



UPCOMING MEETING

October 28th 5:30pm-7:00pm

VIRTUAL MEETING

*TOPIC: Booster Pumps-
Application and Sizing
Speaker: Ed Ross - QuantumFlo*

*REGISTRATION AVAILABLE AT:
<https://baltimoreaspe.com/>*

A link to the meeting log-in will be sent to all registrants on Monday October 26th and again the morning of October 28th.

*Meeting will be free to members
of all ASPE chapters.
Non-member fee is \$20*

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Please Contact [Jason Eagles](#) or [Jeff Edwards](#)

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

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

President’s Report

For the last week or so, the temperatures outside have been cooling down which I am a big fan of, especially when playing golf, sitting outside next to a fire pit or even mowing grass. But please note, I hate cold weather 😊

Our September virtual meeting from Niki Patel of Sherman Engineering was very good. I believe there were approximately 30 attendees. This month’s meeting will be presented from Otto Sales/QuantumFlo on booster pump packages.

Our virtual meetings will be providing CEU’s if you attend the meetings. If you are looking for additional CEU’s, please know all our chapter sponsors offer many types of product video’s that earn you CEU’s. Please don’t hesitate to reach out to them if needed.

Please stay safe and hopefully we are close to getting back to what we use to call normal, if that is even possible anymore.

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

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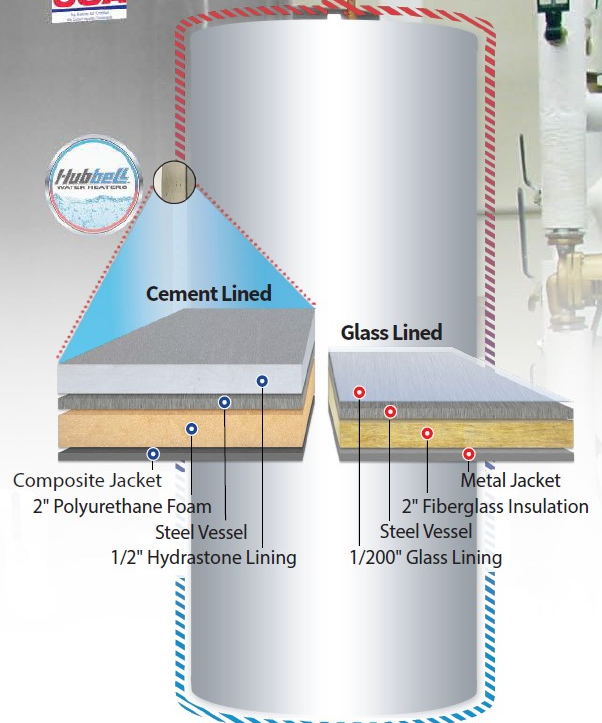
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Nikita Patel, EIT, MBA
AYP Liaison



AYP Report



AYP Baltimore has chosen to follow WOA's example and will be holding a joint activity with AYP Philly, DC and Virginia (Blue Ridge and Richmond). Prepare for your mind to be blown on Thursday, November 19, 5:30-6:30PM!

Join us for an experience like no other. Keelan Leyser, World Renowned Digital Illusionist, will provide us with a fully interactive, virtual digital magic and mind reading show that happens right through your screen. Keelan Leyser has been on over 100 television shows, performed in over 60 countries, and he was voted the British Magic Champion by his peers in the UK. Keelan has hundreds of thousands of followers across social media and his videos have racked up millions of views. Join us for a one of a kind close up interactive experience you won't forget!

This event will be capped at 30 participants and a registration link will follow soon. Special thank you to Jeff for agreeing to sponsor this event for the Mid-Atlantic AYPs!

Thanks, Niki

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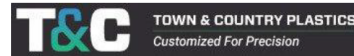
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WSSC Plumbing/Gas Plans Review Submittal Overview

Earlier / Timelier / 2020 Process Improvements – Non-Residential Projects

Executive Summary

WSSC has made changes to facilitate earlier/timelier reviews of plumbing/gas plans for commercial projects (that require a review in conjunction with a plumbing/gas permit issuance).

WSSC is now set-up to review plans *concurrently* with the building design review and other trade reviews performed by Prince George’s and Montgomery Counties, as well as the City of Laurel.

The design team, more specifically the mechanical engineer, can submit directly to WSSC. This will allow the Plans Review to commence and progress all the way through to approval. The corresponding permit will not be invoiced and issued until a registered Master Plumber / Gasfitter is added to the permit and all required design/permit requirements are met.

WSSC will also accept plumbing plans ahead of water and/or sewer service connection and may allow for a “Ground Works Only” submittal in conjunction with a County issued ‘foundation only’ permit.

WSSC will not approve a full plumbing permit and the corresponding plans until the water and/or sewer service connections have been approved.

Background / Misconceptions / Entrenched Cultural Practices

Prior to 2018, only a Master Plumber/Gasfitter was allowed to submit for plumbing permit and plan review. As a sub-trade, the plumber is typically one of the last to be awarded; however, the plumber needs to be one of the first on the job and first to sink a shovel in the ground.

WSSC has never required that a building permit be issued prior to submitting for WSSC plumbing permit and plan review.

Changes in Plumbing/Gas Plans Review

WSSC approved Code Change in July 2018 to facilitate earlier plan submittals:

Engineer’s Submittal – Architect or Mechanical Engineer should submit *concurrently* with the building design review and other trade reviews.

Ahead of Plumber – in conjunction with the first bullet, WSSC will review the design plans and the permit application. The plans may progress to final approval, whereas the permit application will be held until the plumber is added and all design/permit requirements are met; then invoiced.

Ahead of Connections – when either or both of the civil designs for public water/sewer system (System Extension Permit {SEP}) and/or private water/sewer system (Site Utility {SU}) are not complete/ approved but the building construction has commenced, WSSC will begin the review. If the review progresses to the approval step and the civil design is still incomplete, WSSC will consider a “Ground Works Only” permit for certain projects.

Groundwork Only – For certain large-scale projects where the complete design is behind schedule, but the construction schedule calls for installation of the building’s foundation and the plumbing system’s “ground works,” WSSC may issue a “Ground Works Only” permit. WSSC will assess the status of the complete design and insist on reviewing the entire project where applicable.

The Applicant shall make one of the following declarations in the comments section of the Permit application:

Architect/Engineer submitting “Ahead of Plumber”

Architect/Engineer submitting “Ahead of Connections and Plumber”

Architect/Engineer submitting “Ahead of Plumber” and for “Ground Works Only”

Architect/Engineer submitting “Ahead of Connections and Plumber” and for “Ground Works Only”

Plumber submitting “Ahead of Connections”

Plumber submitting “Ahead of Connections” and for “Ground Works Only”

Rejection Prescreen and Disapproved Review Fees – July 2019

Rejection Prescreen Fee – applicable for first/any submittal not meeting minimum requirements/ checklist (Floor plans, riser schematics, fixture/equip. schedule)

Disapproved Review Fee – applicable after 3 disapproved reviews, due on fourth submittal.

All electronic submittals – Sept 2019

Outreach Efforts to Date

MBIA, WSMAPA, ASPE (Baltimore and DC Chapters)

Five Announcements

3 – Newsletters (Spring 2018, Fall 2018, Spring 2019)

1 – Announcement - July 2019

1 – Reminder – Late August 2019

Word of mouth, repeating customers, folks in a time jamb, etc.

Identified Areas of Improvement

Roll-out – an “Informational Flyer”

Discuss and Gain Buy-In – Internally

Discuss and Gain Buy-In – Counties (incl. City of Laurel)

Continual Outreach by *All* to development community

Fine Tune WSSC responses and interactions (e.g. Permit app ahead of connection; contact applicant (via phone or email) asking question: “did you submit early seeking to get a jump start on plan review”

FAQ’s



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

Technical Report

For those of you that didn't know, the September meeting was our inaugural live virtual meeting. Our chapter and Region 1 AYP Liaison Niki Patel put on a great show for us and I'd say it was a rousing success! Niki discussed the ins and outs of NFPA 99, how it came to be, and how it applies today. I'd personally like to thank her for facilitating the meeting (and for being our test run). Her presentation showcased how important cross-connection control, gas storage requirements, and performance testing is to life safety in healthcare.

This month's technical presentation comes from Ed Ross from QuantumFlo and his topic for us will be on Booster Pumps Application and Sizing. He'll be discussing the proper applications of different pump types and how to use fixture types and quantities to determine the demand for the building. Ed has over 30 years of sales experience in the Plumbing/HVAC industry including, domestic water pressure booster pumps, fire pump and start up experience, water heater and boiler, and waste water pumps. Ed has been a member of ASPE since 1998 and member of ASPE / National Level, Affiliate Sponsor of ASPE via QuantumFlo, Inc. He was also the Former Liaison Affiliate Officer for Johnstown, PA ASPE Chapter Board, just down the road from where I grew up! Please welcome Ed and I'm sure that this session will be as successful as the last.

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



The 70% Method Finally Comes to the Plumbing Design Handbook

I was recently given the honor of contributing to the next update of the 2014/2015 Plumbing Engineering Design Handbook, Volume 2 Plumbing Systems, specifically as it relates to Chapter 5, Cold Water Systems. This section includes sizing procedures for Domestic Pressure booster systems starting on page #64. For the first time in the history of this amazing and useful publication, engineers will be given a “scientific” procedure for calculating redundancy requirements for variable speed boosters. This is something that I have been talking about for the past 18 years as I travel the country and listen to the challenges of the plumbing designer and engineer. Some may ask why this is so important and the answer is simple; because until now, there was no method available!

WHAT IS REDUNDANCY?

Consultants understand that at some point in the history of a project, pump systems require maintenance. When this maintenance occurs, it is also logical that there must be a way to “ride-through” these events, much like the way that traffic is re-routed when a roadway is being maintained. The first thing to understand about maintenance is that it is temporary. The second element that must be considered is that this temporary modification of operation is brief. Unfortunately, there has never been a “scientific method” available for engineers or manufacturers that addresses how to account for occasional service events, unless you believe that “adding another pump” or “doubling the flow” are scientific!

Designers must consider the “worst-case” condition during necessary maintenance, and although this can be a scary proposition of “what if’s” the answer can be found within the methods that have been used for over 80 years. The Hunters Curves that are currently used to select these systems include some of this redundancy, but don’t consider the pump quantity available if a service event were to occur. This additional capacity (or redundancy) must be further determined by the designer. We can trust that the Hunters Curves are the industry standard for booster sizing but although they were developed in 1940, they still remain relevant since they are constantly modified over the years for low flow fixtures by the UPC, IPC and others. The essence of Dr. Roy B. Hunter’s work centered on the fact that plumbing demand is “never coordinated”. This means that all fixtures will not be used at exactly the same time but the flow is random, and Dr. Hunter proved that these random events could be accurately accounted for and calculated as a result of the diversity of our interaction with the plumbing system. For example; when was the last time you checked into a Hotel and took a hot shower while simultaneously washing your hands and going to the bathroom? Sounds ridiculous, doesn’t it? This is what Dr. Hunter surmised, and then proved with sound mathematical models we now know as the Hunter plumbing diversity curves.

Regardless of the building type, there is always diversity because there is never coordination! Even if we consider the type of structure which would have the least amount of diversity, it still exists! Consider the water usage in a stadium. I believe that we can all agree that the Stadium

is an extreme example of low diversity. How many of us have waited in line during halftime or inning change during a sporting event? With all the bathrooms completely full and a line to the water closet, one would assume that this means the delivery system is at 100% capacity, but according to Hunter, you would still be wrong! The fact of the matter is, no booster is EVER at 100% capacity. There is randomness in even the most seemingly non-diverse environment such as a stadium due to the fact that everyone is not flushing the toilet while simultaneously washing their hands at a lavatory. Furthermore, the “superflush” test that is performed on many of these stadium structures is, in essence, a completely illogical test since it will never occur in the life of the building! Consider the randomness of flash bulbs at the opening ceremonies of the Winter Olympics. If humans were ever able to coordinate pressing their camera button and subsequently the flash bulb at exactly the same time, the whole stadium would probably go blind!

APPLICATION OF REDUNDANCY

Now that the logic of human diversity is understood, how can we use this information to create better sizing methods? This brings us back to what happens when a piece is removed from the puzzle temporarily, such as when a pump is removed for service. The first question to ask is; what are the odds that all the pumps fail coincidentally at the same time? Well, I have never calculated the odds, but I believe they would end up somewhere in the “one-time for every billion or so systems” range. In fact, much like our roadwork example, when the capacity is re-routed, the system must “ride through” this event seamlessly without any indication to the user.

This brings us back to Hunter and his diversity values. We can surmise that if the system is sized per the Hunters Curves, the worst-case scenario would be that all fixtures would NOT be in use simultaneously. Based on Hunters’ diversity figures, the industry has accepted that boosters will never reach more than 70% of the total flow load. In this case, at 70% capacity, there is no indication by a user that a pump is removed when there is demand at a fixture. In other words, if we have a remaining load of 70%, the system will still serve 100% of Hunter’s REAL load with diversity temporarily until the pump can be re-installed.

Now that we are armed with this information, we can formulate a “real world” solution for our redundancy problem without the need to add another pump or arbitrarily double the flow capacity. In fact, adding another pump has no scientific basis whatsoever, but it sure does a great job of helping pump manufacturers sell more pumps!

We need to consider that when a SINGLE pump (because they don’t fail at the same time) is removed for service in a multi-pump booster system, the remaining pump or pumps should still be capable of 70% of the total GPM. If our initial intent is to size a Duplex pump system and (1) pump is removed for service, we need be certain that the remaining SINGLE pump can maintain 70% of the load. Using simple math where our Hunter’s Curve GPM is 100 gallons, this means that in a 2-pump system, if one pump fails, there is only (1) pump remaining to carry the load.

In a duplex arrangement, we would need to increase our redundancy GPM to offset for the lack of redundancy in the quantity of pumps available as follows:

- **100 GPM Demand = 70 GPM x 2 Pumps or 140 GPM Total Redundant Load**

Each pump must be sized for the full 70% redundancy since, if one pump fails or is removed for service, the other pump must still have a 70 GPM (70% of 100 GPM) capacity in the event the other pump is disconnected.

Consider what happens if we begin with a triplex (3-pump) system instead of a duplex system. If (1) of the three pumps fails, we actually have greater redundancy since there are (2) pumps left to perform the 70% load capacity. By starting with (3) pumps instead of (2) we have started with a greater redundancy than the duplex system, thus:

- **100 GPM Demand = 35 GPM x 3 Pumps or 105 GPM Total Redundant Load**

Did you notice that the Total Load is reduced due to the additional redundancy of more pumps? If (1) 35 GPM pump in the Triplex example were to be removed for service, there are still (2) remaining pumps at 35 GPM. These two pumps combined yield the same 70% redundancy, but are calculated based on the remaining pump or pumps. This is the “magic” of the 70% method, since we are sizing for real-world conditions, but we are not oversizing for an occasion that will simply never happen.

THE SCIENCE OF REDUNDANCY

Since we now have a methodology to accomplish our “ride through” demands, this coincidentally creates an opportunity to scientifically determine the number of pumps required in order to better match the load of the system at any given time. In 1994, a colleague and I coined the “80/20 Rule” for booster pumps. Simply put, 80% of the time, a typical Plumbing Booster is at 20% or less. After all, what is the booster, other than a glorified jockey pump! Once the piping system is filled with water, the primary job of the booster is to maintain pressure in the piping riser and branches. Most of this time, the flow is “make-up” water as a toilet is flushed or a lavatory is opened. (remember the Hunter’s Curves?) Now that we are armed with this data, rather than choosing pump systems based on personal preference in pump quantity, designers can correlate the demand to the selection. Consider our example of a duplex system versus a triplex system. If the duplex is selected, since we have to add more flow due to the fact that there are now fewer pumps, let’s assume that we end up with a selection requiring (2) 10 H.P. pumps. Now size using the triplex system and notice that the pump quantity is higher, so that additional redundant flow is not required. Let’s assume this selection comes up with (3) 5 H.P. pumps as in the example below:

- Duplex Selection – 2 pumps x 10 H.P./EA = 20 Total Combined HP
- Triplex Selection – 3 pumps x 5 H.P./EA = 15 Total Combined HP

Clearly, from the example above the lesser HP selection would be better since the combined load is less, but that is just the tip of the iceberg! Since 80% of the time, only one of the pumps will be operating and the Duplex must run a 10 HP pump whereas the Triplex unit will only run

a 5 HP pump or, in this example, HALF THE LOAD is required, 80% of the time! The only item that changed in the formula is the quantity of pumps. This, example is our “scientific proof” that the method adapts based on the design conditions used.

This is why we say that the 70% Method can be proven mathematically, which is the hallmark of any scientific method. Other methods, such as adding another pump or arbitrarily adding flow cannot be proven scientifically, thus the 70% method becomes logically obvious. I have personally used this sizing method for the past 18 years and have NEVER undersized a booster pump! In fact, my company guarantees the sizing when IPC WFU’s are used along with the 70% method. We put our money where the math is since it is scientific! The past 18 years, along with the 80 years of Hunter’s Curve history, are the industry’s proof of concept.

Written by: David P. Carrier
QuantumFlo, Inc.
September 2018

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Christopher Imhof, PE, CPD
Education Committee Chair, VP - Legislative

Legislative Report

I'd like to introduce myself as the new VP of Legislative, I am also the Education Chair. I am currently the Technical Standards Engineering Manager for the Regulatory Services Division at WSSC Water. WSSC Water is the plumbing and fuel gas regulatory authority for the majority of Montgomery and Prince Georges Counties. I also serve on the ICC action committee for the IMC, IPC, and IFGC. As the VP of Legislative, I have several goals for our chapter. My first goal is to create and maintain a database of local codes, code officials, and contacts. I will work to create the initial database and hope the chapter members will help to maintain moving forward. My second goal is to provide code guidance and education thru newsletter articles, presentations at meetings, and chapter discussions. If you have a code or legislative question do not hesitate to contact me. It's my job to stay current on the latest codes and legislative actions for the local areas, the state, and across the country. My third and final goal is for the chapter to become more active in the code development process. I plan to keep chapter members up to date with ICC action committee and encourage participation in the development of the local, state, and model codes.

Regards,

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



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Brian Crisp, CPD
Vice President - Membership

Membership Report

Hello again folks! Our first digital meeting for the year is in the books, I hope everyone enjoyed the relaxed dress code and free beer and wine (that you had to provide yourself).

Just a reminder, if you let your membership lapse (for financial reasons or otherwise), as long as you renew within a year of when your membership expired, you can maintain your tenure. If you have any questions about this, feel free to reach out to me.

I mentioned the Membership Tenure awards in last month’s article, last year’s recipients should all have their awards by now. Having received one for 10 years myself, I have to say it looks pretty spiffy sitting on my desk. But on to the future, this year’s recipients are listed below, Please join me in congratulating them on their contributions to the chapter, society, and industry!

10 Year Membership Award

- Steve Watkeys
- Matthew Mason Morgan
- Edward Burke
- Robert Neal Thomas

20 Year Membership Award

- Adam Kegan
- Philip Joseph Holthaus
- Patrick Joseph Plourde
- Eric Paul Sellers

No new members this month but Baltimore is holding steady at 115 current members.

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
vpmember@baltimoreaspe.com



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2020-2021 ASPE Baltimore Chapter Meeting Schedule

Date: **September 23, 2020**

Speaker: Niki Patel -Sherman Engineering

Topic: NFPA 99

Date: **October 28th, 2020**

Speaker: Ed Ross -QuantumFlo

Topic: Booster Pumps

Date: **November 25th, 2020**

Speaker: Lauren Berenato –Jomar Valve

Topic: Valves 101

Date: **December 16th, 2020**

Speaker: James Wall –CISPI

Topic: Installation Standards of Cast Iron Piping

Date: **January 27th 2021**

Speaker: BJ Schrader/Laura Loziuk –McWane

Topic: Cast Iron and PVC Piping Value Engineering

Date: **February 24th, 2021**

Speaker: Ken Isman –UM

Topic: Fire Protection Standpipe System Design

Date: **March 24th, 2021**

Speaker: Jeff Henscheid –PVI

Topic: Water Heater Sizing, Construction & Efficiency

Date: **April 23, 2021**

Event: Annual Golf Outing

Date: **April 28th, 2021**

Speaker: TBD

Topic: Engineering Liability

Date: **May 26th, 2021**

Speaker: TBD

Topic: TBD



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