ASPE
American Society of Plumbing Engineers™
BALTIMORE

Monthly Newsletter — JANUARY 2022

Upcoming Meeting

VIRTUAL

Date: **January 26, 2022**

Time: **5:30PM**

Place: Virtual Link to be Provided

Topic: Arc-Flash Mitigation in Fire Pump Controllers

Speaker: Mark Smullen - STH

Meeting Format

VIRTUAL—Link will be provided

Please Register online at WWW.BALTIMOREASPE.COM

Attendance is free

MEETING LOCATION

January will be Virtual
We hope to return to Olive Grove in February

Please register at
WWW.BALTIMOREASPE.COM

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In This Issue

Local Chapters are not authorized to speak for the Society.
Newsletter questions please contact Jason Eagles

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- Ads for the year will begin in the September issue and run through the May issue.
- All ads must be paid in full prior to the advertisement being included in the newsletter.
- Advertiser must provide ads in high resolution PDF format. Logo must be provided in .jpeg format 200px wide max.

•Cost per advertisement size is as follows:

Size	Per Year
Full page	$750
½ page	$500
Bus. Card	$250

Please Contact Jason Eagles or Jeff Edwards

Make checks payable to Baltimore Chapter of ASPE. Please contact the chapter Treasurer with any questions.

Kathy Dwyer
EJ Dwyer Company Inc.
kdwyer@ejdwyer.com

DISCOVER ENGINEERS WEEK

CELEBRATE NATIONAL ENGINEERS WEEK

FEB 20-26 2022

the ENGINEERS CLUB & Engineers Week Council invite you to Engineers Week

Since 1951, National Engineers Week has helped to increase public awareness and appreciation of the engineering profession and to celebrate the accomplishments of engineers. Join us at the Engineers Club and the Baltimore Museum of Industry for the many activities celebrating National Engineers Week and the Maryland Engineering Challenges.

MARKING the 71st Anniversary of NATIONAL ENGINEERS WEEK

Meet Maryland's most prominent engineers & technology educators at these activities.

National Engineers Week was founded in 1951 by The National Society of Professional Engineers and is celebrated annually at the time of George Washington's Birthday. Our first president was a military engineer and a land surveyor. Like our first president, today's engineers are problem solvers. They design, develop and oversee the design, manufacture and construction of products, machines and structures. Engineers Week is a time to recognize the contributions engineers have made to our way of life and to encourage students to pursue engineering careers to perpetuate advancements for future generations.

The Engineers Club and its affiliated Associate Societies encourage everyone to come out and support these activities at The Garrett-Jacobs Mansion, 11 West Mount Vernon Place and The Baltimore Museum of Industry, 1415 Key Highway.

For more information call 410-539-6914 or log on to www.esb.org. For information on other challenges in the Maryland Engineering Challenges Series, visit the Baltimore Museum of Industry website at www.thebmi.org, and click the Programs link.

Happy 71st NATIONAL ENGINEERS WEEK!

Engineers Week Activities

Friday	February 18th	ASPE Program - Plumbing System Design & Public Health
	10 am to 1:30 pm	A Program & Luncheon for High School Students & Advisors to learn about the how plumbing protects public health and the different professions that work within the plumbing business. There will be opportunities to meet and talk with engineers, sales representatives, architects, and plumbers.
Tuesday	February 22nd	ASHRAE Program – Green Building Technology
	10 am to 1:30 pm	A Program & Luncheon for High School Students & Advisors to meet with engineers, discuss career opportunities & complete a design challenge using Green Buiding Technology.
Wednesday	February 23rd	Consider a Career in Engineering – A Program & Luncheon
	10 am to 1:30 pm	For Middle & High School Students & Advisors to introduce them to the different branches of civil engineering & show them how a team of engineers interacts to design and construct a project. Presented by the ACEC/MD, MDOT SHA & the Maryland Quality Initiative (MdQI) Industry Outreach Subcommittee https://students.mdqi.org
Thursday	February 24th	WTS - Introduce a Girl to Engineering – A National Event Program & Luncheon
	10 am to 1:30 pm	A Program and Luncheon for High School Girls & Advisors to introduce them to the field of civil engineering, provide an opportunity to hear from successful women who have made a career in the transportation industry and to practice what they have learned via several fun hands on activities. Presented by the Women's Transportation Seminar (WTS) Baltimore Chapter
Friday	February 25th	MDOT - Technology in Transportation - A Program & Luncheon
	10 am to 1:30 pm	A Program & Luncheon for introducing Middle School Students to the steps the Maryland Department of Transportation (MDOT) takes to plan, design, construct and maintain roads/bridges using various modules of interactive technology. Presented by MDOT
Friday	February 25th	MITAGS & Sail Baltimore – Introduction to Maritime Training and Simulation- A Program & Luncheon
	11 am to 2 pm	Hosted at MITAGS (692 Maritime Blvd. Linthicum Heights, MD 21090) A Program & Luncheon for introducing Middle & High School Students to the maritime industry and the significant role it plays in much of everyday life. Many of the products we use or consume on a daily basis are shipped to local stores from overseas. Maritime workers make this possible. Students will hear from current and former ship captains and local pilots, as well as participate in fun hands-on activities like knot tying and compass navigation. In addition, they will have an immersive experience on one of MITAGS full-mission ship simulators (the largest in North America). Presented by MITAGS (Maritime Institute of Technology and Graduate Studies) & Sail Baltimore

ALL OF THE ABOVE ACTIVITIES ARE AT THE ENGINEERS CLUB UNLESS OTHERWISE NOTED
FOR MORE INFORMATION, CONTACT LEANNE HARRIS AT LHARRIS@JMT.COM
PLEASE NOTE: WE WILL FOLLOW ALL CDC AND BALTIMORE CITY COVID-19 REQUIREMENTS

CELEBRATE ENGINEERING

Jan-April 2022

Maryland Engineering Challenges at the Baltimore Museum of Industry

For more information contact Jessica Celmer by email: jcelmer@bmi.org, or visit www.thebmi.org and click the Programs & Events tab.

Baltimore Museum of Industry

Engineering Challenge	Dates in 2020	Individual Event Sponsors
Coaches Information Sessions at Baltimore Museum of Industry:		Wednesday, 11/13/19 from 4 pm to 7 pm. Robot Coaches Hands-On Workshop 11/13/19 from 4 pm to 7 pm and Saturday, 1/25/20 from 10 am to 2 pm
Future City	January 18th	Sponsored by the MD Society of Professional Engineers, American Society of Civil Engineers, American Society of Highway Engineers & Society of American Military Engineers
Wood Bridge	January 18th	Co-sponsored by the MDSPE & ASCE
Straw Bridge	January 18th	American Society of Mechanical Engineers, Baltimore Section
Paper Airplane	February 22nd	American Institute of Aeronautics & Astronautics, Mid-Atlantic Section
Safe Racer	February 22nd	Whitney, Bailey, Cox & Magnani, Wallace Montgomery Employee Team
Hovercraft	April 26th	American Institute of Chemical Engineers, MD Section
Robot	April 26th	Institute of Electronic & Electrical Engineers
Cargo Ship	April 26th	Technology & Engineering Educators Association of Maryland

Be Creative DISCOV- Celebrate
TRAVEL EX- CHANGE THE
COLLABO- Solve Problems
Make a Difference COMMUNI-

Happy 71st NATIONAL ENGINEERS WEEK!

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BALTIMORE

Chuck Swope, PE, CPD, LEED AP BD+C
Vice President—Technical

Technical Report

Happy New Year! I hope that all of your resolutions are kept and successes be plentiful. We closed out the year with a bang with our technical session pressure reducing and control valves. Who knew there were so many ways of controlling a control valve; using a float surprised me. We thank Matt Morris and the Joyce Agency for bringing Nick Azmo and his expertise to us.

This month we bring good and bad news with us, depending on how you view it. Our January technical meeting will be presented virtually for your education. Bad news for those that enjoy the company we bring each month, but good news for those that don't like wearing pants! We hope that you can forgive our momentary return to the virtual setting. We intend to return to in-person meetings, governor and county health boards willing. This month, STH is kind enough to bring us a multi-disciplinary topic of Arc-Flash Mitigation in fire pump controllers. You may think to yourself, "Self, how does this pertain to me?" Well, Self, it affects us all from the electrical design, specification of our controllers, and layouts of our fire pump rooms. Please join us and invite those that you think may benefit.

Changes published in the 2022 Version of NFPA 20 include important new requirements for Arc-Flash Mitigation in fire pump controllers. We will look at how these changes for arc flash protection will greatly improve the safety of personnel working on fire pump controllers. NFPA 70E, annex K, states that approximately 30,000 shock accidents occur each year and 2000 people are admitted to hospitals every year due to arc flash burns. Arc flash temperatures can reach 35,000 degrees which cause instant burns and ignition of clothing. Arc blast explosive expansion of surrounding air and metal in the arc can create sound levels over 160 dB and expel molten metal fast enough to penetrate the human body.

This presentation was prepared by Bill Stelter of Master Control Systems and will be presented by Mark Smullen from STH, Inc. Bill sits on the NFPA 20 Technical Committee on Fire Pumps and played a large role in the content of this code section. Bill is a pioneer in the application of VFD's for fire pump controllers and was the first to use the technology in his controllers. He holds several patents related to fire pump controllers and his product improvements have driven the industry to provide better fire pump controllers

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

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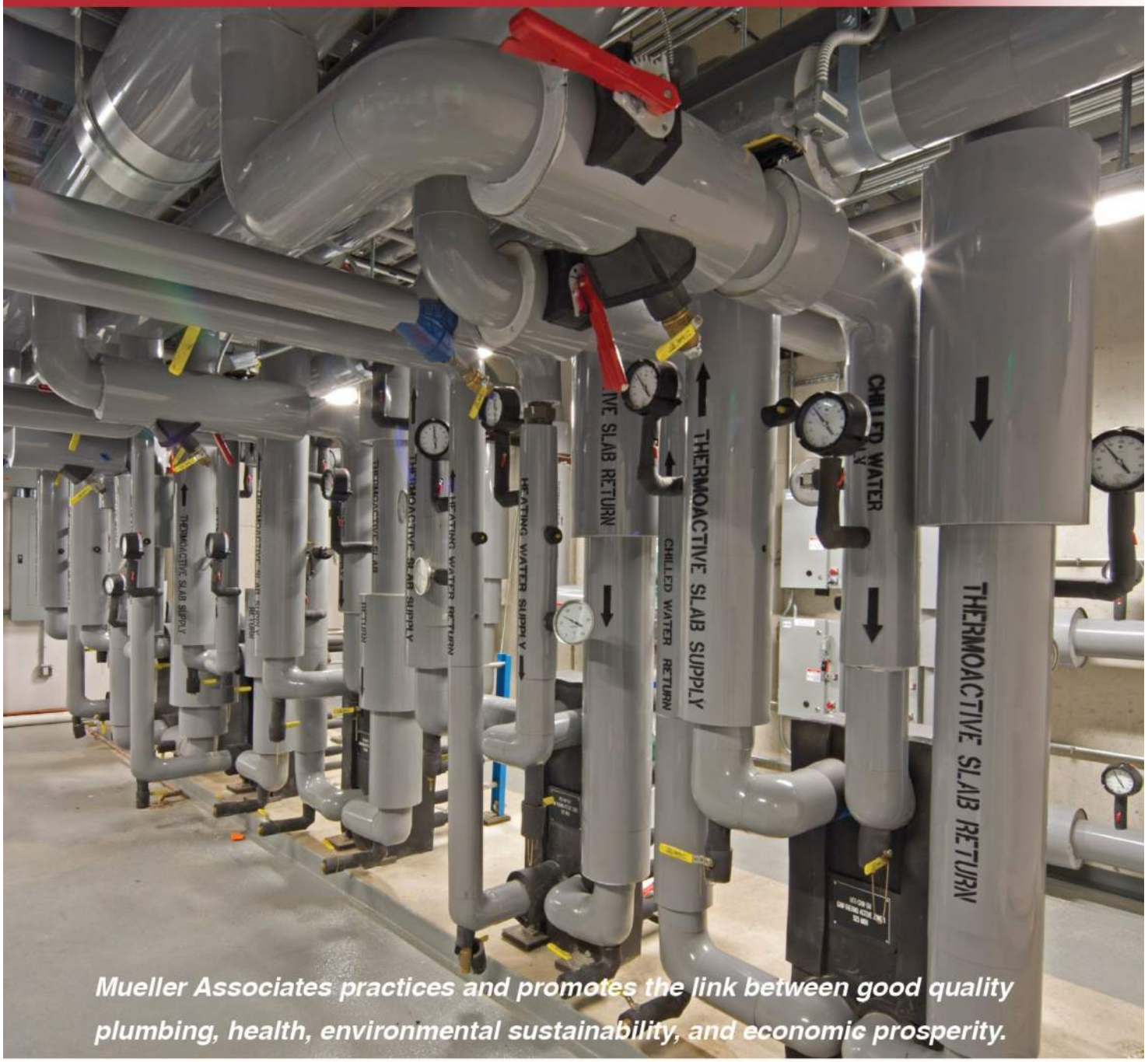

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ENGINEERING GREAT EXPERIENCES

ASPE Design Guide Volume 4 Chapter 4

"The goal of the designer should be for the system to operate with as little energy as possible for a given demand."

"At no time is a booster at 100 percent flow based on Hunter's diversity curves"

"When selecting the total flow capacity, one preferred way to evaluate the operational efficiency is to use a method that can be scientifically proven, such as the 70 percent method."

"Tanks will typically be required when the manufacturer does not utilize low flow testing algorithms to detect low flow"

"New energy standards concede that reducing the speed of a pump during most of its operational time and restarting for makeup loads is more efficient than using tanks as "water storage batteries" during low-flow conditions."

** The above is taken from American Society of Plumbing Engineers design guide volume 4 chapter 4**

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Is a fire pump necessary in your facility?

When faced with an apparently marginal water supply, a consulting engineer may be inclined to figure conservatively and employ a fire pump.

May 18, 2018

Todd E. Smith

Marginal water supplies present a particular challenge when consulting engineers performance-specify. Building, renovating or retrofitting with a fire pump requires the first cost of the pump, the pressure maintenance pump, controllers and a reliable or alternate source of electric power, diesel drive or steam drive.

Owning a fire pump also requires the cost of regular inspection, testing and maintenance (ITM). Therefore, the best time to find out whether a fire pump is necessary is early on in the design stage. The first costs of pumps and power need to be captured in the construction budget, the architect needs to provide a fire-rated pump room large enough to house pumps and controllers, and the owner needs to plan the cost of ITM into their operating budget.

Capturing the costs associated with a fire pump, if required, is imperative during design. Not capturing the costs associated with a fire pump, if one is not required, is equally important. Careful consideration of fire water supply and demand is necessary as early as possible during the design. When faced with an apparently marginal water supply, a consulting engineer may be inclined to figure conservatively and employ a fire pump. Because of budgetary ramifications, this type of conservative decision could ruin a client relationship if the builder's calculations show during construction the pump was not necessary.

Understanding supply

In order to properly apply pumping to water-based fire suppression, recognizing the fire water supply is beyond the consulting engineer's control, improve margin

by minimizing pressure losses in the fire suppression system itself. Margin is the surplus water pressure when you subtract the demand pressure from the supply pressure at a particular operating point. Both pressures are normalized to a common location known as the base of riser (BOR) and compared graphically. Now consider both supply and demand pressures vary with flow and you may realize it is necessary to understand how much water flows to a design fire in order to identify the margin.

Flow is dependent upon how many fire sprinklers operate, where they are located relative to the BOR and the required hose stream. Vast collections of empirical data by reputable sources indicate the high majority of all fires are controlled with significantly fewer fire-sprinkler heads than are required to be in a minimum design area as defined in NFPA 13, FM Global (FM) or the Unified Facilities Criteria (UFC). This means compliance with a design standard requires a conservative demand flow compared to the actual flow likely to control a fire in the design area assuming the protected hazard has been properly identified.

A calculated design margin of zero would provide a positive margin if less than the quantity of fire-sprinkler heads in a given design area activate. Some standards dictate a minimum requirement for margin, but NFPA 13 does not. We are able to influence fire water demand flow through intentional application of the applicable design standard. NFPA 13 gives engineers and designers more latitude than FM and UFC standards.

A clear understanding of supply begins with a recent fire hydrant flow test in the vicinity of the project. Testing should be performed in accordance with NFPA 291 or a similar guideline. The difference between static and residual pressures needs to show a discernable pressure loss. Question the testing agency if fire hydrant test results are not clear. It is imperative that no assumptions are made about test results associated with the water supply. Fire hydrant flow tests provide a snapshot in time of fire water supply performance. It is necessary to have a high degree of confidence the results are repeatable because the above-ground fire-suppression design depends on this data.

Minimizing demand flow

Let's consider ways to minimize pressure losses in a fire-suppression system in order to improve margin. Finding the minimum allowed demand flow to the hydraulically-remote area is the first order of business. Remember that physically remote is not necessarily hydraulically remote and several sets of hydraulic calculations may be necessary to approximate the design area with the highest demand.

Keep building height as short as possible. Building height is the single-largest consumer of available pressure and will almost certainly not be a consideration for the architect. If the building program requires a multistory building, you may be forced into a fire pump by height alone. If the project is just tall enough for the water supply to be considered marginal, can an attic level be avoided? Can an attic be made inaccessible and non-combustible in order to avoid sprinklering?

If the prevailing design standard allows, look for opportunities to omit fire sprinklers or apply a design-area reduction. It is crucial to understand all unique design requirements you are bound to by the design standard you are working with. Insurers and federal agencies often have requirements that actually increase water demand far beyond common NFPA 13 requirements.

Minimizing demand pressure

Once you are confident you have approximated the minimum design flow, it is time to look at minimizing friction losses. Increasing pipe diameter is one way to reduce friction losses. Another is employing a looped main or gridded system that gives water multiple pathways to reach a design fire. Sometimes this can be done without an increase in pipe size. If an isolated area in a facility has a significantly higher design density, such as the acetylene torch cutting area in the middle of a welding lab, consider routing the fire main directly toward the high-demand area from the riser first.

Of course, larger pipes and multiple pipes mean higher material and labor costs. It is important for the consulting engineer to develop the system far enough to have an understanding of size and route of fire-sprinkler risers and mains. Enough information must be conveyed on the drawings to ensure the builder can infer the design intent that was used to realize the anticipated friction losses. Early attempts at hydraulic design may have the builder asking for a fire pump. The ensuing conversation needs to be based in defensible design logic in order to bring resolution.

Underground piping between the utility tie-in and the building provides similar opportunities to reduce flow and pressure losses. It is vitally important to understand the configuration and sizes of the utility infrastructure in order to have a degree of confidence that the fire-flow test results are repeatable.

Backflow prevention is a requirement of the plumbing code to protect water supplies from cross-contamination. Many municipalities require outdoor backflow prevention near the tie-in. If your building is far enough from the existing underground water main to require adding a fire hydrant, be cautious about

designing private fire hydrants on the building main downstream of the backflow preventer. Tie fire hydrants in upstream of the backflow preventer or tie into a different location on the city main. Additional friction loss through a backflow preventer due to hose stream will be substantial.

What is an acceptable margin? If working with NFPA 13, there is latitude for professional judgement. When deciding, it is necessary to consider aging of pipe over the anticipated lifespan, as well as the likelihood for future expansion or a change in the building program. Some design standards dictate as much as 10 psi or 10%. It is important to vet the question through the authority having jurisdiction during design in order to avoid surprising them with narrow margins during construction. It is much easier to debate the rationale for or against a fire pump with an AHJ during design. Margins in the low single digits are hydraulically viable but may be a difficult sell.

If through this process you have determined there is no way to achieve the required minimum margin without a fire pump, this method also will minimize the size of the fire pump. There is no green incentive for being conservative with fire-pump sizing and being too conservative has a higher first cost. If a standpipe system or combined system is required in your facility, consider employing a manual wet standpipe to separate standpipe demand from the fire-sprinkler system. This will greatly reduce the capacity of your pump and power sources.

Performance-based design of fire suppression requires far more effort than simply denoting an area of coverage on plan-view drawings and applying rule of thumb. Identify or choose a minimum margin you can confidently defend. Know the prevailing design standard inside and out. Apply it as required but take advantage of allowed exceptions. And finally, convey a clear plan for the builder to start with.

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Nikita Patel, EIT, MBA
AYP Liaison

AYP Report

Hello and Happy New Year!

Region 1 AYP begins the monthly virtual seminar series next week with a presentation on Water Heater Technology presented by Watts Water Technologies. This seminar is open only to those who are 35 and younger, so please forward this to anyone in your office or contacts that might benefit. It is eligible for CEU credits. Please use the link on the next page to register or click here.

Thanks,

Niki

ASPE YOUNG PROFESSIONALS

19 JAN | 12 PM

Guest Speaker:
Ryan Brown

Hosted By:
Richmond Chapter
Zoom Meeting

HEAT PUMP WATER HEATER TECHNOLOGY

Attendance is FREE for Region 1 Young Professionals

CLICK HERE TO REGISTER

What's Old Is New Again:

THE ENVIRONMENTAL & OPERATIONAL BENEFITS OF R744 HEAT PUMP WATER HEATERS

Ryan entered the HVAC/P industry almost 10 years ago as an outside sales engineer in the Las Vegas, NV market. Since joining Watts Water Technologies in 2016 he has remained focused on applied heating and hot water solutions and entered his current role in 2020 prior to the announcement of the Lync by Watts brand. Prior to entering the industry, Ryan served 10 years in the United States Army as a Special Forces team member and human intelligence network manager.

As electrification and decarbonization initiatives continue to grow throughout North America, there is increased scrutiny on the refrigerants being used. Heat pump water heaters powered by R744, better known as CO2, provide a way to address ever evolving energy savings and low-GWP requirements. This session will explore low-GWP CO2 refrigerants that can provide high performance under a wide range of operating conditions. This rapidly growing product category offers many unique benefits. This session will examine the factors driving the adoption of R744-powered heat pumps, the keys to a transcritical refrigeration cycle, options for maximizing performance, strategies for applying this technology, and opportunities to integrate them with other ecofriendly water heating systems

REGION 1 ASPE YOUNG PROFESSIONAL LIAISONS

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Karen Schulte, PE, CPD, LEED AP BD+C
WOA Liaison

WOA Report

Welcome to 2022! We hope the beginning of the new year finds all our members healthy and happy. As we continue to monitor the pandemic and be vigilant about keeping each other healthy we hope that later in the year we will be able to gather safely in person for a Women of ASPE event. Until then though we are working on planning a virtual event to at least see our smiling faces through our beloved Zoom-lens!

Best Regards,
Karen Schulte, PE, CPD, LEED AP BD+C

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Christopher Imhof, PE, CPD
Education Committee Chair

Legislative and Education Reports

Legislative

In May 2021, Governor Hogan signed Senate Bill 503 into law. The bill, also known as the Flower Branch Act, is in response to an explosion at the Flower Branch Apartments in Silver Spring that occurred on August 10, 2016. The NTSB ruled that the explosion occurred due to a failed indoor mercury service regulator that was not connected to a vent and thus allowed natural gas to build up in the basement of one of the apartment buildings. The new law requires the following,

> Requiring any gas service newly installed at an occupied structure may have a gas service regulator installed only outside the structure; requiring an existing interior gas service regulator in a multifamily residential structure to be relocated outside whenever a gas service line or regulator is replaced; requiring a gas company, on or before January 1, 2022, to file a plan with the Public Service Commission to relocate any gas service regulator that provides service to a multifamily residential structure; etc.

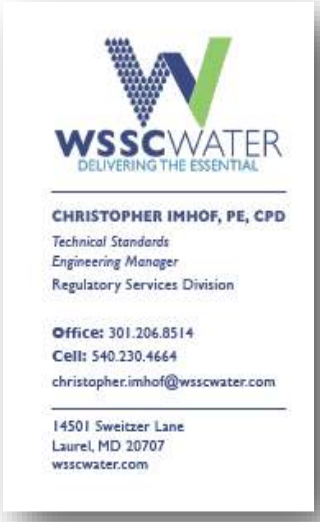
The full text can be found at following link,

https://mgaleg.maryland.gov/2021RS/Chapters_noln/CH_264_sb0503t.pdf

Education

The Chapter is currently working to organize our 2022 Engineers Week Event. This will be the 4th year the Chapter has hosted an event for Engineers Week. This year's event is planned for Friday, February 18th at the Engineers Club of Baltimore. If you're interested in volunteering, please email me at christopher.imhof@wsscwater.com

Chris Imhof, PE, CPD
Vice President – Legislative
Education Chair



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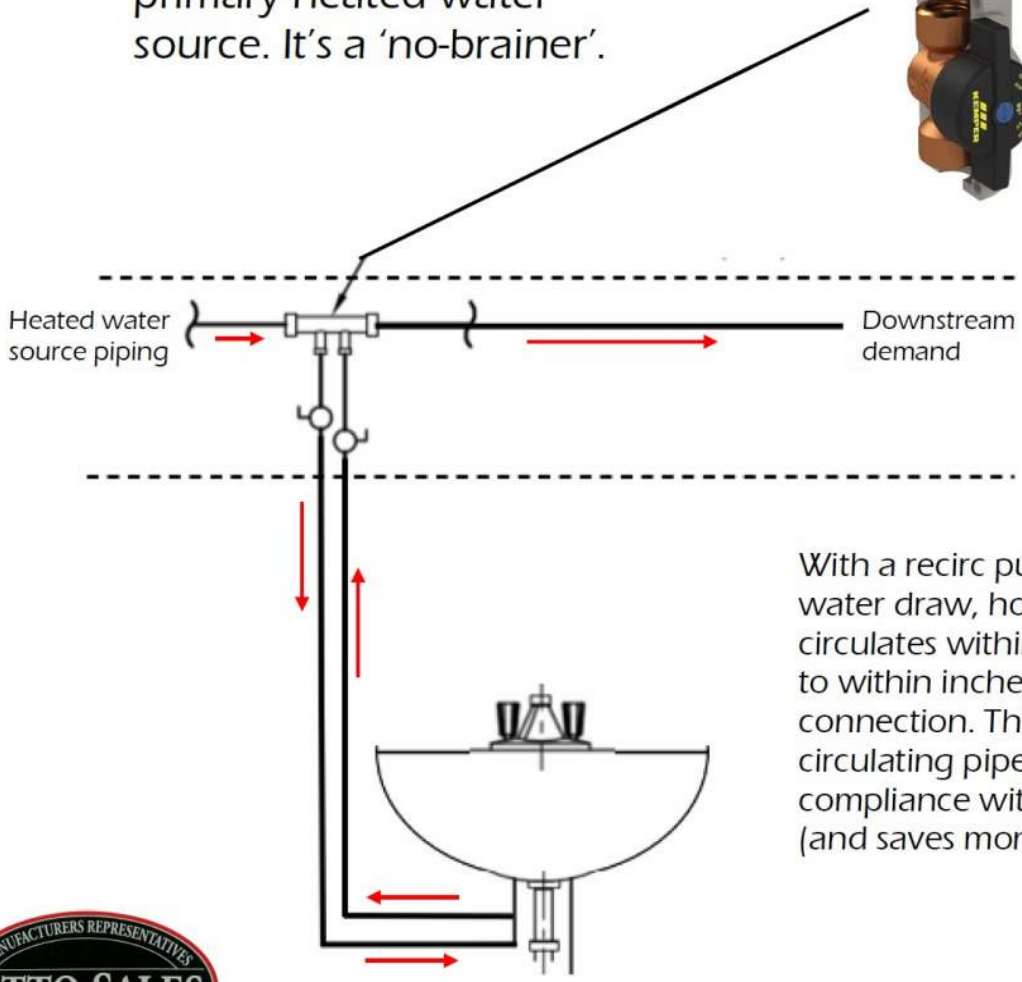
Flow-Splitter
Figure 651 06 XXX



With a recirc pump or downstream water draw, hot water automatically circulates within the connected loop to within inches of the fixture connection. This minimizes non-circulating pipe lengths for compliance with the energy code (and saves money).

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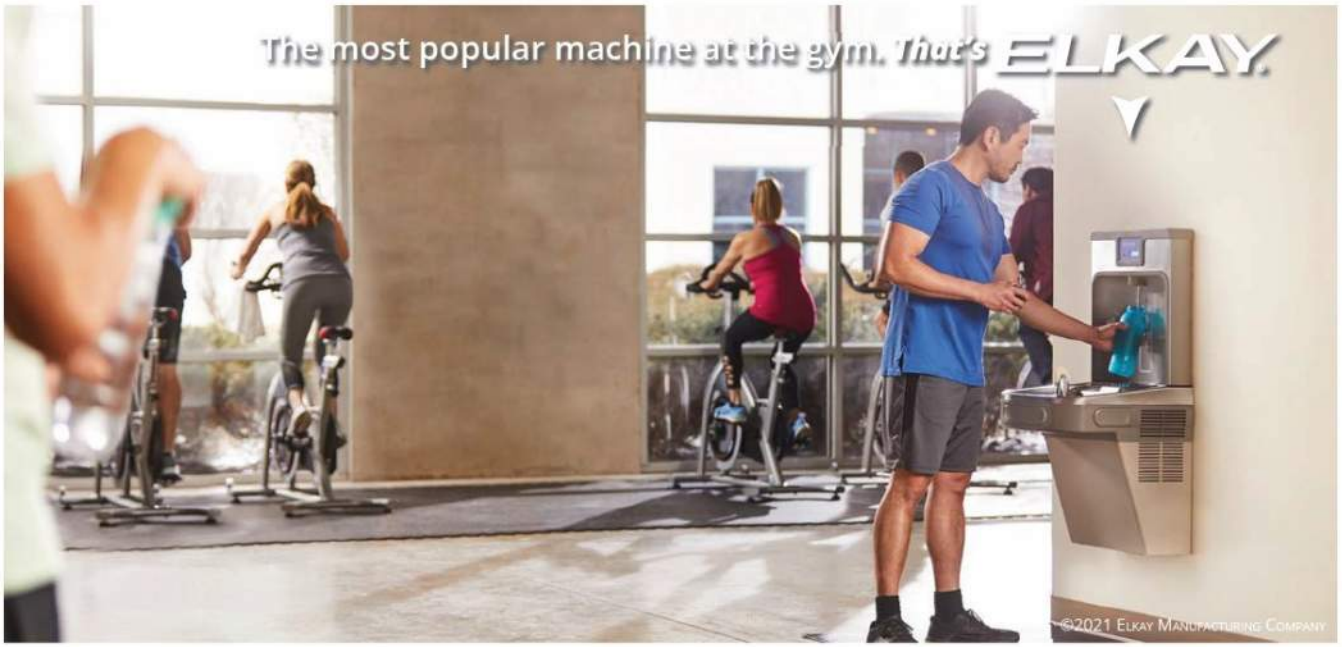

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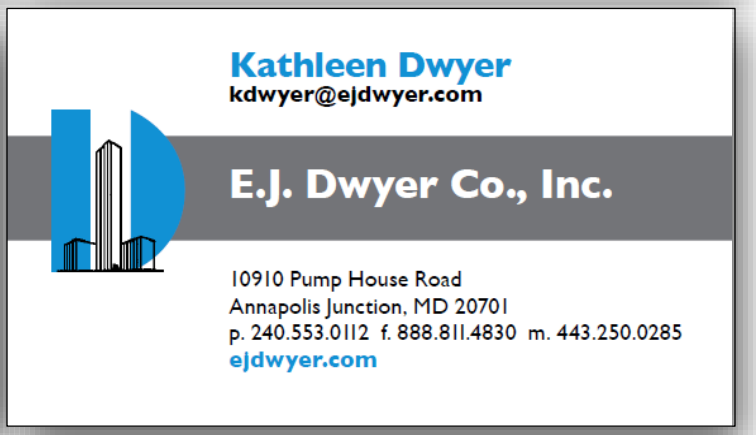

2021-2022 ASPE Baltimore Chapter Meeting Schedule

Date: **September 22nd, 2021**
Speaker: Bay Associates
Topic: Heat Pump Water Heater Technology

Date: **October 27th, 2021**
Speaker: Highland Tank
Topic: Oil/Water Separators

Date: **November 17th, 2021**
Speaker: Ames
Topic: Direct Inline Pumping Systems for Sanitary and Storm

Date: **December 15th, 2021**
Speaker: Joyce Agency
Topic: Pressure Reducing Valves

Date: **January 26th 2022**
Speaker: STH
Topic: Fire Pumps

Date: **February 20-26th, 2022**
Engineer's Week

Date: **February 23rd, 2022**
Speaker: Prof. Ken Isman
Topic: ESFR and Cloud Ceilings

Date: **March 23rd, 2022**
Speaker: Otto Sales
Topic: Wastewater Systems

Date: **April TBD, 2022**
Event: Annual Golf Outing

Date: **April 27th, 2022**
Speaker: Charlotte Pipe
Topic: Hands-on Starter Fittings

Date: **May 25th, 2022**
Speaker: EJ Dwyer
Topic: Emergency Fixtures

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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:

Tabletop Presentations: $100 to provide a tabletop presentation of equipment or material relative to the plumbing profession. The tabletops will be set up from the beginning to the end of the monthly meeting and provides the opportunity to provide a brief (under 5 minutes) presentation.

Please make checks payable to the Baltimore Chapter of ASPE.
Contact Jeff Edwards or Kathy Dwyer if interested
jedwards@muellerassoc.com
kdwyer@ejdwyer.com

NOTE: ONLY APPLICABLE WHEN WE RETURN TO OUR REGULAR IN PERSON MEETING EVENTS