

OCTOBER 2012



NEWS

Eastern Michigan Chapter *
http://aspe.org/Eastern_Michigan

Serving our membership since 1975

Vol. 16, Issue 2

Plumbing Design Classes

Date: Tuesday, October 16, 2012
Where: Plumbing Industry Training Center
SEE map on back page

DATA BOOK SESSIONS

4:00 - 5:00 PM

DINNER

5:00 - 5:30 PM

Cost: ASPE, ASSE, MBPA Mbrs: NC
Non-members: \$18.00 FOR DINNER

REVIT TOOLS TIPS

5:30 - 6:00 PM

DESIGN CLASS

6:00 - 8:00 PM

Topic: Domestic Hot Water Systems

Speaker: Ronald L. George, CPD

See page 3 for program & bio

See the full event schedule on our web site.

REGISTRATION REQUIRED

Dann Holmes, Director/ Chapter Affiliate:
dann.holmes7@gmail.com
(248) 939-2476

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From Joe Hernandez, CPD President Of EMC ASPE



I love the fall, the football, apple cider, tree colors and the cool brisk days. Last month we had programs that featured REVIT and Boiler Basics. Our planning committee met several times over the summer to get this year's program finalized and put in place.

We asked the basic question of how we can best serve our membership and the answer was simple. Provide a program that will assist them in their day to day design activities. The Boiler Basics idea came about because

the State is planning to roll out the Boiler Code Rules and so the topic for last month was a prelude to this rollout. The REVIT session was on placement of a typical boiler and how to populate the 3-D model with valves and such.

This month we are welcoming back a familiar face, Mr. Ron George, CPD. Our subject will be on the principles of Domestic Hot Water Design. Ron is a very skilled presenter and this topic is old hat for him. He will be covering system design and hot water return. I think it's always good to review and in some cases learn a new approach to an important subject that can easily be misunderstood. Our REVIT session will reflect Ron's presentation on Domestic Hot Water Design. I should mention that the REVIT session will always be directly related to the topic being presented that evening, good stuff and Pam does a masterful job.

The fall brings an ASPE National Convention every two years. This time the location is in Charlotte, North Carolina. We have 4 delegates attending, myself; John Nussbaum; Pam Hartsell of SES, Inc; and Bill Grayzar of DiClementi Segal Design. Our Affiliate Liaison, Dann Holmes is also attending. There is more to the Convention than just Society business, such as, a solid line of technical classes. If you're interested, I recommend that you go on to the ASPE web site for additional information.

The planning committee has also set up a roster of pre-dinner sessions starting this month with George Johnston of Johnston-Balfrey on the Navien Condensing Water Heater. These are the instantaneous type and are great energy savers. His program begins at 4:00 PM. November's topic is Sanitary Design.

If you think you missed out on the Design Book sales, don't fret, they are still available and John Nussbaum will be more than happy to fill your shopping cart. There is a page in this newsletter to help you with your selection.

Continued on page 2

* Chapters are not authorized to speak for the Society.

NOTICES.....

ASPE Is ACCEPTING APPLICATIONS FOR THE ALFRED STEELE SCHOLARSHIP

The Alfred Steele Scholarship has \$3,000 in available monies for qualified applicants. Is is limited to ASPE members and their immediate families who have a GPA of 3.0 or higher, who are enrolled in or plan to enroll in an engineering program at a college, university, or technical school on a full-time basis. Contact Stacey Kidd for more information at (847) 296-0002, or email skidd@aspe.org

PLUMBING TRAINING CENTER ASSE BACKFLOW RE-CERTIFICATION

We'll be giving an ASSE Backflow Re-Certification class to any member who is eligible. If you're interested, please call the Training Center and get your name on the sign-up list for the next class training.

MED GAS INSTALLERS CERTIFICATION

Most members' Installer's certs will expire before the next Med Gas Standards are issued in late 2012. Before your Installer certification expires, you need to apply for an extension with the NITC. Extension forms are available at the Plumbers Union Hall and Training Center.

CPD EXAM WORKSHOP

Saturdays, March 16th & 23rd of 2013
MCA Detroit location - Registration form in upcoming Newsletter

President's Report

Continued from page 1

One final note, we are going to have a CPD refresher course again and it will be similar to last year, at the same location, MCA Detroit on 8 Mile. Our Chapter turns 37 years old this year and is still going strong. If you like what we are doing, we thank you. If you have ideas for improvement, give us a call or better still, get involved. It's your Chapter.

Your President,

Joe Hernandez, CPD

New Member

MICHAEL MCMURPHY

Member Status: Student
Engineering Program at LTU
employed at MA-Engineering

Welcome to ASPE EMC Michael

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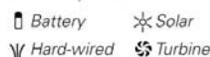
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SLOAN.

Past President Report

John Nussbaum, IPP, FASSE



Past President's Report & Comments

To all Contractors, Plumbing Design Professionals and Licensed Master & Journey Plumbers, the Plumbing Code & Development Committee of Southeastern Michigan is in need of a person or persons who are knowledgeable in the plumbing code

and who have a desire to participate in the promulgation of plumbing code language. This committee began when I realized the need of contractor participation at the national level; it was when I became the executive director of PHCCASM in 1986. In 1987 I was able to meet and convince the director of BOCA International, today known as the International Code Council (ICC), to place a PHCCASM contractor on their Plumbing Committee. Dave Sechlin from Detroit Mechanical was our first of many contractors to be appointed, the rest is history. I was able to establish this Code Committee with the approval of the PHCCASM Board of Directors.

Change came in 1998 when it became necessary for the committee to become a separate entity and self-sufficiently funded in order to subsidize sending representatives to the national code hearings. A set of bylaws were written and the "Code Study & Development Group of Southeastern Michigan" was officially established. This committee is a plumbing industry consensus committee. Funding is made possible by selling code books and solicitation from other plumbing industry organizations.

Code changes may be written by any individual, group, organization or business entity that wishes to do so, and may have them reviewed before being sent on to the ICC for their consideration. The Code Committee checks for compliance to the ICC rules and may endorse the change or suggest a modification to the change. Code change meetings may be requested by any member or group wishing to do so. The Code Study & Development Group of Southeastern Michigan (CSDGSM) is open to all persons in the plumbing industry having an interest in the promulgation of the ICC Codes specifically the IPC, IRPC and IPSD or the State of Michigan version of these codes. Meetings occur when the ICC monograph of proposed code changes is made available to the membership, prior to the national code hearings. At this time the CSDGSM meets to discuss the proposed changes in order to determine how the CSDGM representatives to the hearings support, move to modify or oppose the change and in some cases abstain.

What would be expected of you should you wish to participate? You would be expected to attend the CSDGM meetings dealing with the ICC monograph of proposed code changes which take place once every couple of years, attend and give testimony at the ICC hearings IPC, IRPC, IPSD with other members of our committee in attendance

October Program

Domestic Hot Water Systems



This Design Class will discuss how to design water heaters, mixing valves and circulating pumps, to work in harmony to provide safe energy efficient hot water systems.

Ron George is the president of Plumb-Tech Design & Consulting Services LLC and oversees all operations,

as well as, all design and consulting projects. Mr. George is very familiar with the plumbing and mechanical codes and standards and sits on numerous plumbing & mechanical codes and standards committees. He has over 32 years of experience designing plumbing and mechanical systems for several major architectural, engineering, and design & construct firms. He has served as an expert witness in many cases and performs forensic investigations all around the United States. He has designed plumbing, mechanical, and fire protection systems for all building types including airports, stadiums, industrial manufacturing facilities, office buildings, commercial and retail buildings, hospitals, laboratories, prisons, jails, hotels, apartment buildings, military projects, high rise and educational facilities. Please go to the following websites for more information: www.Plumb-Techllc.com and www.Legionellaprevention.org and www.scaldprevention.org.

Past President's Report

Continued from previous column

and go along with the consensus reached by the CSDGM. Doing this gives you exposure to possibly be appointed to one of the mentioned committees. We are proud of the 25 years we have been part of the code development process. I encourage you younger plumbing industry people to become involved, there is satisfaction in knowing you are contributing to the well-being of the industry you have chosen to earn your living in, as well as the health and safety of the community you work in. CSDGM is the only Plumbing Industry consensus group that participates at the ICC national hearings and is highly respected. Others who participate are building officials, plumbing and mechanical inspectors, plumbing design professionals as well as manufacturers of plumbing products and equipment. For further information you may reach me at MCA-Detroit

(313)341-7661.

John R. Nussbaum, IPP, FASSE

Hard work spotlights the character of people: some turn up their sleeves, some turn up their noses, and some don't turn up at all. - Sam Ewing



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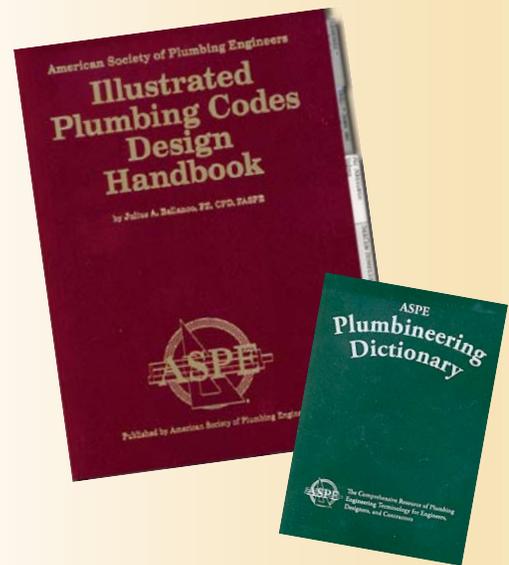
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Affiliate Liaison Report

Dann Holmes



Like professional football, we've kicked off our 2012-2013 ASPE EMC season; not without some of the same issues we've witnessed in football though. We fumbled through our Design Class; we must apologize for the technical and visual problems we experienced. Rest assured, these issues will be rectified; never to surface again.

With that said, I'm here to thank our tabletop sponsors. Bill Grayzar, our VP Legislative, was our Tabletop Champion for September. His task was to solicit vendors for our Boiler Design Class. Paul Prentice with R. L. Deppmann; Curt Martin with Performance Engineering; Jason Loverich with Lochinvar and Mike Burdett with Diversified Spec Sales all ran for touchdowns for our chapter. After numerous play reviews, our refs determined their initial calls on the field were correct and our vendor scoring stood!

What did this mean to our chapter? It meant we put money into our bank account, not depleted it. Your ASPE EMC Board takes this seriously; especially with the history many organizations have experienced over the past few years. We operate on very little money and with that, we expect to bring you higher quality returns month-after-month and year-after-year. This requires asking our manufacturers and reps to huddle, plan their plays, execute and score. When they win, we all win. They need you to attend our meetings, visit their tabletops and learn about their product, listen, ask questions, and give valuable input; this way, we all learn.

Here is a short recap of the technology we were privy to at our September 18th meeting.

R. L. Deppmann in Southfield, MI (248) 354-3710 was represented by Paul Prentice LEED AP, Gerry Potapa Jr. CPD, Jamie Caporosso and Dillon Neale. They displayed their LAARS® NeoTherm® residential hydronic boilers. These 95% AFUE boilers are available in four sizes ranging from 80,000 to 210,000 BTU/h. Features include; floor-standing condensing boiler; all connections on top of the unit; stainless steel heat exchanger; rated for alcove and closet installations; easy to service; qualifies for many Energy Rebates; utilizes the LAARS® Integrated Control System; works with Building Automation Systems; backlit LCD display with touch pad; quick setup control feature and the control display is in plain English, not cryptic codes.

Continued in next column

Most of the important things in the world have been accomplished by people who have kept on trying when there seemed to be no hope at all. ~ Dale Carnegie



R. L. Deppmann's LAARS® NeoTherm®

Performance Engineering in Livonia (734) 266-5300 is our Raypak® representative in Michigan. Curt Martin with Performance presented the Raypak® XFire™ and XTherm® ultra-high efficiency boilers. For over 60 years, Raypak® has been a leading manufacturer of boilers and water heaters. Raypak's current headquarters are located in Oxnard, CA and supports a 235,000 sq. ft. state-of-the-art manufacturing facility. Raypak® expects the market acceptance of new condensing products will continue to increase and they are well positioned to handle that growth. Raypak's design goals are, and have always been high quality, reliability and energy efficiency. Their current commercial product lines include: Raytherm™ Atmospheric - 82% Efficient; HiDelta & Delta Limited - 84 to 85% Efficient; MVB (Modulating Vertical Boiler) - 84 & 87% Efficient Versions; XFire™ - 95% Efficient All Stainless Steel Condensing and the XTherm® - 96% Efficient Copper & Stainless Steel Condensing.



Performance Engineering XFire™

Continued on page 7

Affiliate Liaison's Report

Continued from page 4



Performance Engineering XTherm®

Lochinvar in Plymouth, MI (734) 454-4480 was represented by Jason Loverich, District Sales Manager. Lochinvar manufactures a full range of residential and commercial water heaters, boilers, pool heaters and storage tanks. Within these product families they provide a full range of efficiencies from a standard of 81% though 99%, allowing Lochinvar to offer the widest range of products and efficiencies when it comes to heating water. With their strong focus on manufacturing quality and R&D they're proud to say they are second to nobody in this industry. For more information regarding the Lochinvar family of products and how these products can assist you in meeting your needs, please contact Jason A. Loverich on his cell at (248) 613-1034.



Lochinvar family of products

Diversified Spec Sales in Oak Park, MI (248) 398-2400 represented by Mike Burdette and Bob Thomas presented their condensing boiler line. The high efficiency P-K MACH® condensing boiler is a universal boiler that is suitable for condensing, non-condensing and combination systems. CSA certified at up to 96% efficiency and delivering actual net thermal efficiencies to 99%, the P-K MACH® boiler is a shining example of their commitment to green technology and innovation. The ultra-high efficiency of the P-K MACH® boiler helps reduce fuel bills by as much as 80%.



Diversified Spec Sales - The high efficiency P-K MACH®

To learn more about the boiler technologies listed above, please contact the people and companies listed. They go beyond many of their competitors to support our mechanical, plumbing and engineering communities. You'll find these people on the job during a boiler start-up, presenting a lunch-n-learn to an engineering firm, calling on end-users with their distributors and giving input on new ideas for future product development.

Our upcoming October 16th Design Class will focus on Domestic Hot Water Systems. Presenting this topic will be Ronald L. George, CPD. Increase your knowledge on how to design water heaters, mixing valves and circulating pumps to work in harmony to provide a safe energy efficient hot water system. Pamela Hartsell will be our Tabletop Champion for this month. She's already signing up vendors so if you want to be included, contact her at phartsell@sesnet.com or (248) 399-1900 x222.

Thanks to everyone for taking a few extra minutes in their busy day to read my article.

As always, I can be reached at dann.holmes7@gmail.com and/or (248) 939-2476.

Dann Holmes,

Viega District Manager and ASPE Region 2 Affiliate Liaison



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Michigan Chapter**

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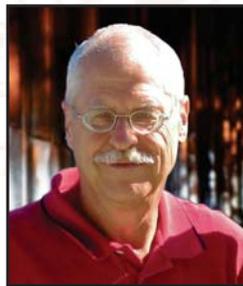
*The Annual Meeting &
Awards Banquet*

Saturday, February 2, 2013 - 6:00 PM

Shriners Conference Center

24350 Southfield Road - Southfield, MI 48075

Open Bar ~ Dinner ~ Entertainment



Keynote Speaker ~ Jim Olszynski

Jim was founding editor of Plumbing & Mechanical magazine in 1984, and until retiring in 2011 held simultaneous positions as Editor of Supply House Times, Editorial Director of Plumbing & Mechanical and Consulting Editor of PM Engineer magazines, all owned by BNP Media Co.

Additionally, Jim wrote a syndicated monthly column titled "Smart Business" that appears in several magazines of BNP Media's Construction Div.

He appears on camera as a plumbing industry spokesperson for the History Channel's Modern Marvels program titled: "Arteries of Civilization: The History of Plumbing." It was first shown in 1997 and has been rerun several times each year since. Jim assisted with production of that show, which grew out of Plumbing & Mechanical's "History of Plumbing" series, which ran in the magazine for a 10-year span during the 1980s and 1990s.

Jim's knowledge of plumbing history led to his being recruited to write organizational histories for several PHC industry groups. These include:

- 100th Anniversary History of the Mechanical Contractors Association of America (MCAA)
- 75th Anniversary History of the Plumbing-Heating-Cooling Information Bureau

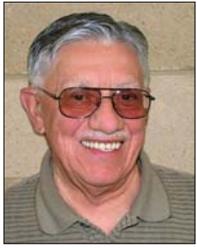
<p><i>John E. Matthews Scholarship Raffle</i> Grand Prize: 50" LG 3D Smart HDTV w/glasses Apple I Pad 16 GB Amazon Kindle Fire 8 GB Less Than 500 Raffle Tickets Printed Tickets are on sale now and will be sold at the Banquet. Need not be present to win! Drawing on Saturday, February 2, 2013 \$10 per ticket / 3 tickets for \$25 / 7 tickets for \$50 Great odds to win! A worthy cause for our industry!</p>		<p>If you would like to make a VALUED donation to the John E. Matthews Scholarship Fund please refer to the ASSE Annual Meeting & Banquet registration form for easy instructions and ASSE THANKS YOU for taking the steps to continue this great tradition of helping young people succeed within this important industry.</p>
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Contact any ASSE Board Member for raffle tickets: A contact sheet for phone and email is available on the ASPE and ASSE web site.

Tickets and forms designed and printed courtesy of the Mechanical Contractors Association of Detroit.

VP Technical Report

Edwin Hawley, CPD



ASPE, Eastern Michigan Chapter
Tuesday, September 18th, 2012
Plumbing Industry Training Center,
Troy, MI.

Evening Programs Design Class
Presentation by: **Joe Hernandez**, CPD
Subject: "Boiler Basics 101,
& Category Venting."

The program started with a short presentation of the Computer's AutoCAD MEP, "REVIT TOOLS & TIPS" by: **Pam Hartsell**. Illustrated in steps, how the detail of the Hot Water Boiler is developed. All the details of the objects that are drawn are done with some simple commands. Various elevations and angles make it very capable to add piping and valves, with all standard components. Once you've learned all the tips, it appears to be simple and quick process to create a complete detailed plan for a Boiler installation. Pam stated that the demo took her much too long; it is normally done much quicker by a trained operator at his work station.

Joe Hernandez then began his delivery with this question.

"What is a Boiler?"

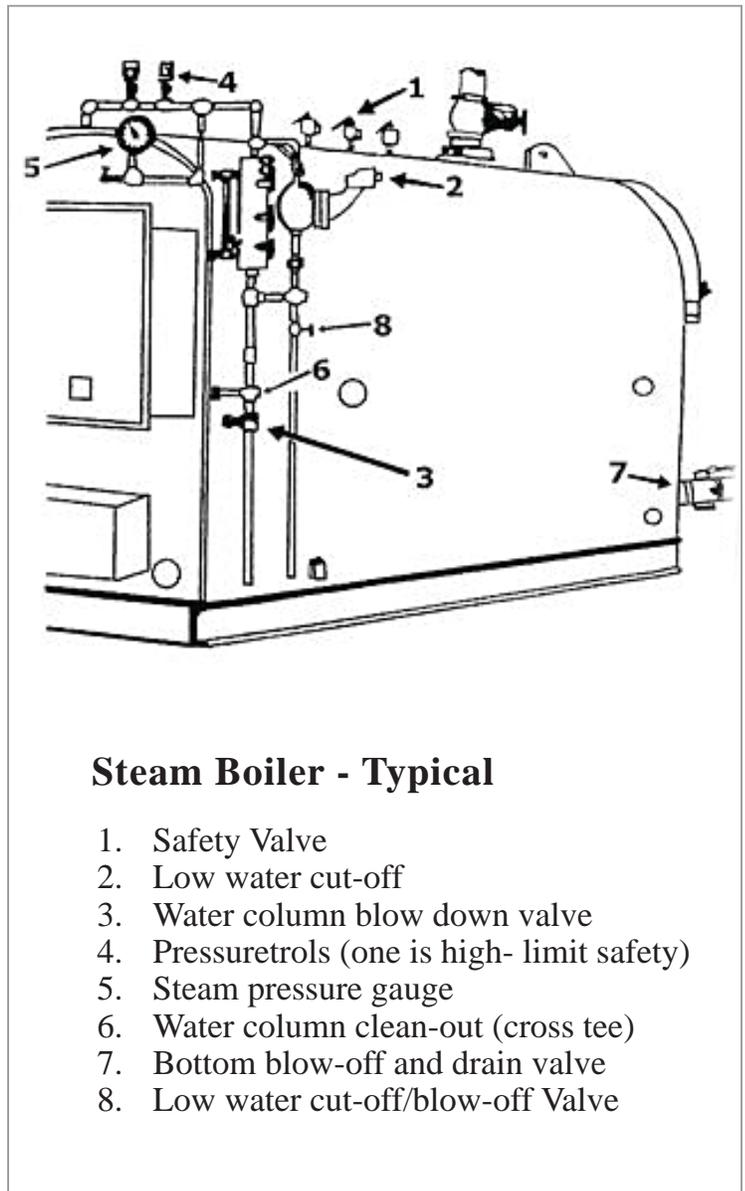
- ❖ An apparatus that converts liquid to steam
- ❖ An apparatus that elevates liquid temperature

Conventional steam boiler

- » Furnace
- » Surfaces to transmit heat
- » Space where steam can form and collect.
- » Fossil fuels
 - ✓ Oil
 - ✓ Gas
 - ✓ Waste fuels

There are two types

- ❖ **Fire Tube Boilers**
 - » Water surrounds the steel tubes of hot gas
 - » Steam generated collects off the water level
 - » Safety Valve allows excess operating pressure to escape
 - » Easy to install
 - » Easy to operate
 - » Fire tube boilers are used for steam locomotives
 - » Used to heat buildings and factory processes
- ❖ **Water Tube Boilers**
 - » Water inside tubes
 - » Gases circulate around water tubes



Steam Boiler - Typical

1. Safety Valve
2. Low water cut-off
3. Water column blow down valve
4. Pressuretrols (one is high-limit safety)
5. Steam pressure gauge
6. Water column clean-out (cross tee)
7. Bottom blow-off and drain valve
8. Low water cut-off/blow-off Valve

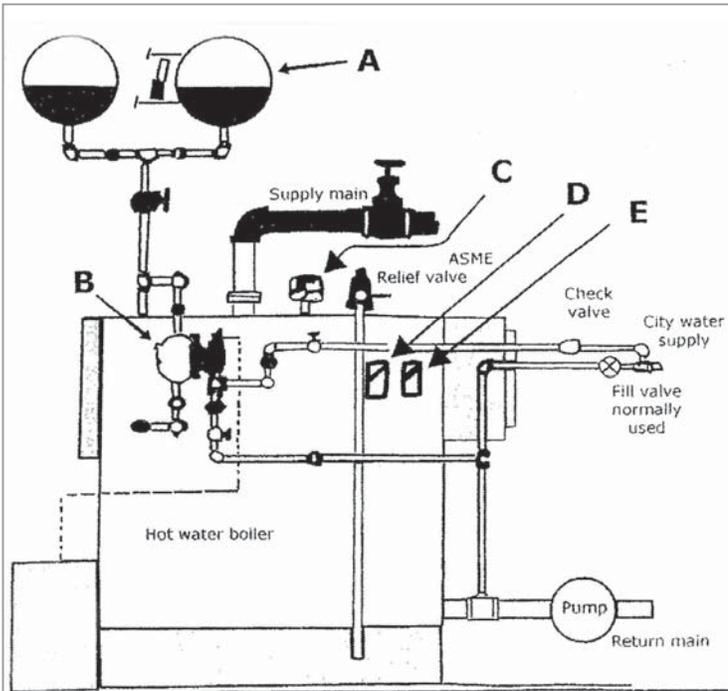
Checking Low-Boiler water level every shift is the most important rule to maintaining proper water level. Low-water and feed water controls are the Elect/Mech device that should be tested daily (failure could result in a boiler explosion). In the Low-water cutoff slow drain test, you would shut off the feed water pump and slowly open the boiler bottom, blow down valve to drain the water from the boiler. The low water should shut down the burner before the water level goes out of sight low; if the burner does not shut off, restart the feed water pump before the water level goes out sight low and immediately troubleshoot the low water cutoff to determine the cause of failure. The boiler must be under constant attendance by a properly licensed engineer at all times during this test.

IMPORTANT NOTICE: While checking codes notice that the *International Mechanical Code* has made the change of TRANSFERRING all the boiler sections and all appropriate items to the *2009 International Fuel Gas Code*.

continued on page 11

VP Technical Report

Continued from page 6



Hot-Water Boiler

- A. Expansion tank
- B. Low water cut/off
- C. Combination temperature/pressure gauge or altitude temperature gauge.
- D. High-limit safety aquastat
- E. High-limit safety aquastat

What is combustion?

- ❖ High speed
- ❖ High temperature
- ❖ Chemical reaction
- ❖ Controlled explosion

What are the products of combustion?

- ❖ Hydrogen + oxygen = intense heat and vapor
- ❖ Carbon + oxygen = intense heat; carbon monoxide; carbon dioxide
- ❖ Sulfur + oxygen = sulfur dioxide and heat

Is the combustion process 100% efficient?

Combustion can never be perfect

- ❖ Top Quality Coal; 20% noncombustible
- ❖ Residual Oil; 10% noncombustible
- ❖ Natural Gas; 6% noncombustible

What are the various types of combustion?

- ❖ Perfect
 - » When all the fuel is burned
- ❖ Complete
 - » All fuel using minimal amount of air above theoretical amount of air needed to burn the fuel.
- ❖ Incomplete
 - » All fuel is not burnt; becomes soot and smoke

What is the requirement for combustion?

- ❖ Oxygen (obtained from the atmosphere) 21% oxygen by volume.
- ❖ 2000 CF required for one gallon of fuel oil 80% eff.
- ❖ 15 CF Oxygen required for One CF of Natural Gas

Nitrogen is an unwanted parasite

- ❖ Contributes nothing to combustion
- ❖ Adds volumes to be vented
- ❖ Heat robber

What is primary air?

- ❖ Controls the rate of combustion
- ❖ Determines the amount of fuel that can be burned

What is secondary air?

- ❖ Controls combustion efficiency by controlling how completely the fuel is burned

What is excess air in combustion?

- ❖ Excess air is the air supplied to the burner that exceeds the theoretical amount needed to burn the fuel

How does the composition of the fuel used influence the combustion air requirements?

- ❖ Fuel composition
 - » Nitrogen, ash, oxygen, sulfur, carbon and hydrogen
 - » Excess air required to complete burn
 - ✓ Chilling effect on the flame
 - » Natural Gas
 - ✓ Slightly less efficient than Oil

Does the altitude affect the required combustion?

- ❖ Sea level to 3,000 ft. weight of oxygen does not vary
- ❖ Greater than 5,000 ft. weight of oxygen is 4/5
 - » Therefore 20% more air by volume must be added for combustion
 - » Fuel Oil does not vary. Same weight at any altitude

continued on page 12

Boiler Design

What is the heat balance for a boiler?

- ❖ Fuel is fed to burner
- ❖ Heat is absorbed by the water
- ❖ Not all heat absorbed

A + B + C

A: Heat energy available in the fuel

B: Heat energy absorbed by any water in the boiler

C: Heat losses

Therefore Efficiency of the unit = B divided by A

What are the energy losses that occur in a boiler?

- ❖ Gasses of combustion to atmosphere, 9%
- ❖ Incomplete combustion, 1%
- ❖ Moisture in the fuel, 1%
- ❖ Moisture in the air, 1%
- ❖ Water vapor produced Hydrogen, 2%
- ❖ Unburned combustion, 2%
- ❖ Radiation, 3%
 - » Approximately: 18–19%

What are the various heating surfaces in a boiler?

- ❖ Boilers do one thing transfer heat
 - » Radiant heating surface
 - ✓ Indirect or primary
 - » Converted heating surface
 - ✓ Indirect or secondary
 - » Extended heating surface
 - ✓ Economizers

What is a “Pass” for a boiler?

- ❖ Refers to the number of times heat is released in combustion in conducted passes before the gasses are vented

How are boilers rated?

- ❖ By the amount of heat that will be produced when fired
- ❖ This is typically the efficiency rating

Which boiler designs are more common?

- ❖ Fire Tube and Water Tube
 - » Fire Tube
 - ✓ Fire in the tube
 - » Water tube
 - ✓ Water in the tube

How do I select a boiler?

- ❖ Four points of concern
 - » System type
 - ✓ Steam or hot water

- » System load
 - ✓ Building maximum and minimum btu/hr.
- » Performance consideration
 - ✓ Efficiency, material
- » Codes and Standards
 - ✓ CSD, ASME, etc.

What is a system load?

Measured in BTU/HR or LB steam

- ❖ Process load
 - » Usually high pressure steam for manufacturing
 - » Heating loads
 - ✓ Building loads
 - » Combination load
 - ✓ Combined heating - process.

What are the performance considerations in selecting a boiler?

Water source: Raw or untreated water is never pure.

- ❖ Common water impurities.

IMPURITY	SOURCE	EFFECT
Algae	Organic Growth	Fouling
Calcium	Mineral Deposit	Scale
Carbon Dioxide	Dissolved Gasses	Corrosion
Chloride	Mineral Deposits	Corrosion
Free Acids	Industrial Waste	Corrosion
Hardness	Numeral Deposits	Scale
Magnesium	Mineral Deposits	Scale
Oxygen	Dissolved Gasses	Corrosion
Silica	Mineral Deposits	Scale
Solids	Un-Dissolved Materials	Fouling

What are the major problems associated with water quality and equipment?

- ❖ Scale formation
 - » Minerals salts form and reduce heat transfer
- ❖ Corrosion
 - » Mineral eaten away due oxidation
 - » Ph values are low
- ❖ Fouling
 - » Evil goo
- ❖ Foaming
 - » Frothy bubbles more evil goo
- ❖ Embitterment
 - » Hair line cracks in highly stressed area .

continued on page 13

VENTING

Venting Systems

- ❖ **Negative pressure**
 - » Atmospheric draft
- ❖ **Positive pressure**
- ❖ **Fan assisted vent system**

How do I determine the venting requirements?

- ❖ **Manufacturer's installation manual**
- ❖ **ANSI 221.13 Standard**
 - » All gas fired low pressure steam and hot water boilers are required to have a vent system category (I, II, III, IV) on boiler rating plate

Note: Category I venting is the most common. It operates on a negative draft principle.

CATEGORY I

- ❖ **Most common**
- ❖ **Hot flue gasses operate above dew point**
- ❖ **10% of the flue gasses are water vapor**
- ❖ **Condensate is very corrosive**
- ❖ **Heated flue gas will naturally gravitate to the cool area causing the draft**

CATEGORY II

- ❖ **Operates with negative pressure in the vent**
- ❖ **Flue products cooled in point where condense**
- ❖ **All Category I, considerations addressed in addition to the condensate**

CATEGORY III & IV

- ❖ **Operate with a positive pressure in the vent**
- ❖ **Must be fully sealed**
- ❖ **Must be evaluated if condensation is likely**
- ❖ **Category III, flue temperature above dew point**
- ❖ **Category IV, flue products cool below dew point, and may condense in the flue**

VENT MATERIAL SELECTION

- ❖ **Category II, III, IV must use AL29-4c venting material**
- ❖ **Category I shall be vented with Type double wall**

Note: Consult manufacturer equipment for vent flue size

BOILER SAFETY DEVICES

Steam Boiler CSD, basic requirements

- ❖ **Each automatic fired low pressure steam vapor boiler - at least two (2) low water cutoff's**
With pumped condensate return system
Lower LWCD to be locked type, manual reset
- ❖ **Each high pressure steam boiler (except Miniature) - at least two (2) low water cutoffs**
Locked types with manual resets

MORE BOILER SAFETY DEVICES

Heating Boiler

- ❖ **Low water cutoff**
 - » Locked type
 - » Manual reset
- ❖ **Forced circulating water tube**
 - » Flow switch
- ❖ **Steam boiler**
 - » (2) pressure control
 - » High limit to be lockout type, and manual reset
- ❖ **Hot Water Heating**
 - » (2) Temperature actuated controls
 - ✓ Fuel supply at preset operating set points
 - (1) High temperature limit control

There are many detailed items, and special experiences that could have been shared with all of those in attendance. However time was too short. I HOPE that these notes can help to do the job.

We always work hard on these programs and hope that they are successful. We have an excellent program lined up for the October the 16th, 2012, at the Plumbing Industrial Training Center. The Presenter is Ron George, and the subject is *Domestic Hot Water Systems*.

I HOPE to see all there.

Edwin Louis Hawley, CPD

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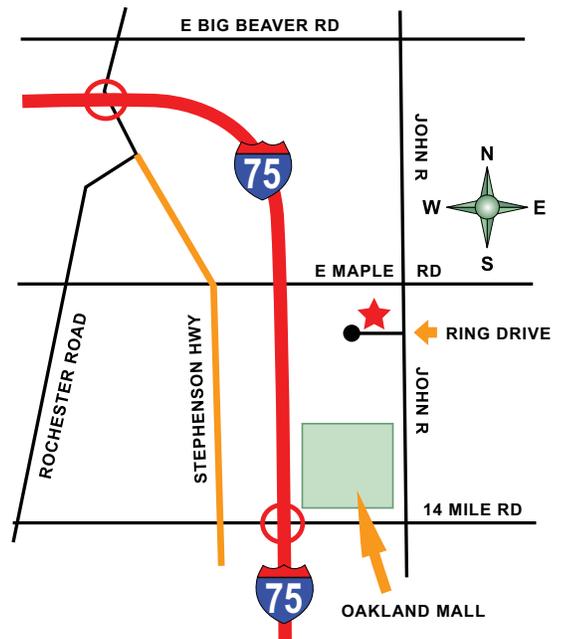
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