe as the material of choice for interior water distribution systems in the United States. Since then, other products and materials have sought to replace copper as the material of choice. Some of these products such as CPVC and PEX have proven to be competitive options. Other materials such as polybutylene(PB) piping have proved to be a failure. Due to leaks and failures, polybutylene water pipes are no longer accepted by standard building codes and have been the subject of class action lawsuits.

There are many attributes that can be examined when choosing between copper and plastic water piping,

- Lifespan of piping and fittings
- Ownership of system
- Cost of material
- Cost Installation
- Resistance to corrosion
- Lead-free properties
- Health concerns
- Allowable temperatures

It is important to understand that each material or product may have different dimensional properties and a variety of design and installation requirements. It is the designer’s responsibility to properly design a system based on the materials specified in the contract documents. The designer may not be responsible for the final decision on the pipe product. Product submittals, RFIs, and any value engineering should be carefully reviewed for deviation from documents. Ultimately, the flowrate and dimensions of the pipe determine the velocity and the manufacturer determines maximum allowable velocity.

The following table shows the dimensional properties between Copper Type L , CPVC, and PEX pipe,

Pipe Type	Nominal Pipe Size					
	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
	Inside Diameter					
Copper Type L (cold water)	0.527	0.745	0.995	1.245	1.481	1.959
CPVC	0.489	0.715	0.921	1.125	1.329	1.739
PEX	0.475	0.671	0.862	1.054	1.244	1.629

It is easy to see that when compared to nominal pipe size, Copper Type L piping has the largest inside diameter and PEX has the smallest.

Flowrate can be calculated using the following formula,

$$q = 2.449 * v * d^2$$

q = volume flow (gpm)

v = velocity (ft/s)

d = pipe inside diameter (inches)

The following table shows the flowrate based on maximum velocity allowed and inside pipe diameter,

Pipe Type	Maximum Velocity	Nominal Pipe Size					
		1/2"	3/4"	1"	1 1/4"	1 1/2"	2"
Copper Type L (cold water)	8 ft/s	5.4	10.9	19.4	30.4	43.0	75.2
CPVC	8 ft/s	4.7	10.0	16.6	24.8	34.6	59.2
PEX	12 ft/s	6.6	13.2	21.8	32.6	45.5	78.0

Although PEX piping has the smallest inside diameter, it has the highest flowrate due to higher maximum velocity. Even though CPVC piping has the same maximum velocity as Copper Type L, the smaller inside diameter results in a much lower maximum flowrate. It should be noted that Copper Type L has a suggested maximum flowrate of 8 ft/s for domestic cold water systems and 5 ft/s for domestic hot water systems.

The designer should consult with product literature and the recommended sizing criteria.

Notes:

Copper Type L piping was based on available literature from the Copper Development Association.

CPVC piping was based on available literature from the Charlotte Pipe.

PEX piping was based on available literature from Uponor USA.



**CHRISTOPHER IMHOF, PE, CPD**  
*Technical Standards  
 Engineering Manager  
 Regulatory Services Division*

**Office:** 301.206.8514  
**Cell:** 540.230.4664  
[christopher.imhof@wsscwater.com](mailto:christopher.imhof@wsscwater.com)

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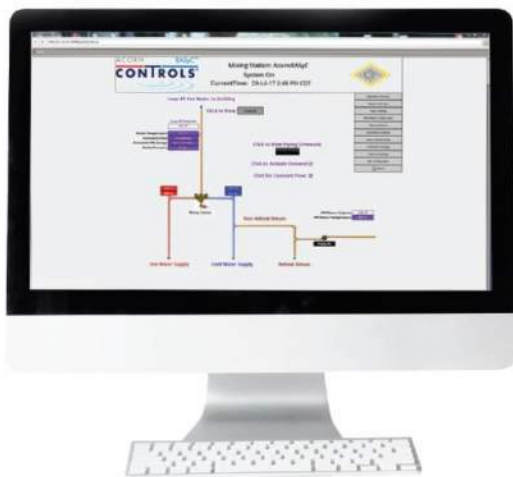
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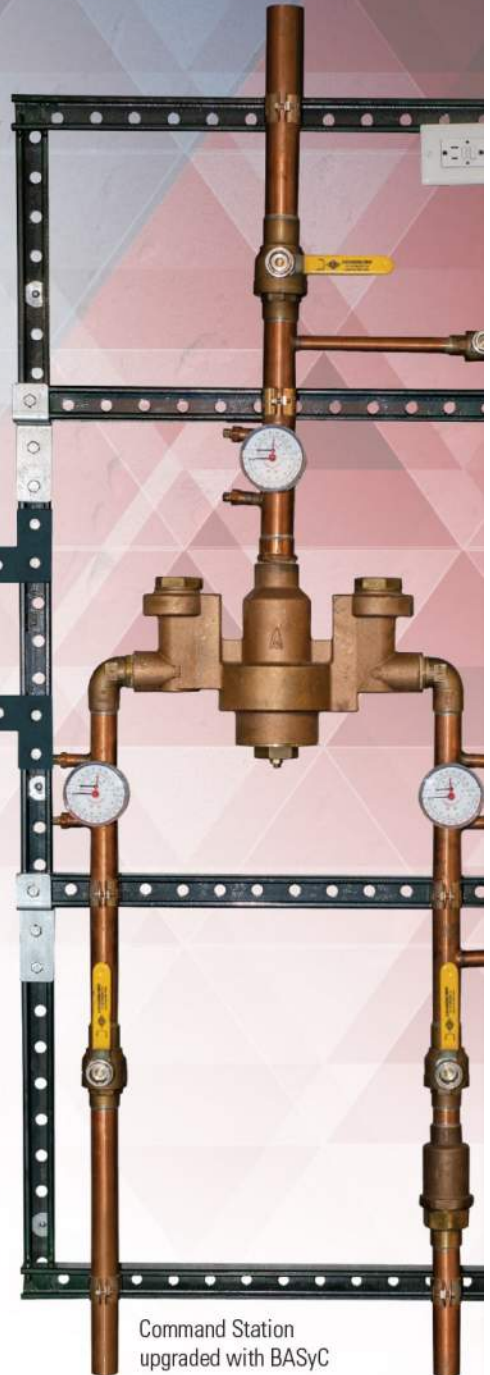
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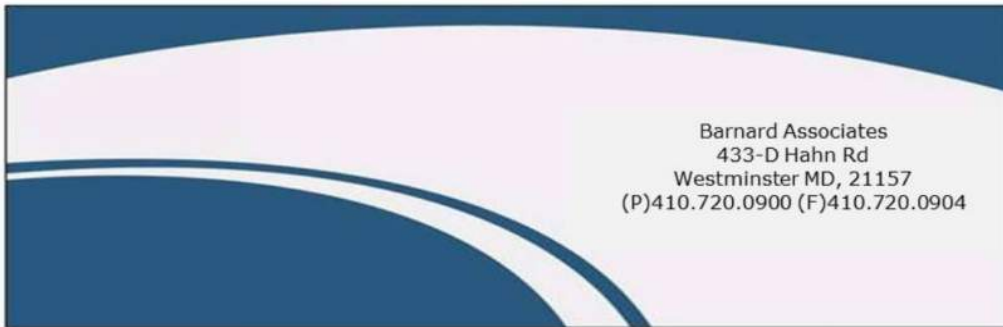
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# 2019-2020 ASPE Baltimore Chapter Meeting Schedule

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Date: **September 25, 2019**

Speaker: WSSC

Topic: Cross Contamination Control

Date: **October 23, 2019**

Speaker: Generac

Topic: Natural Gas Sizing for Emergency Generators

Date: **November 20, 2019**

Speaker: Viega

Topic: Opportunistic Pathogens 101

Date: **December 13, 2019**

Event: Holiday Party

Location: [Mustang Alley's](#)

Date: **January 22, 2020**

Speaker: McShane PC

Topic: Professional Ethics in Engineering

Date: **February 26, 2020**

Speaker: Professor Kenneth Isman—UMCP

Topic: Importance of Fire Protection Hydraulic Calcs

Date: **March 25, 2020**

Speaker: PVI

Topic: Water Heater Sizing, Construction, and Efficiency

Date: **April 22, 2020**

Speaker: Charlotte Pipe

Topic: Cast Iron Pipe

Date: **April 24, 2020**

Event: Golf Outing

Location: [The Timbers at Troy](#)

Date: **May 27, 2020**

Speaker: Watts

Topic: Automatic Control and Pressure Reducing Valves



## Monthly Sponsorship Opportunities

The Baltimore Chapter of ASPE continues to have successful meetings and is looking to continue improving throughout the year.

The Chapter has the following sponsorship opportunities for each month:

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