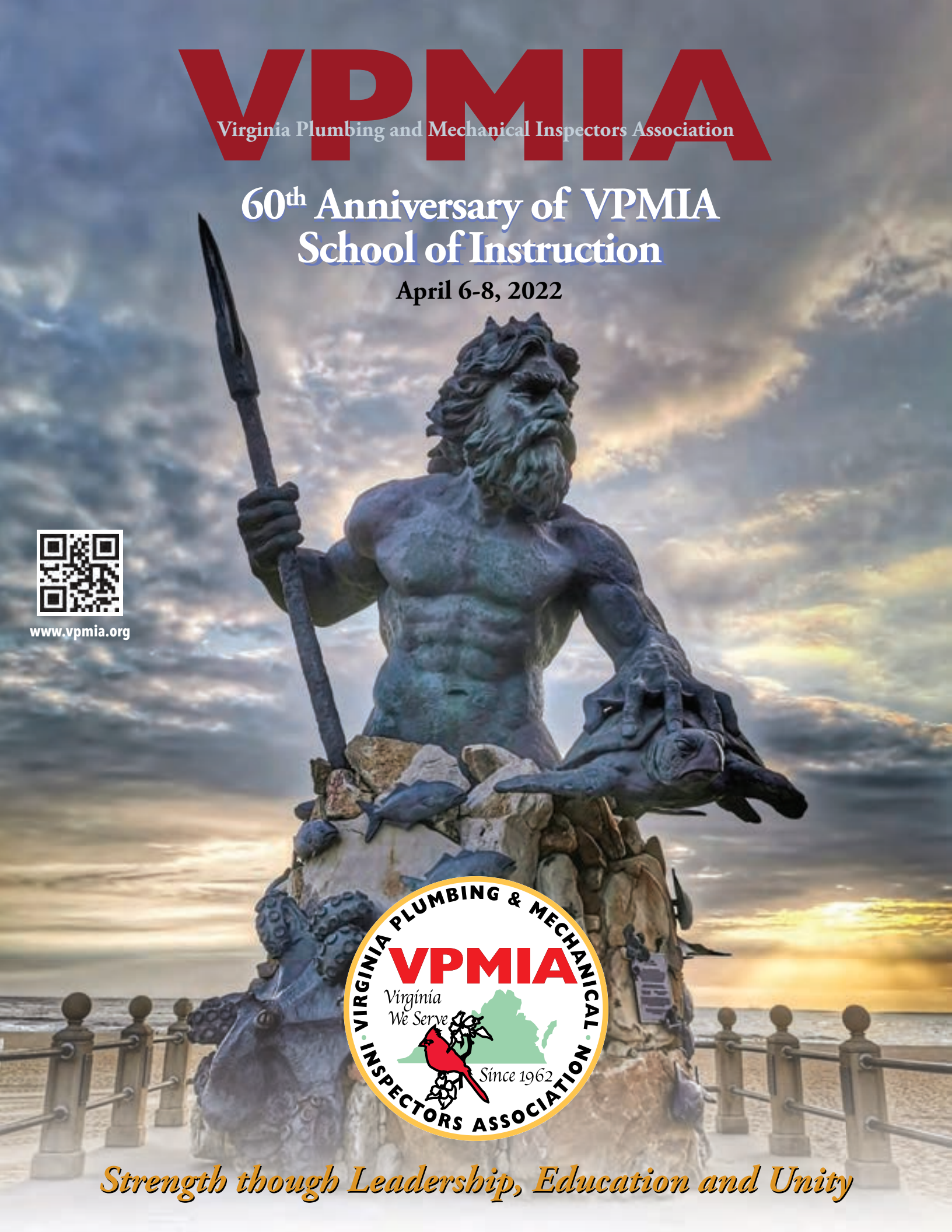
VPMIA

Virginia Plumbing and Mechanical Inspectors Association

60th Anniversary of VPMIA School of Instruction

April 6-8, 2022



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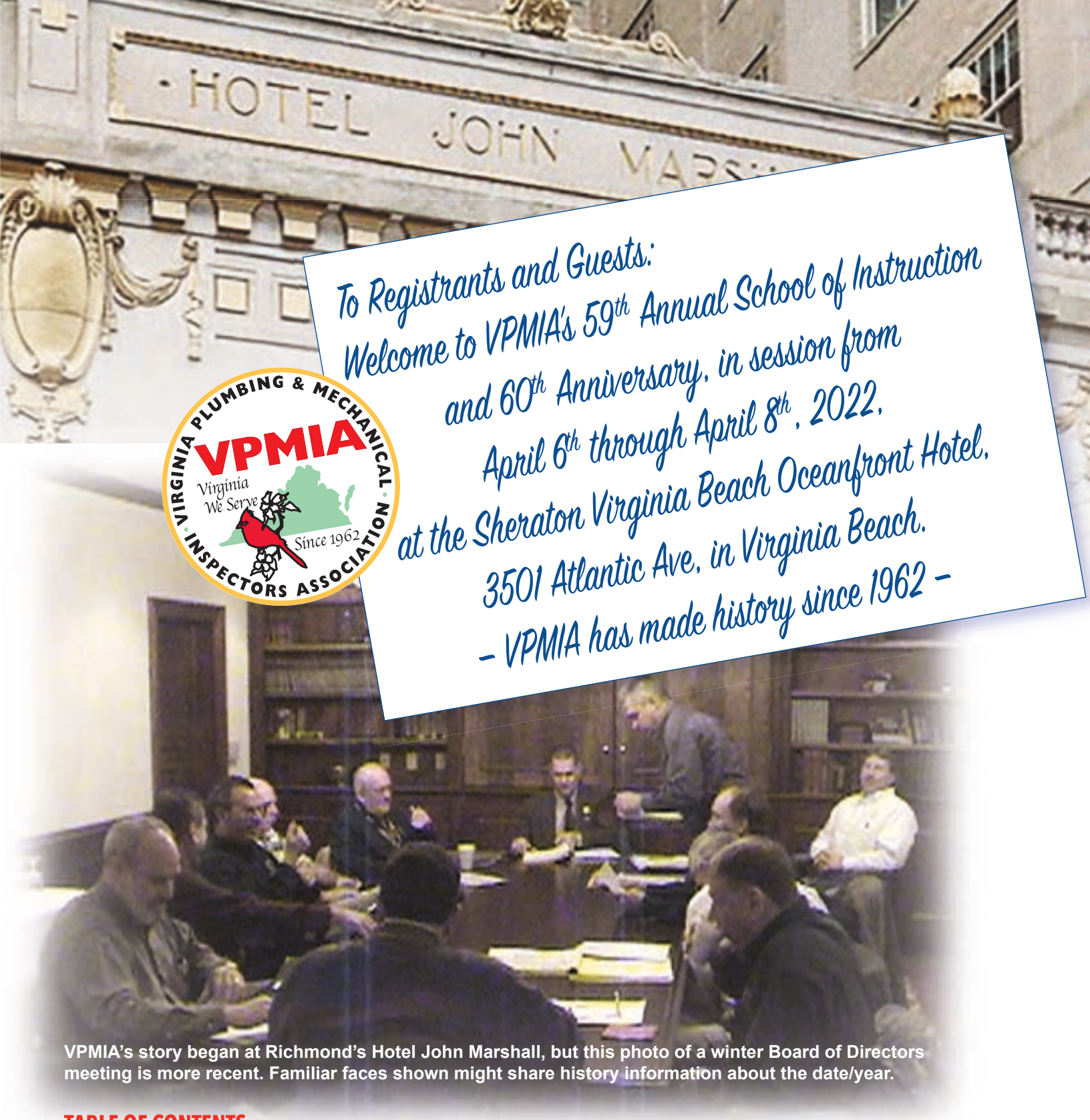
To Registrants and Guests:
Welcome to VPMIA's 59th Annual School of Instruction and 60th Anniversary, in session from April 6th through April 8th, 2022, at the Sheraton Virginia Beach Oceanfront Hotel, 3501 Atlantic Ave, in Virginia Beach.
– VPMIA has made history since 1962 –



VPMIA's story began at Richmond's Hotel John Marshall, but this photo of a winter Board of Directors meeting is more recent. Familiar faces shown might share history information about the date/year.

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President's Message

Fellow VPMIA Members,

Hope everyone and their families are healthy and well during this challenging time in our country. The VPMIA membership family has faced enormous challenges as an organization during this COVID-19 virus pandemic. Despite those challenges, VPMIA leadership, membership, associate members, and supporters, have continued to move forward in our mission to support the membership through the collective unity and efforts of our Officers, District Directors, Committee Chairs, and supporting membership.

VPMIA has continued to provide assistance to our state and local code officials by providing technical code application input about new plumbing and mechanical system installations through participation in the ICC National Code Development process. This included review of proposed code changes for the 2021 Group A code cycle, sharing that information with our ICC Region VII neighboring states, and our presence and participation in the ICC Code Hearings in Pittsburgh. We were also a sponsor and an exhibitor at the Governor's Virginia Housing Conference, and we continue to collaborate with Department of Housing & Community Development sub workgroups as part of state code study and code adoption process.

VPMIA members and its' supporters should take great pride in the legacy of decades of work this organization has contributed to building safety since 1962.

This legacy should serve as the foundation for building the future of our organization. I would like to encourage our general membership to join our Board of Directors: volunteer to be on a committee, chair a committee, become a District Director, and eventually become an Officer. And during this journey, please share with your colleagues about all the great public service that is provided by VPMIA.

I would like to thank all those dedicated, hardworking, patient, and unselfish members of VPMIA that work diligently to complete our mission, and all our supporters that stood by us and placed ads in the yearbook. Without that teamwork, the 60th Anniversary Yearbook could not have been created, and you are greatly appreciated, THANK YOU!

To the general membership, including Board of Directors, it has been a privilege to serve this term as your President. I THANK YOU!

Ellis McKinney
VPMIA President, 2021

Looking forward to a Graves Mountain Summer School of Instruction.




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22-21084

Wednesday, April 6

7:30 am - 8:00 am	**Registration/Sign in**
8:00 am - 9:30 am	**PLUMBING CLASS: Keeping plumbing systems and their users safe from contamination.**
9:30 am - 10:00 am	**Break**
10:00 am - 11:30 pm	**PLUMBING CLASS** (Continued)
11:30 pm - 12:00 pm	***Report from Nominating Committee Nomination of 2022/2023 officers***
12:00 pm - 1:00 pm	**Lunch**
1:00 pm - 2:30 pm	**MECHANICAL CLASS: Shifting to environmentally friendly refrigerants and the effect this has on mechanical codes and standards.**
2:30 pm - 3:00 pm	**Break**
3:00 pm - 4:30 pm	**MECHANICAL CLASS** (Continued)
4:30 pm - 5:30 pm	***General Membership Meeting***
5:30 pm - 6:00 pm	**President's Welcome**
6:00 pm - 7:30 pm	**Dinner**

Thursday, April 7

8:00 am - 9:30 am	**GAS/MECHANICAL CLASS: 2018 IMC & IFGC Combustion Air and Venting**
9:30 am - 10:00 am	**Break**
10:00 am - 11:30 am	**GAS/MECHANICAL CLASS** (Continued)
11:30 am - 12:00 pm	**Visit Sponsor Tables**
12:00 pm - 1:00 pm	**Lunch**
1:00 pm - 2:30 pm	**GAS/MECHANICAL CLASS** (Continued)
2:30 pm - 3:00pm	**Break**
3:00 pm - 4:30 pm	**GAS/MECHANICAL CLASS** (Continued)
5:00 pm - 6:00pm	**Reception**
6:00 pm - 8:00pm	**Banquet/Awards/Officer Installation**

Friday, April 8

7:00 am - 8:30 am	**Breakfast Buffet**
8:30 am - 10:00 am	**FEMA DISASTER RESPONSE: Coping with disaster, are you ready?**
10:00 am - 10:30 am	**Break**
10:30 am - 12:00 pm	**GAS CLASS: 2018 IFGC Gas Piping, Methods and Materials**
12:00 pm	SOI adjourns

–Visit www.vpmia.org for more information about VPMIA–

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ACKNOWLEDGMENTS:
Publishing the VPMIA Yearbook is a joint effort. Please join us in gratefully acknowledging this year's advertisers (listed on page 34) and recognize the exhibitors, listed above.

The Advertising and Yearbook Committee gratefully acknowledges the technical article contributions of Wes Davis and Jack Rise of ACCA, Nicholas Capezza of the Pool & Hot Tub Alliance, and of Mark Fascel of ICC. Special thanks to Vic Hines for conducting a most successful advertising campaign, to John Seay and Ron Bladen for updating the VPMIA history, to Anthony McMahan, for his expertise and assistance throughout the entire process, and to Jane Fitzgerald for the 2022 Yearbook's design/layout plus Doyle Printing for producing it.

– Ellis McKinney, President

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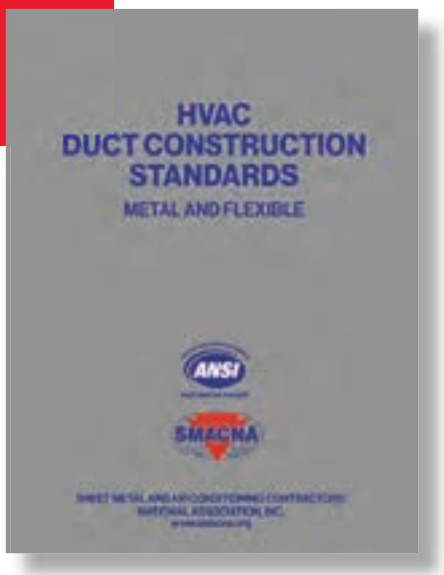

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2021 DIRECTORS

District 1 Director	**Paul Hickman**
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2021 COMMITTEE CHAIRS

Advertising/Yearbook	Ellis McKinney
Auditing	Anthony McMahan
Awards	Tom Clark
Bylaws	Dustin McLehaney
Certification/Education	Anthony McMahan
Finance	Fred Crowell
Information Technology	Jane Kim
Legislative	Ronald Clements
Membership	Christopher Martin
Nominating	Tom Clark
PMG Code	Richard Grace
Time & Place/SOI	Bob Adkins

2021 AD HOC COMMITTEE CHAIRS

BCAAC	Randy Pearce
Building Safety Month	Tom Clark
VCEC Conference	Dustin McLehaney
VBCOA Liaison	David Beahm

Mission: VPMIA is an association of code professionals dedicated to promotion of uniform enforcement and development of the codes throughout the Commonwealth to assure the health, safety, and welfare of its citizens and anyone who may live, work, or visit the state of Virginia. The pursuit of this endeavor is achieved through close, open, and equal working relationships with design professionals, builders, contractors, material manufacturer's and others involved in the construction industry. VPMIA supports the ICC, its goals and mission

Strategic Plan Mission: VPMIA's strategic plan is to advance our mission through training in order to promote better understanding of the benefits and efficiency of using model codes. The association promotes teamwork, while embracing fairness and respect to all involved parties, always maintaining open communications in every aspect to those who participate in the process.

Vision Statement: VPMIA members are committed to providing code development leadership and continuous training that results in uniform application of the codes. We look for opportunities to partner with all who are impacted and strive to develop and deliver codes and standards that result in health, safety, and welfare protection for the public.

www.vpmia.org, VPMIA's website, provides news and industry information as well as membership benefits for those interested in being part of this history-making organization.

Socializing in 2019 was not much different than in1976!

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Resolution of Respect for Vernon Wayne Hodge

Whereas our colleague and friend Vernon Wayne Hodge of Woodford, VA passed on January 13, 2022, with his family at his side, in the home he built timber by timber;

Whereas Vernon Wayne Hodge, was born in Charlottesville, VA. He worked as a building inspector, and for 29 years as a technical and code development specialist for the Virginia Department of Housing and Community Development. He was a contributing member of the Virginia Plumbing and Mechanical Inspectors Association (VPMIA), and received the Code Development Leadership Award Jack A. Proctor Sr. Active Award for 2015-2016;

Whereas Vernon Wayne Hodge is survived by his wife of over 25 years, Terry Hodge, and four children: Emily Hodge (Pehrson) of West Milford, NJ; Michelle Kube Graves (Robert Graves) of Fredericksburg, VA; Joseph Hodge (Carly Hudson) of Wilmington DE; and Erin Kube (Harry Rosas) of Ruther Glen, VA. He adored his grandchildren: Evan Medlin and Tripp Graves, and Isaac and Julian Rosas Kube. Vernon had many loving relatives, including Rachel Kube Goodloe (Gordonsville, VA), his first wife Mary Hodge (Woodford, VA), and his brothers Allen Hodge (Kim Hodge) of Fredericksburg, VA, and Perry Hodge (Jane Hodge) of Wichita, KS; and

Whereas VPMIA notes with great sadness the passing of Vernon Wayne Hodge; now, therefore, be it

Resolved, that VPMIA, on behalf of its members:

(1) joins the family of Vernon Wayne Hodge in celebration of his life and do also offer their most heartfelt sympathy at the loss of this cherished family member;

(2) stands in readiness to assist the family of Vernon Wayne Hodge in any manner desired or requested; and

(3) that this resolution be respectfully submitted to Vernon Wayne Hodge's family as a permanent memorial to the memory of Vernon Wayne Hodge.

Adopted this eleventh day of March 2022.

Signed: Ellis McKinney, VPMIA President
Signed: Anthony McMahan, VPMIA Vice President

Resolution of Respect for Richard Carlyle Witt

Whereas prior to his passing on March 8, 2022, at the age of 67, Richard C. Witt, was preceded in death by his father, Roy Browning Witt, Jr., and sister, Mary Leigh Witt;

Whereas Richard C. Witt, an active member of the Virginia Plumbing and Mechanical Inspectors Association (VPMIA), retired from Chesterfield County after 35 years of dedicated service as Director and Building Code Official;

Whereas Richard C. Witt worked alongside his colleagues and legislators to establish safe building codes and practices, he was appointed to the Technical Review Board by Governor Northam and served on the Board of Housing and Community Development. He received the 2016 Code Official of the Year Award by the International Code Council. He also received VPMIA's Outstanding Service Gordon I. Dameron Active Award for 2007-2008, the Lifetime Membership D. Paul Jack Active Award for 2012-2013, and the Code Development Leadership Award Jack A. Proctor Sr. Active Award for 2016-2017;

Whereas Richard C. Witt is survived by his devoted wife of 45 years, Susan Witt, and children, Nathan Witt (Tina) and Jennifer Patterson (Clint); grandchildren, McLellan Witt, Colton Patterson and Matthew Patterson; mother, Judy Witt; siblings, Barry Witt (Tamara), Laura King (Dave), Nancy Martin (Bob), Carol Witt, and Kim Beyer; and many loving nieces and nephews; and

Whereas VPMIA notes with great sadness the passing of Richard C. Witt; now, therefore, be it

Resolved, that VPMIA, on behalf of its members:

(1) joins the family of Richard C. Witt in celebration of his life and does also offer heartfelt sympathy at the loss of this cherished family member;

(2) stands in readiness to assist the family of Richard C. Witt in any manner desired or requested, and

(3) that this resolution be respectfully submitted to Richard C. Witt's family as a permanent memorial to the memory of Richard C. Witt.

Adopted this eleventh day of March 2022.

Signed: Ellis McKinney, VPMIA President
Signed: Anthony McMahan, VPMIA Vice President

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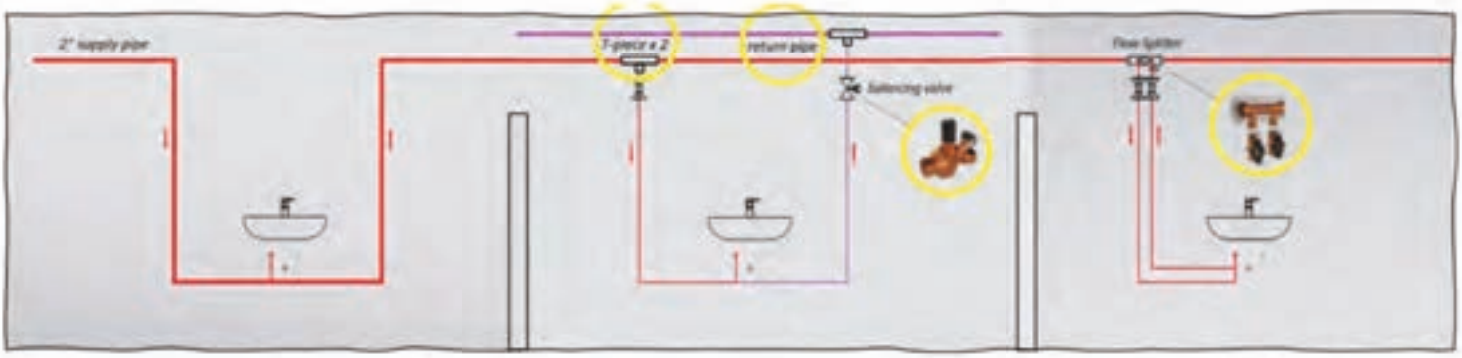
2018 IECC Energy Code Compliance Made Easy



1. ***Serpentine master distribution pipe into room***
   - ***Difficult to route with large pipe and insulation***
   - ***Expensive pipe material***

2. ***Use a traditional method with return piping, T-piece connections & balancing valve***
   - ***Return piping required***
   - ***Balancing valve adjustments***
   - ***More connections***
   - ***Increased points of failure***

3. ***Use the Venturi Flow-Splitter Valve***
   - ***Single valve***
   - ***No return piping***
   - ***No adjustments***

With a maximum 24" dead-leg from recirc-loop to fixture for a ½" supply pipe, there are three ways to achieve compliance with the 2018 IECC energy code. Using the Kemper Flow-Splitter (Option A) is the simplest to plumb and uses the least pipe.

Potable Water Hot and Circulation
// Reduce non-circulating pipe lengths
// Minimize heat loss in the hot water installation

Potable Water Cold
// Maintain water quality throughout the installation
// Avoid stagnation and heat gain in the piping system

The International Swimming Pool and Spa Code (ISPC)

by Nicholas Capezza, PHTA

The **ISPSC** exists as part of the International Code Council's family of I-Codes including the **International Residential Code (IRC)** and **International Building Code (IBC).** Developed through a partnership between the International Code Council and the Pool & Hot Tub Alliance, the **ISPSC** remains the only comprehensive swimming pool code coordinated with the I-Codes and Pool & Hot Tub Alliance Standards.

Standards developed by the Pool & Hot Tub Alliance go through the rigorous ANSI standards development process and cover a wide variety of industry topics. The 16 Standard, developed by the Association of Pool and Spa Professionals (the Pool & Hot Tub Alliance's previous name), is recognized in federal law to address suction outlets.

Updates are made to the **ISPSC** and all I-Codes on a three-year cycle. These updates look to address new concerns, clarify existing topics, and ensure harmony between the family of codes. The adoption process involves thorough scrutiny of proposals with input from code officials, subject matter experts, and industry stakeholders. Each Code has Committee Action Hearings and Public Comment Hearings prior to balloting by the IBC Council's voting body.

As the I-Codes are considered a family of codes to be used together, code language and requirements already developed in one Code will be referenced in another Code where relevant.

The Commonwealth of Virginia recently adopted the 2018 **ISPSC**, having previously adopted the 2015 edition. The measure to adopt new versions of the I-Codes is not unusual and shows the jurisdiction wants to remain on the cutting edge of code development. Major enhancements new to the 2018 **ISPSC** include:

Definitions – Terms that were updated throughout the 2018 family of codes, including the ISPSC, were alteration, approved agency, labeled, owner, and repair.

General Compliance Items – Colors and finishes – except for residential pools and residential spas, interior colors and finishes may not obscure objects within the pool or spa.

Wastewater discharge – for wastewater discharge, the connection shall be through an air gap while following the requirements of the **International Plumbing Code** or **IRC.** Examples of wastewater include backwash from filters and deck drains.

Barrier requirements – spas and hot tubs equipped with a lockable safety cover and pools equipped with a powered safety cover are excepted from other ISPSC barrier requirements. These covers must comply with ASTM Standard F1346.

Decks – the design and installation of decks around pools shall meet requirements found in the **IRC** or **IBC**.

Water heaters – each type of water heater must meet the requirements of the relevant Standard referenced in the **ISPSC**. Additional Code language was adopted to cover solar thermal water heaters including referencing installation requirements in the **International Mechanical Code**.

Potable water – in order to protect the potable water supply from backflow issues, potable water supply system connection shall be through an air gap and comply with appropriate Codes and Standards referenced in the **ISPSC**.

Aquatic Recreational Facilities – The 2018 **ISPSC** defines an Aquatic Recreational Facility as "a facility that is designed for free-form aquatic play and recreation. The facilities may include, but are not limited to, wave or action pools, leisure rivers, sand bottom pools, vortex pools, activity pools, inner tube rides, body slides and interactive play attractions."

Deck showers – clarifying language was added on how many showers required by the Code may be located on the deck or entrance of each pool at the facility.

Permanent Inground Residential Swimming Pools – The 2018 **ISPSC** defines a residential swimming pool as "a pool intended for use that is accessory to a residential setting and available only to the household and its guests."

Entries and exits – entry and exit designs must receive approval by the relevant jurisdictional authority. Secondary entries and exits shall be provided when the deep area of the pool exceeds five feet, unless the exit may create a hazard and, in those instances, handholds shall be provided.

Pool stairs – updated language addresses the walking area requirements for tread dimension and area and riser heights on pool stairs. The previous language in the **ISPSC** was considered vague and there became a necessity to amplify that the Code language was specific to walking areas.

Code officials and other interested parties are encouraged to participate in the I-Code process by submitting proposals and participating in hearings during the code cycles.

The Pool & Hot Tub Alliance provides classes on the **ISPSC** in order to assist officials in jurisdictions adopting the **ISPSC** for the first time or moving to a new edition of the Code. Educational materials regarding the **ISPSC** are available on the Pool & Hot Tub Alliance website at **http://www.phta.org.**

About the author: *Nicholas Capezza is the Program Director of Codes and External Standards for the Pool & Hot Tub Alliance. In this role, he serves as the lead on code development work in national code-making bodies and state code cycles, oversees outside standard development work by other standard organizations, and is the point person for code interpretation and compliance questions.*

Significant Changes to the International Plumbing Code IPC,® International Mechanical Code IMC,® and International Fuel Gas Code

By Mark Fasel, International Code Council (ICC)

The International Code Council develops Significant Change publications as a resource to code users for identifying code revisions and understanding the reason behind the changes. This is a valuable resource for the authority having jurisdiction during the code adoption process.

Only portions of the total number of code changes are discussed in the publications. The changes selected are identified for many reasons ranging from their frequency of application, special significance or change in application. The changes included in the publications are accompanied by illustrations or photographs to aid in and enhance the reader's understanding of the specific code revision. Each code change is identified by type, be it an addition, modification, clarification, or deletion.

The Significant changes publications were first developed with the 2015 editions of the codes and have proven themselves to be invaluable to code users. These tools were created due to the fact it would be impractical to include significant change language, illustrations, and photos into the code publications. Let us take a sneak peek at some of the content that exists in the Significant Changes for the 2021 IPC, IMC and IFGC.

IPC

602.3.5: Potable Water Pumps to Comply with NSF 61

CHANGE TYPE: Modification

CHANGE SUMMARY: Pumps used to supply drinking water must conform to NSF 61.

2021CODE: 602.3.5 Pumps.

Photo courtesy of gettyimages.com/prodrive2002

NSF 61 - compliant potable water pump

Pumps shall be rated for the transport of potable water. Pumps in an individual water supply system shall be constructed and installed so as to prevent contamination from entering a potable water supply through the pump units. Pumps intended to supply drinking water shall conform to NSF 61. Pumps shall be sealed to the well casing or covered with a water-tight seal. Pumps shall be designed to maintain a prime and installed such that ready access is provided to the pump parts of the entire assembly for repairs.

CHANGE SIGNIFICANCE: A number of major manufacturers of potable water pumps have had their pumps third-party certified to NSF 61 for many years, even though the code did not require compliance. Now that the majority of manufacturers have pumps that comply with the standard, adding this requirement to the code provides additional safety for systems that supply drinking water.

Products intended for contact with drinking water are tested and reviewed in accordance with the requirements contained within NSF/ANSI/CAN Standard 61 Drinking Water System Components standard. This standard limits the number of impurities that a product can potentially introduce into drinking water and typically include faucets, faucet supply lines, pipe, valves, meters, pumps, and fittings that are for use to convey potable drinking water and other components of the potable water system such as drinking fountains, water coolers and water dispensers.

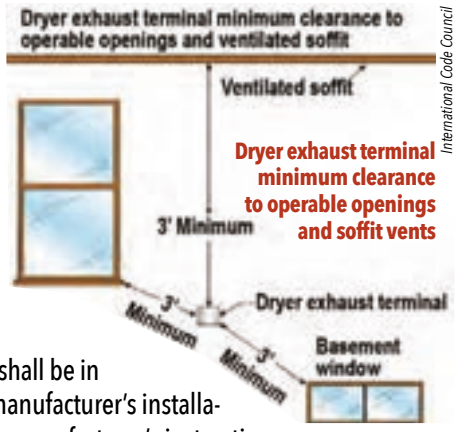
It is important to remember Section 303.4 Third-party certification in the IPC requires that plumbing products and materials required by the code to be in compliance with a reference standard shall be listed by a third-party certification agency as complying with the referenced standards. When listed, the products will be marked with NSF-61. If the product is too small to incorporate the marking, the marking will appear on the product packaging.

IMC

504.4.1: Termination Location for Dryer Exhaust

CHANGE TYPE: Modification

CHANGE SUMMARY: New text was added to address the possibility of dryer exhaust air being reintroduced into a building interior.



International Code Council

2021 CODE: 504.4.1 Termination location. Exhaust duct terminations shall be in accordance with the dryer manufacturer's installation instructions. Where the manufacturer's instructions do not specify a termination location, the exhaust duct shall terminate not less than 3 feet (914 mm) in any direction from openings into buildings including openings in ventilated soffits.

CHANGE SIGNIFICANCE: Previously, the code did not address the required separation between building openings and clothes dryer exhaust terminations. The appliance installation instructions may or may not specify such separation distances. This new section defers to the appliance installation instructions, and if the instructions are silent on the matter, a 3-foot minimum separation distance is specified. Building openings include doors, windows, ventilation and makeup air intake louvers and ventilated soffit intake openings.

As seen in the excerpt above this code revision clarifies the requirements for separation of dryer exhausts from building openings thus preventing the opportunity for the dryer exhaust being

reintroduced to the building interior. The visual aid, although not all inclusive, offers examples of what would be considered building openings including ventilated soffits. Clearance consideration should also be given to building intake openings for make up or combustion air as well. Refer to section 504 for all code requirements on dryer exhaust ducts.

IFGC

503.10.7: Vent Connector Junctions

CHANGE TYPE: Addition

CHANGE SUMMARY: New text addresses the juncture of appliance vent connectors and the required method.

2021 CODE: 503.10.7 Connector junctions. Where vent connectors are joined together, the connection shall be made with a tee or wye fitting.

CHANGE SIGNIFICANCE: This new requirement was added to address, primarily, single-wall vent connectors that are joined together before connecting to a chimney, B-vent, or Type L vent. An age-old practice was to cut a hole in the side or bottom of a single-wall metal pipe vent connector to join a smaller vent connector pipe to it. For example, a 6-inch vertical single-wall pipe vent connector serving a boiler or furnace has a hole cut in the side of it and a 3-inch single-wall pipe vent connector serving a water heater is inserted into the hole and fastened in place by bent tabs that are screwed or riveted to the larger vent connector pipe.

International Code Council

Vent connectors joined by tee or wye fittings

Such connection is not substantial or secure, allows considerable leakage that can affect draft, creates an obstruction inside the larger vent connector, typically ignores connector sizing criteria and is, at best, poor practice. This new section requires the use of manufactured tee or wye fittings. This has not been an issue with double-wall connectors because they are necessarily joined with tee and wye fittings designed for the purpose.

As you can see, the 2021 Significant Changes to the IPC, IMC, and IFGC are a great resource for the code user. The publications familiarize the user with many significant changes to the codes and more importantly supply understanding of the reasons behind the changes. Be sure to visit https://codes.iccsafe.org/ and view the other available resources to assist in your continued education and understanding of the codes. Wishing you all a happy and healthy 2022.

About the author: Mark Fasel is the Director of PMG Technical Resources, International Code Council mfasel@iccsafe.org

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History, revisited

Yearbook Committee members researched available records to update VPMIA's history this year

Note: The original history by Paul C. King was compiled from the minutes of the Virginia Plumbing Inspectors Association (VPIA) meeting April 14, 1962.

A small group of Virginia plumbing inspectors met in 1959 following a seminar at VPIA in Blacksburg. The group discussed the possibility of forming a statewide association for the purpose of dissemination of information touching on new methods, materials and testing procedures used in the plumbing and heating profession.

Following the three-day seminar, the inspectors returned to their respective jobs. Being dedicated to their profession, these men contacted individual members of the Virginia State Master Plumbers Association. Cards were mailed asking the inspectors if they were interested in forming such an association.

The first meeting of the group, which would be called The Virginia Plumbing Inspectors Association (VPIA), took place April 14, 1962, at the Hotel John Marshall in Richmond. Attending were fourteen plumbing inspectors and three associate members. (These names are published as Charter Members.) The first order of business for the group was to name a temporary chairman, Mr. Mannion, followed by nomination and election of officers.

Officers elected were: President, Charles E. Mannion, Richmond; Vice President, Paul C. King, County of Fairfax; Secretary, John B. Mason, Henrico County; Treasurer, James B. Jones, Jr., Martinsville; and Sgt. At Arms, E. R. Carr, Winchester. Board of Directors named included: U.E. Allen, Jr., Portsmouth; Frank B. Bosman, Arlington County; and Gordon Dameron, Danville.

A committee consisting of inspectors King, Chairman, Carr and Cooper were appointed and instructed to draw up the proposed bylaws for the Association. A general discussion followed covering the aims and purposes of the organization. A date was set for the next meeting and the group adjourned its meeting to join the Master Plumbers Association, which was in session at this time.

Bylaws Adopted

VPIA met November 3, 1962, at 1014 East Broad Street, Richmond. The Bylaws Committee presented its report, which was duly adopted. Article II of those bylaws set forth the purpose of the organization:

A. Cooperate in the formulation of Virginia Plumbing Code Standards.
B. Promote uniform understanding and application of all city, town and county plumbing codes.
C. Secure and promote uniform administrative ordinances and inspection methods.
D. Promote closer cooperation between inspectors, inspection departments, health departments, plumbing contractors, and the public.
E. Promote and improve the standards of the profession of plumbing inspectors.
F. To institute and maintain a central organization to properly test new materials and methods to be used in this Commonwealth.

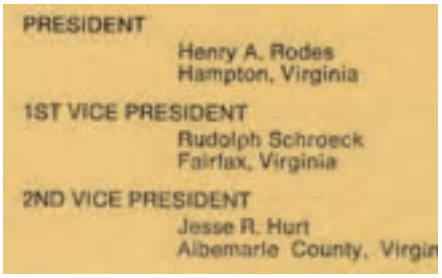
PAUL CLIFTON KING
1903 - 1968

School of Instruction

The Association embarked on a program when Paul C. King served as proxy which has proven to be well accepted by those men serving in all phases of the plumbing industry. Known as "School of Instruction and Conference," the program owes its success to D. Paul Jack, Hampton. Through his efforts, almost single-handedly, Mr. Jack managed to obtain speakers from Texas, across the South, and as far west as Wisconsin. The first annual School of Instruction and Conference was held in Hampton on April 17 and 18, 1964, and was a huge success. Each succeeding year has found the meeting generating more interest in the plumbing profession.

President Ed Parsons calling the first meeting of the School and Conference to order

Inspectors have found that the Annual School and Conference has given us the opportunity to carry out some of the aims of VPIA, namely: "the dissemination of new methods and materials" on a state-wide basis. Our speakers are not only considered experts in their fields, but they also present facts which help to generate enthusiasm



among those Association members interested in promoting the plumbing profession.

Executive Secretary

In 1969, the Board of Directors appointed an Executive Secretary with the responsibilities to direct the school for Qualified Plumbing Inspectors and to publish a newsletter for the purpose of keeping inspectors abreast with the workings of the Association and other related items of interest that inspectors in Virginia and the southeastern states should be concerned with. Thus far, the newsletter has accomplished its purpose and its present circulation includes eighteen states.

We are proud to be members of VPIA. The knowledge we have gained during the past years has made it possible for us to be cognizant that the plumbing profession is indeed one of the leading 'trades' in the building industry.

History Update

In 1986, the Board of Directors instructed the Bylaws Committee to update and revise the bylaws to meet and comply with the present-day regulations. President John W. Thurston appointed Edward J. Baldwin, Jr., Chairman, and D. Paul Jack, as part of a two-member committee to study and propose the needed changes.

In April 1988, at the Twenty-Fifth Annual School of Instruction, as the yearly conference had now come to be known, after two years of study and consideration by the committee and Board of Directors, the amended bylaws were approved and adopted by the voting membership of VPIA.

On July 21, 1990, at the Association's summer meeting, the voting membership of VPIA voted unanimously to change the name of the Association to the Virginia Plumbing and Mechanical Inspectors Association (VPMIA). The change was felt necessary because of the number of jurisdictions within the Commonwealth of Virginia having separate mechanical inspection divisions whose inspectors were seeking educational opportunity. It was the feeling of the membership that this Association could provide that opportunity of educational instruction.

Inasmuch as there were some other concerns regarding the bylaws, the ByLaws Committee, consisting of Edward J. Baldwin, Jr., Chairman, Kenneth R. Snyder, Sr. and D. Paul Jack, Vice Chairmen, William F. Hines, Dennis W. McNaughton, Thomas C. Roberts, and Paul M. Adams, Executive Secretary, was directed by President Robert M. Broome to study and submit amendments to the bylaws reflecting the name change and other necessary changes needed to include the mechanical personnel. Through the course of the study, an executive board, four regional director's positions and specific duties of the president-appointed chairpersons were incorporated. The amended bylaws were approved by the committee on September 6, 1990, by the Board of Directors on October 6, 1990, and by the general membership on December 1, 1990. After a period of working under the executive board, which consisted of the elected officers and the four regional directors, the Board of Directors instructed the ByLaws Committee to once again review and recommend any needed changes deemed necessary. This resulted in more changes being proposed, the most significant being a change in the fundamental membership and voting rules. The system used since the beginning of the Association was that of jurisdictional membership with a limit of one vote per jurisdiction. The proposed amendments included a change to individual membership with one vote per active member (associate members must remain without a vote in order to protect chapter membership in building officials and code administrations international).

The progress of these amendments, of the proposals and counter proposals, spanned the terms of three presidents and three bylaws' committees. The first action of the general membership, which resulted in a change, was made on March 26, 1994, at the conclusion of the Thirty-First Annual School of Instruction. That change eliminated the executive board and dictated meeting schedules. Action was taken on June 25, 1994, which clarified the responsibilities of various officers and both board and presidential appointments. The action which resulted in the current bylaws was taken at the winter meeting on December 3, 1994.

During the course of the bylaws change process, another transition for our Association was under way. In the spirit of promoting closer cooperation between inspectors, inspection departments and plumbing contractors, the membership decided to hold the Twenty-Eighth Annual School of Instruction in Norfolk. The dates were April 11, 12, and 13, 1991, and this coincided with the annual meeting of The Virginia Cross Connection Control Association (VCCCA), The Virginia Association of Plumbing, Heating and Cooling Contractors (PHCCVA), and the Richmond Chapter of The American Society of Plumbing Engineers (ASPE). Although the various associations involved held their own separate educational and business meetings, the trade exposition, where new products and materials could be analyzed and evaluated in a "hands-on" manner, was a central focal point. This cooperation has proven to be a successful format and continues with most of the same organizations being involved.

VPMIA was founded for the purpose of education and communication. As further evidence of this commitment, beginning in 1994, the annual summer meeting was

expanded to include a day of technical training. With the consolidation of BOCA, ICBO, and SBCCI, into the International Code Council (ICC), and subsequent adoption of the International Codes in Virginia, the potential for growth had expanded and we took up the challenge. We continued to be a leader in the support of education and code development. In 2002, we received the BOCA Chapter of the Year Award for excelling in educational opportunities, membership, and participation in BOCA activities. In 2004, we received the Directors Award from the Virginia Department of Housing and Community Development (DHCD) in recognition of our members' participation in the development and delivery of plumbing and mechanical code educational modules for the Virginia Building Code Academy (BCA), as well as conducting statewide training in plumbing, mechanical and fuel gas code requirements, and service on the BCA Advisory Committee. In 2005, the Association was honored to accept a Chapter Merit Award from ICC.

Making History

Closer ties with our partners in code development and administration both within Virginia and throughout the country have developed. VPMIA, along with the Virginia Building and Code Officials Association (VBCOA) and the Virginia Fire Prevention Association (VFPA) came together on October 21, 2005, for the first ever joint conference in Hampton, Virginia, at Hampton's brand-new Conference Center.

The Conference was a four-day event that offered training in all areas of code enforcement and gave the participants an opportunity to network with each other, develop code knowledge, and earn valued continuing education credits towards certification maintenance. The training, which included Legal Aspects of Code Enforcement, Commercial Kitchen Hood Systems, Hydrogen Refueling, Property Maintenance, and overviews of the 2003 ICC International Fire, International Building, and International Residential Codes, was the center piece of the Conference using top trainers from around the country.

We have strengthened our Association by focusing on our responsibilities and purpose. Our foundation now consists of a vision, a mission, and a strategic plan, to further our goals. Thus, we go onward, not knowing what challenges are to be faced tomorrow, but confident that through our dedication to learning today, we will be prepared.

ICC CEO, James Lee Witt, former FEMA Director, and ICC President Henry L. Green, were on hand to install Officers and speak to the members. They spoke about the ICC Foundation, helping Code Officials in the Gulf Region that was devastated by the hurricanes last summer, get back on their feet. They also spoke regarding ICC's efforts to provide uniform codes for users nationwide. Mr. Witt is spearheading an effort called HEROS. It helps wounded war veterans retrofit their homes for handicapped accessibility as they return from war with devastating handicaps.

A tabletop show with manufacturers of building materials, computer systems, and organizations such as ICC and UL, were on hand to discuss their products and services. Several of the table-top vendors also taught classes in their specialized areas.

The social events were a big hit and well attended. On Saturday evening participants were treated to a buffet dinner and casino night at the Air and Space Museum, in Hampton. Everyone had a great time at the casino night and enjoyed the flight simulators. The next morning you had your choice of a golf outing, or a fishing trip on the Chesapeake Bay. Although there wasn't any hole in ones, and very few fish caught, everyone had a good time and took advantage of the opportunity to network.

2005 was indeed a fulfilling year for VPMIA as evidenced by receiving the ICC Chapter Merit Award and having participated in the first ever joint conference. Additional joint conferences have been held throughout the Commonwealth.

Also in 2005, the Advertising and Yearbook Committee transformed the its look from pocket-sized and copied into a letter-size, publication, printed in color. The new look was well-received by VPMIA members and the businesses that placed ads in the Yearbook. Beginning in 2008, technical articles were added courtesy of ICC and the Air Conditioning Contractors of America. In 2022, we were fortunate to gain a new technical contributor, the Pool and Hot Tub Association.

In 2006, VPMIA and other Virginia Associations voiced strong reservations about a proposed merger of ICC and the International Association of Plumbing and Mechanical Officials to develop a single plumbing code and single mechanical code. While there was mutual agreement on some key matters, the merger failed due to a major difference between the two organizations concerning the code development process. According to then ICC President, Henry Green, … "our members and stakeholders made it clear that they were unwilling to deviate from the ICC governmental consensus process."

In 2009, VPMIA offered training for contractors that was recognized as continuing education units (CEUs) to maintain their

Continued on page 32

Correctly Sizing Variable-Capacity Heat Pump Equipment

The new ACCA Manual S® (2022) will allow heat pumps to be sized for heating when you follow the rules.

The growing use of renewable energy is pushing many communities and energy efficiency programs towards "electrification," the shift to using all electrical products. This translates to an increased use of electric heat pumps as opposed to fuel-fired appliances. Heat pumps have always done a great job providing cooling, and some heating. Modern variable-capacity equipment provides for very robust heating capacity too.

When heat pumps are oversized in areas where there are humid summer conditions, comfort is often compromised, especially during milder (and wetter) shoulder seasons. Another big problem with any type of equipment oversizing is excessive wear. Oversized equipment starts and stops far more often than right-sized equipment. The excessive starts jolt the compressor and motor windings into action, and a few minutes later, it shuts down. Original equipment manufacturers (OEM) do a great job building durable products. However, even great products will fail faster when they must start and stop thousands of times more often than right-sized equipment.

To increase comfort and reduce excessive wear, ACCA's Manual S® sets boundaries for all types of residential equipment. This article focuses on variable-capacity heat pumps.

The Basics

This article quickly dives into draft language in the new Manual S® variable-capacity equipment sizing requirements. If you want to learn more about electrification, please look here: https://en.wikipedia.org/wiki/Electrification. If you need an introduction to heat pump technology, you can learn much more in ACCA's Manual H: https://www.acca.org/store#/productDetail/30aa4e09-bc20-e511-80fa-c4346bacebf4/. Finally, if you need an overview of variable capacity heat pump equipment, I recommend you speak with your favorite distributor.

The Terms

To understand how Manual S® developed its sizing guidance, it's important to know a few key terms: **equipment capacity, minimum compressor capacity, heating loss,** and **size factor.**

Equipment Capacity: Variable-capacity equipment produces a wide range of heating/cooling over a wide range of operating conditions. Some OEMs do this better than others. The only way to tell how the equipment you sell will perform is to look at the OEM's performance data. This will tell you how it works in your area because Seattle is different than Phoenix, which is different than Denver, which is different than Miami.

Variable-capacity equipment can operate at several different speeds, but each product has a maximum and minimum compressor speed. So, to use the new heat pump sizing guidance, the OEM will need to provide the capacity at these speeds for a range of operating conditions, and the maximum and minimum compressor speeds.

Variable Capacity Equipment Sizing Condition **Single-split system (Ducted or Ductless), and Multi-Split Outdoor Unit Air-Air and Water-Air *Equipment***	
Simplified Cooling Only	
MaxC: *Total cooling size factor*	1.30 – 0.90
Latent cooling size factor	≥ 1.00
Simplified Heat Pump - Heating	
Simplified Cooling requirements apply	
Heating size factor	≥ 1.00
Minimum compressor heating size factor	≤ 0.80

Minimum Compressor Capacity: This is the lowest capacity documented in the performance data at the operating conditions. Also known as Minimum Capacity (MinC). The new Manual S® requires that the equipment is sized to meet the load and that the lowest compressor speed must be less than the design heating load. Manual S sets this new limit at 0.80 (80 percent) of the heat loss. A 45,000 BTU/h heating load would need a heat pump with a minimum compressor heating capacity of 36,000 BTU/h. Another way to think about this is that the least amount of heat that the variable-capacity equipment can produce must be 20 percent smaller than the heating load. This ensures that the heating system cannot satisfy the heating load at low speed. This new definition and sizing metric opens the door to use heat pumps to be the sole source of heat in a home.

Heating Loss: Homes lose heat at different rates for different reasons. **Location:** homes in Chicago lose heat faster than homes in Houston. **Construction:** tight and well-insulated homes lose less heat than leaky uninsulated homes. You get the idea. Perform a rigorous Manual J® load calculation to determine the heat loss and gain.

Size Factor: This is the equipment capacity divided by the load. Since there are different types of capacities and loads (heating, total cooling, sensible cooling, latent cooling, etc.), there are also different size factors. The intent of these terms was to simplify the guidance, create concise requirements, and make them easier to understand and use. This article discusses how to use the minimum compressor (heating) size factor.

New Manual S® Guidance – Variable-Capacity Equipment

Manual S® requires the heat pump to meet the heating and cooling requirements:

Cooling:

- The cooling capacity must be between 1.30 and 0.90, and
- The latent cooling capacity must be greater than or equal to the latent load.

Heating:

- Meet the heating load at maximum heating capacity (the heating size factor must be 1.00 or greater), and
- The minimum heating compressor heating size factor must be less than or equal to 0.80. As mentioned, the variable-capacity equipment can produce must be 20 percent smaller than the heating load.

Application: (see below)

ACCA's Manual S® must complete the public review process before it is published. Then it can be adopted by code, or promoted by an energy efficiency program, or accepted by your local jurisdiction. This will provide the option to select a heat pump to deliver all of the home's heating needs. Give your customers the comfort they want and a system that will serve them for years to come.

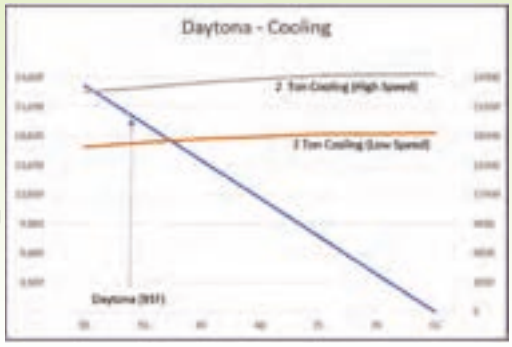
About the author: Wes Davis is the director of technical services for ACCA. He can be reached at wes.davis@acca.org or 703-824-8847.

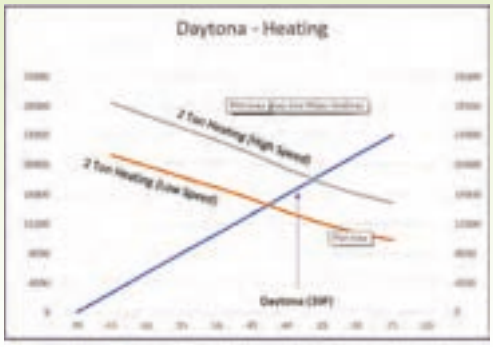
Example: ***Daytona Beach, FL***

Winter: Design Temperature: 39F
Heat Loss: 17,095 BTU/h
Heating Capacity – High:18,682 BTU/h (109 percent)
Heating Capacity – Low: 12,982BTU/h (76 percent)

Summer: Design Temperature: 91F
Heat Gain (Total): 22,357 BTU/h
Heat Gain (Sensible): 20,144 BTU/h
Heat Gain (Latent): 2,213 BTU/h
Cooling Capacity – High: 22,700 BTU/h (102 percent)
Latent Cooling Capacity: 5,406 BTU/h (244 percent)

The heating capacity neatly falls between the heat pump's maximum and minimum capacities and meets the Manual S® requirement to meet the heating load. The minimum compressor heating meets the "under-sized" requirement (80 percent) so it will not suffer from excessive short cycling.





Winter heating is necessary, but in Daytona, cooling is king. This unit provides the cooling capacity to meet the load and has an abundance of latent capacity. In the previous version of Manual S® (2014) there was a limit to the latent capacity, the new manual removed this limitation.

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Carbon Monoxide (CO): How much air is required for complete combustion?

By Jack Rise, CMS

Every cubic foot of natural gas requires 10 cubic feet of air for complete combustion. That's a pretty high ratio at 10:1. Why so much air? The problem with air is that it is mostly nitrogen (78.084 %). We don't need nitrogen to sustain combustion. The nitrogen is inert. We need oxygen. But only about 1/5 of the air contains oxygen (20.9476 %).

That begs the question, how much space is needed in a confined area to ensure that the proper amount of air is present for complete combustion? The answer is, according to all of the mechanical codes, 50 ft3 per 1000 Btuh input of all appliances in the confined space. For example, if we had a 120,000 Btuh input natural gas furnace and a 50,000 Btuh input natural gas hot water heater in the same utility room, that would mean:

- 120,000 Btuh gas furnace
- 50,000 Btuh hot water heater
- 170,000 total Btuh input
- 170 x 50 = 8500 ft3 required.
- And, if the ceiling height is 8 feet, then 8500 / 8 ft. ceiling = 1062.5 ft2 required.

Now, if we had the typical 8′ x 5′ utility room in a finished basement. That would amount to only 40 ft2. We would need more space/air.

Where will you get the air from?

Confined spaces like furnace rooms, boiler rooms, or utility rooms are of most concern. If you were to take the air from an adjacent area, like a finished basement, as in Figure 1, then, you would need two openings, one within 12″ of the ceiling and one within 12″ of the floor. Each opening must have a minimum free area of one square inch per 1000 Btuh of the total input of all the appliances in the enclosure.

So, in our example utility room, with 170,000 Btuh total input, we would need two openings each with a free area of 170 in2. If we wanted to take advantage of the open space between studs (14″), then, 170 / 14 = 12.14″. A 14″ x 12″ opening would be a little too small. Two 14″ x 14″ openings would be an excellent choice. Remember, the codes we work under establish minimum standards. Also, when choosing a grille to cover those openings, pay attention to the free area (Ak) of the grille. *Continued on page 30*

Figure 1

Figure 2

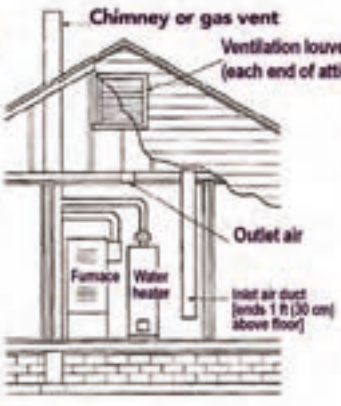

Figure 3

Figure 4

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(Continued from page 28)

You can opt to take the air from a ventilated attic and a ventilated crawl space, as in Figure 2. Now, you will require two openings, one within 12" of the ceiling and one within 12" of the floor. Each opening must have a minimum free area of one square inch per 4000 Btuh of the total input of all the appliances in the enclosure.

Another possibility is to take all of the necessary air from a ventilated attic as in Figure 3, and the opening requirements will be the same (one square inch per 4000 Btuh of the total input).

You can also take all of the air from outside via ducts, as in Figure 4. Now, your requirements are, two openings, one within 12" of the ceiling and one within 12" of the floor. Each opening must have a minimum free area of one square inch per 2000 Btuh of the total input of all the appliances in the enclosure.

What if you can't get large air ducts or openings to the outside?

What if your boiler room is an interior room and there is no good way to get air ducts to the outside or to a vented attic or crawl space? Not to worry. There are mechanical devices that can bring the air into that interior utility room. For instance, Field Controls makes a device they call a Fan In A Can. Using this product (Model CAS-4) you would be able to supply enough combustion air for our furnace and hot water heater (170,000 Btuh total input) with one single 4" round duct up to 152 feet away from an outside wall. You can electrically interface this product with the appliances in the utility room so that when any one or all of them fire up, the necessary outside air will be introduced into the utility room

It is the installing and/or servicing contractor's responsibility to make sure that the proper amount of oxygen is present for complete combustion to occur. Make sure that you and everyone on your team understands these principles.

Get a good handheld CO detector and learn how to use it properly. The safety of your customers should always be your first priority.

– Jack Rise, CMS, Owner at Jack Rise HVAC Technical Trains

About the author: Jack Rise, CMS, is a Certificate Member Specialist of the Refrigeration Service Engineers Society.He has extensive industry experience having worked as a contractor for 18 years, as a distributor of HVAC products for 13 years and for a major HVAC manufacturer for 5 years.In 2004 Jack formed his own company, Jack Rise HVAC Technical Training, and works out of his office in Tampa, Florida.

Jack is an ACCA/EPIC certified instructor for all of the ACCA residential and commercial design manuals including the 8th Edition of Manual J (Residential Load Calculations), the 3rd Edition of Manual D (Residential Duct System Design), the 5th Edition of Manual N (Commercial Load Calculations) and Manual Q (Commercial Low Pressure, Low Velocity Duct System Design). Jack travels extensively around the country conducting seminars on residential and commercial load calculations, system design and on the use of HVAC computer based software.He was an RSES instructor for 10 years, currently runs training sessions for NATE and EPA/CFC Section 608 Certifications and ACCA/ANSI Standard 5 (HVAC Quality Installation Standard).

Jack has authored two books as companion manuals for both Manual J and Manual D. He is the author and presenter of the ACCA HVAC Essentials series and the NATE Essentials series of training CDs. He is a 35+ year member of RSES, a Life Member of the North Jersey Chapter of ACCA, an associate member of ACCA-Florida and FRACCA and a Life Member of the NATE Technical Committee.

Editor's note:*It is with great sadness that we report Jack Rise passed away on December 12, 2021. Jack's innumerable contributions and devoted commitment to the HVAC field are evidenced within his bio. He was considered to be a positive, generous, and funny person to his friends and family, and he strongly supported the Wounded Warrior Project. His generosity, kindness, and knowledge will be greatly missed.*

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HISTORY *(Continued from page 21)*
various certifications. That same year, Virginia's Department of Housing and Community Development (DHCD) accredited VPMIA so that all our SOI training classes qualified towards the continuing education for inspectors, as required by USBC/DHCD.

Members benefited from VPMIA's first free SOI at Graves Mountain Lodge in July. Meanwhile, the availability of new technologies impelled the organization to embrace changes within its operations: the website was made more user friendly; the Office of Treasurer gained accounting software; and a new laptop computer was purchased to bring onsite registration and classroom activity tracking into the 21st century.

In 2011, VPMIA was awarded the ICC Chapter of the Year. Bane Compton, then VPMIA President, gave an inspiring acceptance speech after receiving the award during the 2011 ICC Conference in Phoenix, AZ

This same year was marked with the passing of Jack Allen Proctor, Jr., well known as the "Father of the Virginia Uniform Statewide Building Code". To honor Jack Proctor's accomplishments, DHCD renamed the Virginia Building Code Academy to the Jack A. Proctor Virginia Building Code Academy. In 2012, VPMIA established the Jack A. Proctor, Sr. Code Development Leadership Award to recognize those VPMIA members who are leaders in the code development process. Jack was a VPMIA Honorary Member.

Early 2013, a proposal to eliminate the requirement for plumbing, mechanical and electrical Tradesmen CEU's was raised. It was approved by the Board for Contractors and by the Governor. A concerted effort to reverse this initial approval was undertaken by various organizations throughout the Commonwealth, and included contractors and other ICC Chapters.

Those efforts were rewarded when in December 2013, the DPOR Board for Contractors voted not to eliminate mandatory CEU's for Virginia Tradesman.

In 2014, at DHCD's suggestion, VPMIA made a contribution to and acquired a booth at the Governor's Housing Conference. Said conference consisted of DHCD, VHDA, and other organizations to present a conference regarding revitalization and community development, however, involved very little building code associated training. VPMIA, ICC, DHCD, and VBCOA all had tabletops together and introduced building codes to the conference for the first time. VPMIA continues to support this event.

At the General Membership Meeting at Graves Mountain, a motion was made and approved unanimously that Associate Members be allowed to serve as Committee Chairs. All present agreed that our Associate Members are an integral part of VPMIA and bring unmeasurable value to our organization.

In 2015, VPMIA made a donation and provided a letter of support to the Women in Code Enforcement and Development of Virginia (WICED of VA). WICED of VA became the first state chapter of the national WICED organization as well as the first woman-focused ICC state chapter in the nation in December 2015.

VPMIA was one of WICED's host Chapters when ICC held its 2018 Annual Business Meeting and Code Development Conference in Richmond.

In response to the Governor's shut down during the pandemic of 2020, the 57th Annual SOI did not take place. However, the Yearbook was developed and sent to every VPMIA member. The Summer SOI, which was to be held at Graves Mountain, was also cancelled.

In 2021, VPMIA held a virtual SOI and branched out on social media with a Facebook page to help keep up on VPMIA business, BOD meetings, news articles, etc.

A huge part of VPMIA history is not defined by a certain date, but by the continuous, strong, and influential participation in the code process. The hard work done by the PMG Code Committee and other contributing members has gained well-deserved recognition from their peers for being forces to be dealt with. VPMIA has also collaborated with other code organizations over the years to promote the most worthwhile and beneficial codes.

VPMIA continues in the lead to increase state-wide, training opportunities; continues partnerships with DPOR and DHCD; supports mentoring programs; and promotes and participates in ICC's Building Safety Month every May.

VPMIA maintains an important presence in ICC Region VII Chapter, which includes Delaware, Maryland, New Jersey, West Virginia, Virginia, Pennsylvania, and the District of Columbia. Three VPMIA members, Steve Shapiro, Bill Dupler, and Guy Tomberlin, have served as Presidents of ICC.

Over the past decade, the Bylaws Committee has made considerable revisions to the VPMIA bylaws and to the Board of Directors Job Duty and Committee Description Policy. Participants on that Committee should be commended for their efforts.

VPMIA's history-making continues through the efforts of its membership; 2022 will add more accomplishments to this record. ■

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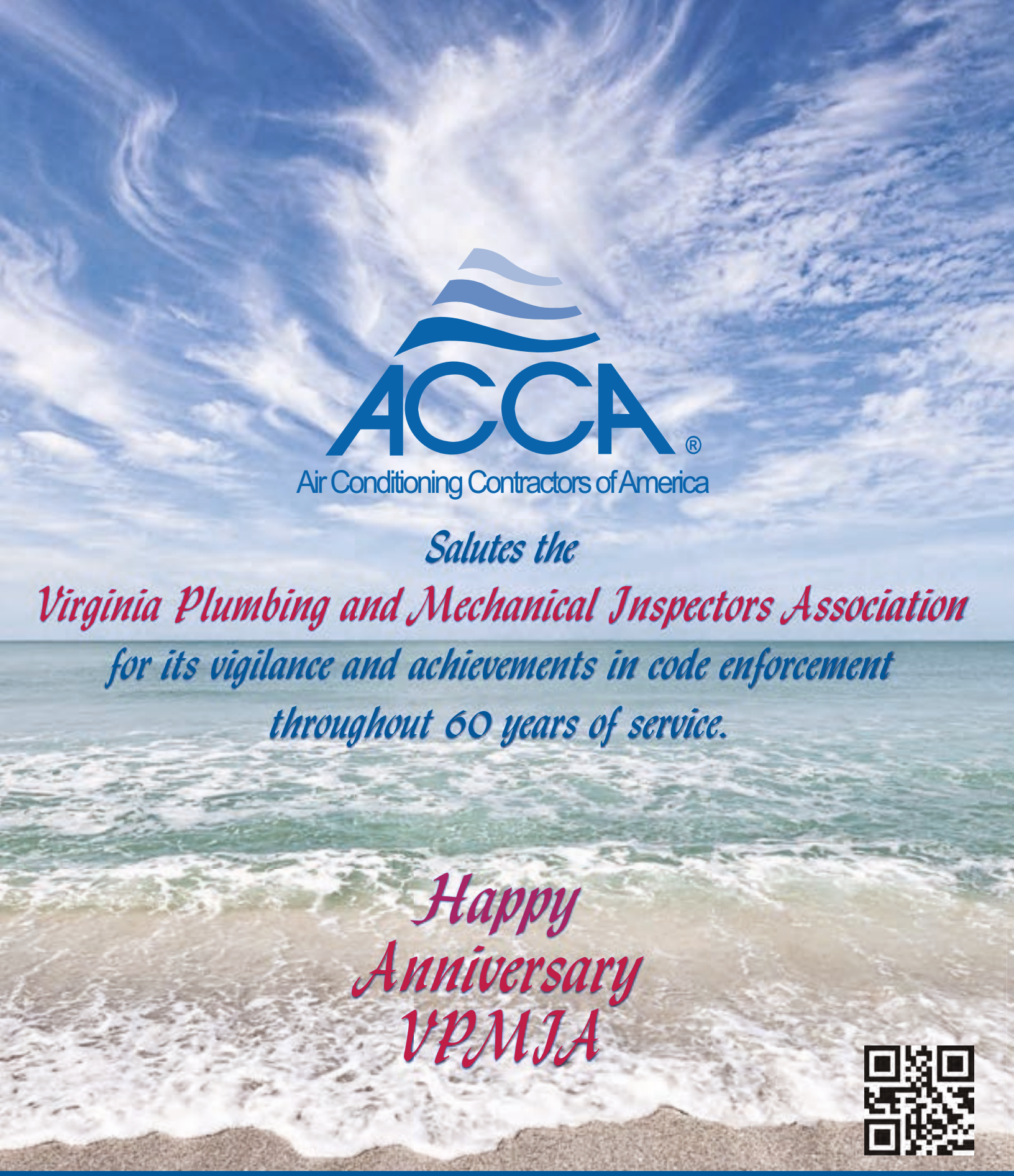

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