

January 2004



Plumbing Design Class

Date: Tuesday, January 27, 2004

Time: 5:30 - 9:00 PM - Dinner and Plumbing Design Class

Cost: Members ASPE, ASSE: No Charge
Non-members: \$15.00

Location:
PMC Center
14801 W. 8 Mile Rd.

Topic: Professional Plumbing Practices,
Estimating and Test Taking Skills

Speakers: Daw Alwerfalli, Ph.D.,
Lawrence Technological University.
Cheryl VanHovel of HILTI

Sponsors:
To be announced

Please confirm your attendance through the web site at aspeemc.org

****SPECIAL NOTICE****

The January meeting will be held on
Tuesday, January 27,
NOT
Tuesday, January 20 as was
previously listed.

We apologize for any inconvenience.

PRESIDENT'S REPORT

**Douglas W. Cryer, CSI CIPE/CPD
President**



I really hope all of you had a wonderful Holiday Season. I did. Spending time with family and friends really is an important part of living. Sharing time with those who mean so much and making memories is what this life is all about.

January, for me, has been and continues to be a busy month. I hope that most of the engineering and contracting firms within my reading area find themselves busy now and in the future.

This article is a potpourri of information about upcoming happenings and thoughts. First, I'll start with the Saturday Review Course on January 10, 2004. What a GREAT Technical Presentation that Bill Grayzar put together. The resounding voice from the attendees was a success. The 20 people that gathered on that cold Saturday morning got a wealth of information to take home or have sent to them by mail. Thank you to the presenters for putting forth the extra effort to gather and discuss their expertise and a special Thank You to John Nussbaum for all his behind the scenes activities and early arrival to open the building to get us ready with juice,

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American Society of Plumbing Engineers

Eastern Michigan Chapter 2003-04 Technical Classes

*Held monthly at the
(except where noted)*

PMC of Detroit
14801 West 8 Mile Road
Detroit, MI 48235

September 23, 2003
Sanitary and Storm Piping

October 28, 2003
Domestic Water Distribution, Boosters,
Treatment and Sizing

November 18, 2003
Commercial Laundry and Kitchen Requirements

December 16, 2003
Domestic Hot Water Generation Design and Sizing

January 10, 2004
First Saturday Technical Review Course (8 hours)

January 27, 2004
**Professional Plumbing Practices, Estimating
and Test Taking Skills**

Friday, February 20, 2004
ASPE/ASHRAE Meeting at Compuware Arena for
Snow Melting and Plumbing for the Ice Arena

March 23, 2004
New Michigan Plumbing Code Review
with Mr. Robert Konyndyk

April 3, 2004
Second Saturday Technical Review Course (8 hours)

April 27, 2004 - Architectural and Structural
Interferences, Coordination and
Value Engineering Panel Discussion

May 25, 2004
Open Microphone Night for Vendors and
BBQ @ PMC Detroit

*Mark your calendars for
February 20 for the
ASPE/ASHRAE meeting
at Compuware Arena for
Snow Melting and
Plumbing for the
Ice Arena*



Sun	Mon	Tue	Wed	Thu	Fri	Sat
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
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ASPE News is published 10 times per year (September through May, plus one summer issue). Yearly advertising rates are \$250.00 per ad for members and \$300.00 for non-members. Insert advertisements are \$250.00 per newsletter for one oz., \$100 for every oz. over. Help Wanted ads, fifty words or less, \$100.00 per issue. For quarter-page and half-page product ads, please contact Joe Hernandez. Checks should be made payable to ASPE E. Mich. Chapter and send check with inserts or ad to Joe Hernandez. Circulation 400-Distributed to: Engineers, Contractors, Inspectors, and other industry professionals in Michigan. For contributing articles contact Joe Hernandez, Newsletter Editor at newslettereditor@aspeemc.org.

VP TECH REPORT

Wes Patton
VP Technical

Greetings! My name is Wesley Patton and I have been asked to join the Board of Directors of the Eastern Michigan Chapter as the interim Vice President Technical. I accept this position with willingness and gratitude on being given the opportunity to serve the plumbing engineering community in which I have chosen to build a lifetime career. The President, Doug Cryer, and all the past presidents serve the community well in as their demonstration by commitment to make a difference. I pledge to bare the same level of desire to make a difference in serving this esteemed Chapter and our members.

I have been with SSOE, Inc. for over 20 years and am a graduate of Wayne State University with a Bachelor of Science in Mechanical Engineering. My career in plumbing encompasses all facets of the architectural community, which have included automotive, healthcare, institutional, commercial and retail. I have experience in all levels of mechanical engineering. In addition to being involved with ASPE, I also have an active membership in ASHRAE. This partnership in HVAC and plumbing will allow me to bridge the communication between the two Societies. Last year I was able to put this to use in assisting in the coordination of the combined ASPE/ASHRAE meeting at Ford Field.

I want to take a moment to wish Jill Dirksen all the best of luck and to say she will be dearly missed. Her enthusiasm is one of her greatest assets and coupled with her solid understand of mechanical engineering will contribute to the ASPE society success. Our loss of Jill is the Society's gain. Well not really, she will make things in the Technical division a whole lot better!

I also want to thank Jill for putting together such a solid technical program this year. It makes things much easier coming into this half way through the year. The next session on Tuesday, January 27, will be on test and exam taking. With this being a CPD exam year, we have been asked by many members to help in this area. Some of you already attended the Saturday workshop with Doug, Esteban and Joe. Hey these guys are great and know their stuff. The exam is a tough one. I speak first hand because I've taken it and know that if complete attention is not given, you will lose! I did and I am taking the CPD again.

Our line up of classes include a combined trip with ASHRAE to the Compuware Ice Arena for a technical session on "Ice and Snow Melting" sponsored by R L Deppman, and presented by Mary Anderson. In March we'll

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President's Report

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coffee and Danish; as well as ordering our lunches. These Saturday Technical classes continue to give additional knowledge and CEU credits towards the CPD re-certification requirements of ASPE. Bill Grayzar, our V.P. Education, says that our CPD Exam Review is still on schedule for Saturday April 3, 2004. So mark your calendars and RSVP when registration forms are mailed.

Second, our January 27, 2004 (make note: *not* January 20, 2004) meeting will be a presentation with topical information that people do not usually speak about. Mr. Daw Alwerfalli, Ph.D., our first speaker, is a professor and the Mechanical Engineering Department Head at Lawrence Technological University. He will discuss test-taking skills, tackling engineering formulas and his infusion of plumbing engineering into his students' curriculum at LTU. Thanks again to John Nussbaum for his relationship and persistence with LTU to recognize plumbing engineering as an actual avocation and respected portion of the engineering industry.

In addition, we will also address the process of fire stopping wall penetrations for the contractor, the code requirements that contractors must follow and what importance engineering firms should place on such needed, and often overlooked Specification Sections. Ms. Cheryl VanHovel of HILTI has a very interesting, entertaining, informative, non-proprietary and convivial presentation ready to go for us. Sit back, listen, interact with questions or concerns and learn all you can.

Third, the new Code Books will be available through the PMC and John Nussbaum very soon. Probably, and hopefully, for the Code Review Meeting on March 23, 2004 with Mr. Robert Konyndyk, Chief Plumbing Inspector for the State of Michigan. The location of this meeting **WILL NOT** be held at the PMC Building on 8 Mile Road. John has been researching venues to handle the number of people we expect to attend as I write this. You'll know as soon as I know. He will be also taking orders for new Code Books at a reduced rate, (price TBA) and he will only order as many as have been requested. So plan on ordering your Michigan Plumbing Code Books for Commercial buildings. An order form for Code Books and RSVP's to the March meeting will follow in the February newsletter with further details. The Residential and the Mechanical Code Books will be available soon, thereafter.

Finally, with Jill departing for National ASPE leadership, I am very pleased to announce that Mr. Wes Patton of SSOE, Inc. will be our new V.P. Technical. Thank you Wes for doing the right thing. I look to all of our members to step up and take some initiative in becoming active in this Chapter's Board of Directors. We're looking for a few new GOOD People. I could be inquiring of you...

Doug

VP Technical Report

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have the Director of the Michigan State Plumbing Board, Bob Konyndyk. He will give us an overview on the new 2003 Michigan Plumbing Code. The program will also include an overview of the 2003 residential code. A panel discussion is on tap for April covering the Architecture of Plumbing. May is a new feature using an open microphone to ballyhoo on any plumbing subject.

Thank you for letting me be your Vice President and understand that I am here to serve. Drop me a line if there is anything you'd like to see happening in the Chapter.

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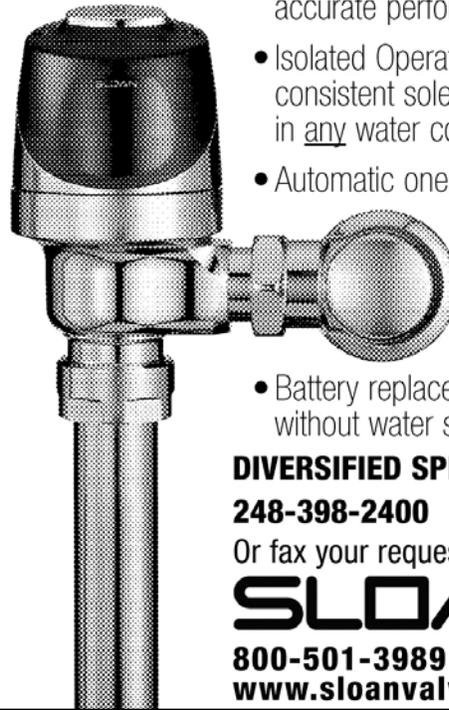
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Professor Plumber sez...

**Bill Grayzar, CPD
VP Education**

Hope you all had a wonderful Holiday, but now it's time when we all need to get back on track and our ASPE meetings are no exception.

For my article this month I would like to briefly discuss Vent Systems.

Vent Systems:

Flow of air is the primary consideration in the design of a venting system to ventilate the piping and protect the fixture trap seals of a sanitary drainage system. Since air is of such primary importance, it is essential that the plumbing engineer be familiar with certain physical characteristics that are pertinent to its behavior in a plumbing system.

Density

The "density" of any substance is its weight per unit volume. The density of air is weight in pounds per cubic foot (lb/ft³) of volume. The density of air is affected by temperature, moisture content, and pressure. The density of "standard air" is taken at sea level at atmospheric pressure and 68.4 °F. It is equal to 0.075 lb/ft³. With a rise in temperature the density of air decreases, and with lowering of temperature the density increases. The moisture content of air in the plumbing system has a negligible effect on its density and can be disregarded in all calculations. Pressure has an appreciable effect; the higher the pressure the greater the density, and the lower the pressure the less the density.

Elasticity

"Elasticity" is the ability of a substance to assume its original characteristics after the removal of a force that has been applied. Air is a perfectly elastic substance. If a force is applied to air, the force can be applied for days or years, and when it is removed, the air will return to its original condition.

Air is Compressible

There is an increase in pressure when air is compressed. In plumbing systems, only an extremely small change in pressure can be tolerated. For a pressure of 1" w.c. (0.036 psi), the volume of air will be compressed by 1/400 of its original volume. A comparatively small change in volume can cause the design limitation of +/- 1" of pressure to be exceeded, with the consequent danger of destroying the trap seals. The vent piping must be designed to permit the air to flow freely without compression or expansion except for the small amount necessary to overcome friction.

Static Head:

"Static Head" is the pressure exerted at any point by the weight of the substance above that point. The pressure can be stated in feet of the substance, e.g., when the substance is water the static head is 100 ft of water or if the substance is air, 100 ft. of air. The following formulas are used to convert from feet of head (ft) to pounds per square inch (psi) or the reverse:

$$p = (w / 144) \times h$$

or

$$144 p = w h \quad \text{and} \quad h = (144 p) / w$$

$$p = \text{Pressure (psi)}$$

$$w = \text{Density of the substance (lb/ft}^3\text{)}$$

$$h = \text{Static head (ft)}$$

Pneumatic effects in sanitary systems:

As water flows in contact with air in a vertical or horizontal piping, there is friction between the air and water. The frictional effect causes the air to be dragged along with the water and at practically the same velocity as the water. When the cross-sectional area of the water occupying the pipe is suddenly increased, such as the hydraulic jump or where a branch discharges into a stack, the air passage is constricted. The constriction acts the same way a stoppage or blockage to the flow of air does. It causes a buildup of pressure, the highest pressure occurring at the constriction and diminishing upstream. It is for this reason that excessive pressure usually develops at the lower floors of a building and at offsets of the stack. It is important to be aware always that protection of sewer

Professor Plumber sez...

continued from previous page.

gases is afforded by the 2-inch trap seal, and the design of plumbing systems must be such as to maintain pressure variations within +/- 1 inch water column (w.c.) at the fixture trap.

Static pressure of air:

Using the formula for static pressure we can determine the design criteria of maintaining pneumatic pressure fluctuation within +/- 1 inch w.c. in terms of an equivalent column of air is as follows:

$$\text{if } 144 \text{ p} = \text{w h}, \text{ then } 144 \text{ p} = \text{W}_w \text{ h}_w = \text{W}_A \text{ h}_A$$

$$\text{W}_w = \text{Density of water (62.408 lb/ft}^3\text{)}$$

$$\text{h}_w = \text{Static head of water (ft)}$$

$$\text{W}_A = \text{Density of air (0.07512 lb/ft}^3\text{)}$$

$$\text{h}_A = \text{Static head of air (ft)}$$

Utilizing 1" w.c. ($\text{h}_w = 1/12 \text{ ft}$) and solving for h_A

$$\text{h}_A = (\text{W}_w \text{ h}_w) / \text{W}_A = (62.408 \times 1/12) / 0.07512 \text{ (at } 70^\circ\text{F)}$$

$$\text{h}_A = 69.23 \text{ ft of air column}$$

From this calculation we can determine that a column of air 69.23 ft will exert the same pressure as a column of water 1 inch high. Stated another way, a static head of 1 inch of water will support a column of air 69.23 ft high.

Friction Head Loss:

When air flows in a pipe, there is a pressure loss that occurs due to the friction between the air and the pipe wall. This loss of pressure can be expressed by the "Darcy formula":

$$\text{h} = (\text{f L V}^2) / (\text{D } 2 \text{ g})$$

$$\text{h} = \text{Friction head loss (ft of air column)}$$

$$\text{f} = \text{Coefficient of friction}$$

$$\text{L} = \text{Length of pipe (ft)}$$

$$\text{D} = \text{Diameter of pipe (ft)}$$

$$\text{V} = \text{Velocity of air (fps)}$$

$$\text{g} = \text{Gravitational acceleration, } 32.2 \text{ ft/s/s}$$

Vent Sizing:

For any given air flow to be conveyed by a vent stack, the total allowable length is computed by the following formula:

$$\text{L} = (2226 \text{ d}^5) / (\text{f q}^2)$$

$$\text{L} = \text{Length of pipe (ft)}$$

$$\text{d} = \text{Diameter of pipe (in)}$$

$$\text{f} = \text{Coefficient of friction (fps)}$$

$$\text{q} = \text{Quantity rate of flow (gpm)}$$

This is the equivalent length of run, not the developed length. "Developed length" is the distance measured along the centerline of the pipe and fittings. Fittings create a greater friction than does pipe of equal diameter. Converting a fitting to an equivalent length of pipe that will produce the same pressure loss permits the utilization of applicable formulas. The equivalent length of the fittings is added to the developed length of run and the result is the "equivalent length of run". In the average venting system, the equivalent length of fittings has been found to be approximately 50% of the developed length. The permissible length of run is then two-thirds of the equivalent length of run as determined by the formula.

The developed length of run of a vent stack is measured from the point of connection to the drainage system at its base to the point of discharge at the outlet above the roof. The lengths given in all codes are the developed lengths.

The minimum size of a vent stack is one half the diameter of the drainage stack it serves.

Venting will be covered in more detail at the January 10th, 2004 review meeting. Look for more calculations in the February ASPE newsletter and watch for a separate flier in March for information and registration for the CIPE/CPD review course tentatively scheduled for April 3rd, 2004.

Bill

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Lochinvar - High efficiency water heaters, boilers, pool heaters, booster heaters & storage tanks.

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ABS Pumps-sump & sewage pumps & systems, **American Water Heater** - commercial tank type water heaters, **Conbraco**-plumbing & heating products, backflow prevention devices, **DWV Foundry**-cast iron soil pipe, fittings, full port valves, **Ecodyne**-commercial and industrial water treatment, R.O. systems, D.I. water PVC drains & cleanouts, **Everhot**-stone lined indirect water heaters, **Flo-Pak/Patterson Pump**-pressure booster systems, package HVAC pumping systems, fire pump systems, **Genova/J.M./Jet Stream**-Sch. 40 PVC, solid & cellular core, Sch. 30, SDR 26 & 21, gasketed & belled end, CPVC & sewer pipe, **Graham**-plate & frame heat exchangers, steam instantaneous water heaters, **Griffin Products**-stainless steel sinks & fixtures, **H.B. Smith** -commercial cast iron steam & hot water boilers, **Hydrotherm**-commercial & residential cast iron modular & pulse boilers, **John Wood Co.**-ASME & commercial pressure vessels, storage & expansion tanks, **Lasco**-PVC fittings, sch. 40 & sch. 80, **Maxitrol**-gas pressure regulators, **Mepco**-steam specialties, condensate & vacuum pumps, traps, **Mifab**-roof & floor drains, cleanouts, carriers, interceptors, access doors, trap primers, hydrants, **Polycast**-trench drain systems in precast polymer concrete or fiberglass, **RBI**-commercial & residential copper-fin boilers & water heaters, storage tanks, pool heaters, **Rehau**-radiant floor hydronic heating & snow melt systems, plumb-pex, **Space Pak**-air conditioning systems, **Thermex**-point of use electric water heaters, **Thrush**-circulator pumps, inline pumps, end suction pumps, heat exchangers, hydronic accessories, **Weinman Pump** -base mounted, horizontal split case, turbine, condensate systems, **Wheatley**-pump accessories, heat exchangers, expansion tanks, air separators, CBV, TDV, strainers&valves, flexible connectors

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A.O. Smith - water heaters, boilers, commercial & residential, **American Plumber**-water filtration products, **Bemis/Church** - plastic, wood and medic-aid, residential & commercial toilet seats, **Boots Plumbingware**-steel lavs & tubs, **Howell Metal** -copper tubing, **Jones Stephens Corp**-plumbing specialties, **Little Giant Pump Co.** -sump, sewage & condensate, **Mansfield Plumbing**-plumbing products, china/steel/brass, **Plastic Trends** - PVC SDR 35 gasketed 4"-24", PVC SDR26 heavy wall gasketed 4"-18", PVC SDR 35 solvent weld 4"-24", styrene solvent weld 3"-6", PVC/DWV solvent weld 8"-24", **Plumco** -specialty products, **Royal Quickstop**-fire protection systems, **Swirl-way**-acrylic whirl-pool tubs, Vandem-no hub cast iron soil pipe and fittings

Aero Mfg-stainless steel sinks, **Bradley Corp.** - washfountains, emergency, patient care & security fixtures, **Central Brass**-faucets & plumbing brass, **Chronomite** - point of use water heaters, **Dwyer Kitchens** - compact kitchens, **Halsey Taylor** - electric water coolers & drinking fountains, **Leonard** - shower & water mixing valves, thermostatic & pressure balanced, **McGuire**-brass fittings, **Santana** - toilet & shower compartments , **Truebro** - trap & supply covers

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Nibco - copper & plastic fittings, plumbing valves, pressure rated valves, industrial plastic fittings & valves

Aldrich-steel tube, oil & gas-fired boilers. Low pressure steam, hydronic and volume hot water heating systems, **Autotrol**-water purification by deionization. Capacities up to 20,000 gallons per day, **Holby Valve Co.**-low/standard range thermostatic mixing valves 1/2" to 4", **Lawler Valve Co.**-low/standard range thermostatic hot water mixing valves, emergency shower valves, temperature and pressure balanced mixing valves 1/2" to 2", **Raypak**-copper-fin hydronic and domestic hot water supply boilers, booster heaters & storage tanks. Sizes from 30 MBTU to 4,000 MBTU, **Ruud Manufacturing**-commercial & residential gas-fired and electric hot water heaters & booster heaters, **Thaw-Pak**-custom in-slab & underfloor heating designs & materials for radiant floor heating, snow melting and de-icing systems, **Valley**-commercial water softeners with metered & non-metered regeneration control, pre-wired and pre-plumbed multi-tank systems

A.C.Tech-variable speed drives, **Advance Thermal**-removable insulation & accoustical covers, **ITT Bell & Gossett**-hydronic specialties, centrifugal pumps, heat exchangers, heat transfer pkgs, pressure booster, domestic water heating, variable speed systems, vertical turbine, submersible pumps, **Cemline**-ASME tanks, hot water storage, packaged water heaters, stone steel lined tanks, replacement tube bundles, unfired steam generators, **ITT Domestic Pump**-condensate return, vacuum & pressure powered pumps, boiler feed systems, **Dow Heat Transfer Fluids** -DowTherm SR-1, DowFrost, **Dri-Steem**-steam injection, gas to steam, steam to steam, electric steam, evaporative humidifiers, ultrasonic fog humidifiers, **Griswold Controls**-coil hook-up kits, constant flow limiting valves, filter, solids separators & filter systems, **Highland Tank**-oil & water separators, **ITT Hoffman Specialties** -steam traps & specialties, condensate return pumps, pressure regulating valves, **ITT McDonnell & Miller**-boiler safety controls, level controls, flow switches, **Metraflex**-flexible pump connectors, expansion joints & guides, non-slam check valves, ball & butterfly valves, **MP Pumps**-self priming pumps, engine driven pumps, **Peterson Equipment** -“Petes” pressure/temperature test plugs, **Preso**-annular/venturi flow meters, **Vertiflo**-pedestal mount sump pumps, **Vibration Eliminator**-vibration control bases, spring isolators, **Watts Radiant**-radiant floor heating systems, snow melting systems, **Weksler Instruments**-pressure gauges, thermometers, recorders **Wessels**-ASME storage tanks, bladder tanks, glass lined storage tanks, glycol fill systems

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Alsons-shower heads, hands showers & accessories, **Campbell Mfg.**-water system & filtration products, **CTS**-copper flange adapters, **Flint & Walling**-well pumps, jet pumps, water conditioning, **Laco Industries**-fluxes, sealants, penetrants, caulk, putty, **PHD Mfg.**-pipe hangers, strut & accessories, **Raychem**-heat tracing products, pipe freeze protection, **Seminole**-pipe nipples, couplings, steel fittings, **Stadler-Viega** - in-floor radiant heat, potable water pex, **Topp Industries**-fiberglass and poly basins, **Viessmann Mfg.**-boilers, controls & energy management, **Ward Mfg.**-malleable & cast iron fittings, wardflex, **Waterless**-waterless urinals, **Zoeller Pump Co.**-sump, sewage & wastewater pumps & accessories

Anaco-no hub couplings, transition couplings, SV gaskets, **Aquarius** - acrylic & gel coat shower/tub-shower surrounds, **Chicago Faucet**-hospital, commercial, laboratory, industrial faucets & fittings, **Eemax**-electric tankless & mini-storage water heaters, **Geberit**-pressure assist flushing systems, sensor faucets & flush valves, **Haws**-emergency showers, eye washes, drinking fountains & water coolers, **Husky**-heavy duty & mid-range no hub couplings, **Intersan Mfg.**-stainless steel and polyresin washfountains & lavatory stations, **J.D. Gould**-electric solenoid valves, bronze & stainless steel, **Orion Fittings**-corrosion resistant piping systems, high purity water & dilution tanks, **Powers**-thermostatic controllers, pressure-balance & thermostatic shower systems, self-actuated temperature regulators, **Stern-Williams Co.**-terrazzo mop sinks & shower floors, drinking fountains, **Tyler Pipe**-Tyler soil pipe & accessories, Rufwall systems

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Watts Regulator Co. -regulators, control valves, relief valves, backflow preventers, ball valves, gate valves, butterfly valves, hydronic valves, tempering valves and other plumbing specialties

ASPE NEWS

American Society of Plumbing Engineers-Eastern Michigan Chapter

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