ASHRAE Southwest Florida Chapter

February 2024 Edition

Upcoming Events

Saturday, February 10th, 10 am – 2 pm

- **STEMtastic Day of Discovery**

February 16th & 17th, 10 am – 3 pm

- **Thomas Alva Edison Kiwanis Science Fair**

Wednesday, February 21st, 11:30 am – 1 pm

- **Monthly Meeting**

SWFL ASHRAE Chapter Meeting Announcement

Date: Wednesday, February 21st, 2024
Location: CROWNE PLAZA AT BELLTOWER SHOPS
Start Time: 11:30 a.m. to 12:00 p.m. Networking
12:00 p.m. to 1:00 p.m. Lunch meeting and main program
Cost: COST: $35.00 PER ATTENDEE – RESERVATIONS ARE A MUST
NO COST FOR COLLEGE STUDENTS WITH A VALID STUDENT I.D.
Pre-Pay via www.paypal.com to swfl.ashrae@gmail.com
RSVP by 19FEB24 via the following link: https://forms.gle/is36BoUN2MBprFAz8

For Last-Minute RSVPs, please email casey.hazen@trane.com We will try to accommodate on a case-by-case basis.

Main Program:

Weighing the Pig vs. Making it Fly: Improve Energy Performance while Maintaining IEQ through Retro-Commissioning

A lot of existing building stock needs to have its energy, and thereby operational carbon, improved if we are to meet the challenges for net-zero energy or carbon-neutrality in the next few decades. The improvement of the existing building stock, which is often looked at as energy hogs, can be greatly improved through the retro-commissioning process. This session covers the stages of weighing the pig (benchmarking) versus actively making improvements for systems. Actual projects for laboratories, hospitality and gaming, and university facilities will be used to demonstrate how to use retro-commissioning to make your pig fly.

Presenter:

Wade H. Conlan, P.E., BCxP. CxA, LEED AP BD+C

Wade H. Conlan, P.E. has over 27 years of commissioning and design engineering experience in the industry in addition to his illustrious career in many levels of ASHRAE. He received his Bachelor of Architectural Engineering from Penn State in 1995 and currently serves as Hanson's Commissioning & Energy Discipline Manager whose team does work around the world. He has led retro-commissioning projects on more than 65 million square feet of buildings around the world. He has also led many commissioning, energy audit, and condition assessments.
In ASHRAE, Wade has been an active participant for years on many levels, including being a past Chapter President and Regional Refrigeration Chair. He is currently a Director-at-Large on the Board of Directors for ASHRAE. Wade joined as a student in 1994, chaired the Environmental Health Committee, lead the ASHRAE Epidemic Task Force's Building Readiness Team, chaired SPC 110 – Method of Test for Fume Hood Performance, chaired TC 9.10 Laboratories, was a voting member of SSPC 300 – Building Commissioning, a voting member of GPC 1.1, and a chair of GPC 1.6P – Commissioning for Data Centers. Wade has been published in many technical documents, including the ASHRAE Journal. He also has spoken at, and chaired, numerous ASHRAE Conferences on topics of energy, indoor air quality, and standards.

A message from Ms. Gena Knight, SWFL ASHRAE President

ASHRAE Southwest Florida Chapter

Greeting SWFL ASHRAE,

Welcome to the month of February and the time of year we celebrate one of our most famous snowbirds, Thomas Edison.

February kicks off the 86th Annual Edison festival of light and includes several opportunities for you to serve your community and spread the word about ASHRAE.

Some highlights:
February 10th is the STEMtastic Day of Discovery from 10AM-2PM at the Caloosa Sound Convention Center which helps bring Science, Technology, Engineering, Math and the Arts to children and families alike.

February 16th & 17th is the Thomas Alva Edison Kiwanis Science & Engineering Fair from 10AM-3PM at Alico Arena in Estero. This event gives student to flex their brains and pursue project-based research on topics that they find intriguing or challenging.

More information on the 86th Annual Edison festival of light may be found here: https://edisonfestival.org/

Interested in learning more about Thomas Edison, visit https://www.thomasedison.org/ .

Wishing you a February full of inspiration!

- Gena Knight

SWFL Chapter President 2023-2024

ASHRAE Southwest Florida Chapter

Upcoming ASHRAE Meetings (Topics TBD)

February 21st, Lunch
March 13th, Dinner
April 10th, Lunch
May 8th, Dinner

Refrigeration – Jeff Brooks

Geothermal Cooling: Everything You Need To Know

By
Dandelion Energy

Did you know that you can use your yard to cool your home in the summer?

In this post, we'll give you a thorough rundown of all things geothermal AC: what is it, how does it work, how does it compare to conventional AC systems, and how it differs from geothermal heating. We'll also help you understand some of the major advantages of geothermal AC, including efficiency, cost, convenience, comfort, and sustainability.

I thought geothermal was for heating your home. Can geothermal be used for cooling?

Yes! Your geothermal heat pump is actually a two-in-one HVAC system used for both heating and cooling. Despite the misleading name, geothermal "heat pumps" are just as effective at cooling your home in the summer as they are at heating it in the winter!

Read More

ASHRAE Social Media

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SWFL_ASHRAE

Student Activities – Gary Devore

2024 Thomas Alva Edison Kiwanis Regional Science & Engineering Fair

The Science Fair is fast approaching. *February 17th* will be here before you know it. Don't forget to sign up for judging online at zFairs: https://fl-rsef.zfairs.com/

Don't forget to make your tax-deductible contribution to Edison Fairs before the end of the year! All donations are welcome, whether large or small, and can be made online at: https://edisonfairs.org/

Apply to STAMP with the QR code!

Student Training & Advocacy Mentoring Partnership (STAMP)
Realizing the great impact that mentors have on students, The Foundation has implemented the Student Training & Advocacy Mentoring Partnership (STAMP). STAMP is a program that offers students the opportunity to achieve success by providing them college and career planning resources and volunteer mentors to give students assistance, guidance, motivation, and accountability to work hard and to ensure they graduate from high school to continue their education either through technical training or earning a college degree. It is a multi-year commitment for at-risk high school students to invest in their future and increase the high school graduation rate and post-secondary educational opportunities.

The STAMP program strives to accommodate eligible students, match them with mentors, and assist them in acquiring scholarships and grants to cover the cost of attending college or other post-secondary training. Students and their families, mentors, school coordinators, and Foundation staff all work together through the STAMP program and are instrumental in helping students pursue their post-high school education and career goals. Students will also be able to attend STEM@work events to learn about local businesses.

Completed Technical Tours at B&I Office – **Thanks to all who Volunteered**

- Island Coast HS – October 11th - 21 Students/3 Teachers Attended
- Cypress Lake HS – November 15th - 23 Students/3 Teachers Attended
- Riverdale HS – January 18th - 11 Students/4 Teachers Attended

Our focus on STEM began with the notion that students need more opportunities in the areas of Science, Technology, Engineering, and Math related fields. The National Science Foundation estimates that 80% of the jobs created in the next decade will require some form of math and science skills.

Our STEM Initiatives are a collaboration between the Foundation and the School District of Lee County. Funded through the generosity of our business partners, this initiative offers students the opportunity to participate in field trips and internships, as well as experience hands-on activities through partnerships with businesses in the community. Check out more information at: https://leeschoolfoundation.org/

Government Affairs – James Martin

ASHRAE Submits Comments in Response to RFI on National Definition for a Zero Emissions Building

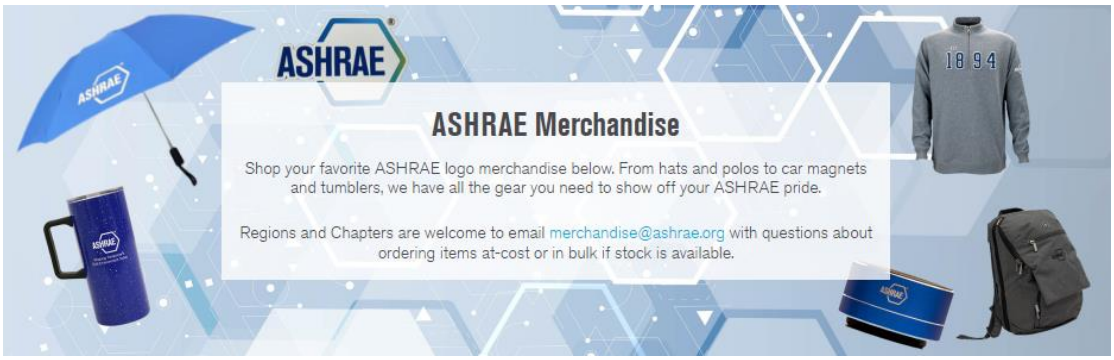
In response to a request for comments from the White House Climate Policy Office through the U.S. Department of Energy, ASHRAE responded to questions and provided recommendations to the Administration. ASHRAE's Task Force for Building Decarbonization played a critical role in these responses, including suggesting clarifications on its reference to Standard 90.1, recommending definitions included in ANSI/ASHRAE Standard 228, *Standard Method of Evaluating Zero Net Energy and Zero Net Carbon Building Performance*, and recommending the application of Standard 90.2 for construction of new homes and Standard 100 for existing homes. ASHRAE also recommended the Administration align its definition with international definitions, and urged coordination and collaboration with ASHRAE on development of new standards, including Standard 242P, *Standard Method for Calculation of Building Operational Greenhouse Gas Emissions*. ASHRAE's full responses can be found here.

ASHRAE Submits Letter to Illinois Senate Appropriations Committee on Indoor Air Quality

On January 30th ASHRAE President Ginger Scoggins submitted a letter regarding Illinois House Bill 3713 to the IL Senate Appropriations Education Committee Chair and Vice Chair, Senator Meg Cappel and Senator Kimberly Lightford. The letter expressed support for the goals of the legislation, which if enacted and funded would see air quality monitoring equipment and air cleaning equipment put into IL schools. ASHRAE's letter also emphasized the role that ASHRAE standards can play in developing indoor air quality rules and regulations in the state. This legislation has passed the IL House of Representatives and is now in the IL Senate, where a favorable vote will send the bill back to the House for concurrence and then on to the Governor for signature into law. The letter from President Scoggins can be read here.

History – Jason Hardman

AHR 2024 Chicago



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Featured Jobs

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- Director of Engineering
- Senior Mechanical Engineer
- Mechanical Engineer/Project Manager (MEP Consulting)
- Facilities Engineer
- Senior Electrical Design Engineer
- Engineer, Senior Controls System
- Mechanical Engineer Department Head
- Manufacturing Engineer
- Energy Efficiency Engineer

ASHRAE Jobs

Apply Here

YEA – Camen Andrews

Florida Everblades vs Adirondack Thunder
Hertz Arena
Saturday, February 10th
7:00 pm

ASHRAE YEA Southwest Florida Chapter

Join the Southwest Florida YEA Chapter for an electrifying night of hockey as we cheer on our local team, the Florida Everblades, in an intense showdown against the Adirondack Thunder!

11000 Everblades Parkway, Estero, FL 33928

ASHRAE YEA Night POKER

Saturday 2/17 @ 7pm

1223 SE 8th St. Cape Coral

August, 2023

From: ASHRAE Southwest Florida Chapter

Subject: ASHRAE Southwest Florida Sponsorship Opportunities for 2023-2024

The ASHRAE Southwest Florida Chapter RP fund-raising events are excellent sponsorship opportunities. Your company reaches many key decision makers and sends a strong message of supporting the research that the community relies upon for comfort and sustainability.

The Southwest Florida Chapter is continuing to make sponsorships even easier by offering levels that include the promotion of your company at all chapter events! If you are unable to contribute at one of these levels, sponsorship opportunities for the Golf and Fishing tournaments will be offered separately before each event!

Go To: https://www.swflashrae.org/sponsorship for an on-line payment option!

Annual Sponsorship Levels

Diamond Level - $6,000 (Savings: $825) ***One Available***

- "Happy Hour" Sponsorship - One drink ticket per attendee with sponsor's logo ***(Value: $2,000***)
  - Swag distribution during happy hour by reception chair ***(Value: Priceless)***
- Golf Tournament: Gold Sponsorship Package ***(Value: $1,750)***
  - (8) Player Entries, (1) Tee Sponsorship, (1) Flag Sponsorship, (8) Mulligans, (1) Arm Length Raffle, (8) Putting Contest Entries
- Fishing Tournament: Gold Sponsorship Package ***(Value: $500)***
  - (4) Entries, Company Logo on Shirt, and special recognition
- Tech Topic Presentation ***(Value: $250)***
- A Complimentary Fishing Charter ***(Value: $1,000)***
- (15) Monthly Meeting Tickets ***(Value: $525)***
- (2) Meeting Sponsorships ***(Value: $500)***
- Signage at each monthly meeting ***(Value: $100)***
- (10) Yeti Raffle Tickets ***(Value: $100)***
- Logo on Monthly Newsletter ***(Value: $100)***

SOLD!!!

Gold Level - $3,000 (Savings: $300)

- Golf Tournament: Gold Sponsorship Package ***(Value: $1,750)***
  - (8) Player Entries, (1) Tee Sponsorship, (1) Flag Sponsorship, (8) Mulligans, (1) Arm Length Raffle, (8) Putting Contest Entries
- Fishing Tournament: Gold Sponsorship Package ***(Value: $500)***
  - (4) Entries, Company Logo on Shirt, and special recognition
- Tech Topic Presentation ***(Value: $250)***
- (10) Monthly Meeting Tickets ***(Value: $350)***
- (1) Meeting Sponsorships ***(Value: $250)***
- Signage at each monthly meeting ***(Value: $100)***
- Logo on Monthly Newsletter ***(Value: $100)***

Silver Level - $1,500 (Savings: $175)

- Golf Tournament: Silver Sponsorship Package ***(Value: $1,000)***
  - (4) Player Entries, (1) Tee Sponsorship, (4) Mulligans, (1) Arm Length Raffle, (4) Putting Contest Entries
- Fishing Tournament: Silver Sponsorship Package ***(Value:$300)***
  - (2) Entries, Company Logo on Shirt
- (5) Monthly Meeting Tickets ***(Value: $175)***
- Signage at each monthly meeting ***(Value: $100)***
- Logo on Monthly Newsletter ***(Value: $100)***

Bronze Level - $1,000 (Savings: $150)

- Golf Tournament: Tee Sponsorship ***(Value: $500)***
- Fishing Tournament: Bronze Sponsorship Package ***(Value: $200)***
  - (1) Entry, Company Logo on Shirt
- (2) Entries in either Golf or Fishing Tournaments ***(Value: $250)***
- Signage at each monthly meeting ***(Value: $100)***
- Logo on Monthly Newsletter ***(Value: $100)***

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Golf and Fishing Tournament Flyers will be distributed ahead of each event if you are interested in event-specific sponsorship packages.

If you wish to be a 23-24 ASHRAE Sponsor or have any questions about the process please reach out to:

Tony Amitia
(239)470-5036
tamitia@bandiflorida.com

We greatly appreciate your assistance and support.

Portion of Proceeds to Benefit ASHRAE Research and the SWFL ASHRAE Chapter Endowment Fund
SWFL ASHRAE is a 501©(3) not for profit organization


Kelley Cramm

Electrical Coordination For Mechanical Designers

BY KELLEY CRAMM, P.E., FELLOW/LIFE MEMBER ASHRAE

Designing HVAC systems is a team effort. Multiple disciplines are required, and they must work together to ensure a successful result. Coordination between the mechanical and electrical designers is particularly important. Mechanical designers may have a limited understanding of electrical codes and requirements, which may result in missing important electrical information that needs to inform the design. This column covers basic electrical concepts that mechanical designers need to know. It also discusses information each discipline needs from the other to create a safe, functional, code-compliant design.

Electrical Basics

This section introduces some basic electrical concepts, terminology and commonly used abbreviations.

Terms related to equipment ampere capacity (ampacity) include:

- MOCP—Maximum overcurrent protection. MOCP is the manufacturer's listed overcurrent protection for a given piece of equipment. It is the maximum circuit breaker or fuse rating in amps.
- MCA—Minimum circuit ampacity. MCA is the manufacturer's listed minimum amp rating for a given piece of equipment. The electrical power wiring to the equipment must be sized to carry this load.
- FLA/RLA—Full load amps and rated load amps. These terms are used for motor load calculations. They generally convey the maximum load a motor will typically see. FLA is used for motors, and RLA is used for compressors.
- LRA—Locked rotor amps, also called starting or inrush current. LRA is the motor load in amps if the motor is prevented from running while powered. It can also be understood as the current a motor draws at start-up before returning to the FLA. It is assumed to be six times the FLA. Refer to *Figure 1* for a graphical illustration of FLA/LRA.

Terms related to equipment protection include:

- AFC—Available fault current. AFC is calculated by the electrical designer. It starts with a value provided by the electric utility company at the utility/service transformer and is then reduced due to resistance as it

Kelley Cramm, P.E., is a mechanical technical manager at Henderson Engineers in Lenexa, Kan.

FIGURE 1 Graphical illustration of FLA/LRA.

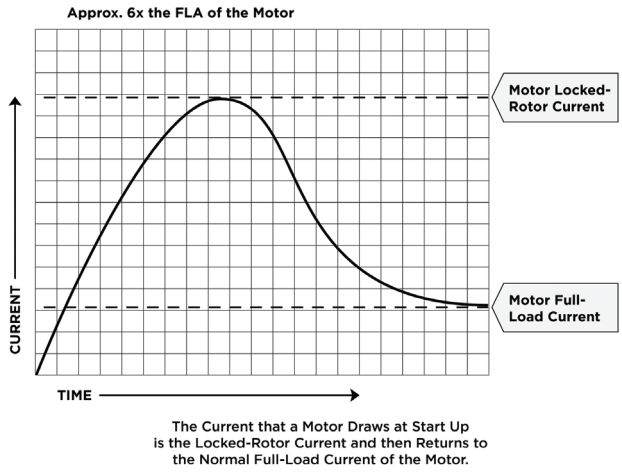


FIGURE 2 Typical rule-of-thumb voltages.

Motors/Pumps	
120V	3/4 HP and smaller
208V 1-phase	1HP – 2HP
208V 3-phase	1HP – 3HP
277V, 480V 1- or 3-phase	5HP and above
Resistive Heating Elements	
120V	< 2.5kW
208V 1-phase	2.5kW – 4.5kW
208V 3-phase	> 4.5kW
277V	< 6kW
480V 1-phase	6kW – 10kW
480V 3-phase	> 10kW

moves through the circuitry of the building.

- AIC and SCCR—Amps interrupting capacity and short circuit current rating, respectively. These equipment rating terms are similar and relate to how much short circuit a piece of equipment can handle before a catastrophic event occurs. AIC is how much current a circuit breaker or fuse can handle. SCCR is the rating of fully assembled equipment, such as a panelboard, and relates to the physical bracing of the equipment. If the AFC at a specific piece of equipment is higher than the AIC or SCCR, a catastrophic event may occur.
- GFEP, GFCI—Ground fault equipment protection and ground fault circuit interrupter. These are similar terms relating to devices that protect from fault current events. GFEP protects equipment, and GFCI protects people.

Common voltages used commercially in the U.S. include 208/120 V and 480/277 V. The three-phase voltage is listed first, followed by the single-phase voltage. Note that sometimes voltage ratings vary slightly. Equipment with voltages stated as 110 V or 115 V will operate at 120 V, and ratings stated as 460 V will operate at 480 V. The mechanical designer should start with rule-of-thumb voltages (*Figure 2*) and coordinate early with the electrical designer to confirm what voltages are available.

National Electrical Code (NEC) Clearances

In the U.S., the NEC, also referred to as NFPA 70, is the most comprehensive and commonly adopted electrical code. The NEC includes clearances and working spaces for electrical equipment. It uses two terms: dedicated space and working space. These concepts are related but also entirely separate.

Dedicated space is for electrical use only. It applies to switchboards, switchgear, panelboards and motor control centers. No other systems can be routed in the dedicated space. The space provides for constructability so conduits, wireways, etc. can be installed. Dedicated space is bounded by the width and depth of the equipment and extends from the floor to 6 ft (2 m) above the equipment, or to the structural ceiling, whichever is lower. Note that a lay-in ceiling doesn't count as a structural ceiling but is allowed to be located within the dedicated space (*Figure 3*).

Working space is required to provide safe clearance distances for electrical equipment (operating at 1,000 V or less) likely to require examination, adjustment, servicing or maintenance while energized. Note that working space applies to electrical equipment listed in the previous paragraph, but also to variable frequency drives (VFD), motor starters and control panels, such as those on variable air volume (VAV) boxes, fan coil units and building automation system panels, since these control panels generally need to be energized to run diagnostics. Clearance for control panels is frequently missed by mechanical designers and can be a source of construction change orders (*Figure 4*).

The NEC working space parameters include depth, width, height and clear space. It varies with voltage and installation conditions but is typically between 3 ft

FIGURE 3 Dedicated space.

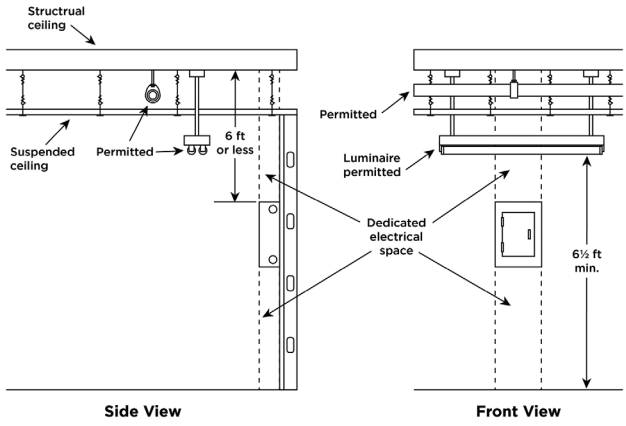
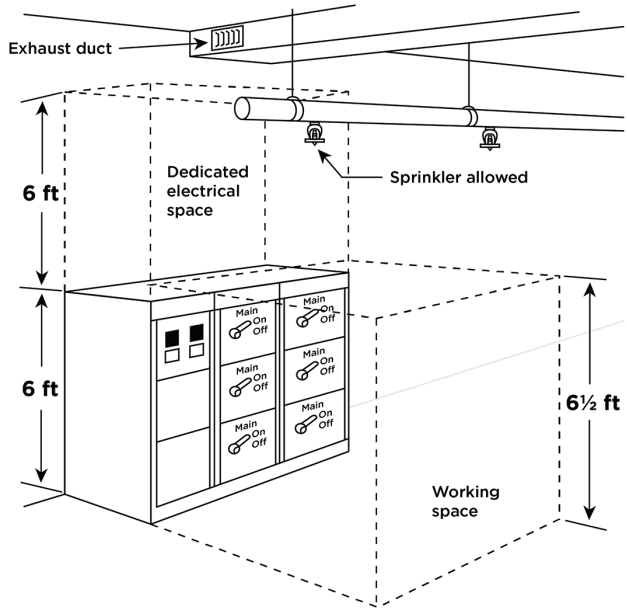


FIGURE 4 Working space.



and 4 ft (0.9 m and 1.2 m). The mechanical designer should consult a knowledgeable electrical designer or the NEC for specifics. The *National Electrical Code Handbook* includes helpful diagrams useful for interpreting working space requirements.

Electrical and Mechanical Needs

Information the electrical designer needs from the mechanical designer regarding mechanical equipment includes: equipment and control panel locations; voltage/phase options; equipment horsepower, ampacity and connection locations; emergency or standby power requirements; disconnecting means; starter or VFD information; and interlock wiring needs, which might include a restroom exhaust fan controlled from a light switch or a VAV box controlled from a room lighting occupancy sensor.

Information the mechanical designer needs from the electrical designer includes: voltage/phase availability and preference; total kVA of transformers in each electrical room (to calculate heat gain for cooling load); AFC at equipment (so equipment can be specified with the correct SCCR); location of large conduit banks, electrical distribution equipment and electrical panelboards (to coordinate duct routing and mechanical equipment location); lighting loads and locations; electrical equipment that produces heat, which could include distribution equipment, inverters, uninterruptable power supply (UPS), transformers, generators and elevator equipment; equipment cooling requirements, which could include UPS, fire alarm control panels, inverters, elevator controllers and lighting controls; and electrical metering integration with the building automation system.

Electrical Equipment Coordination

Electrical items that need to be discussed and coordinated with the mechanical designer are highlighted in this paragraph. Disconnect switches can be fused or non-fused, heavy duty or toggle and can be furnished integral with some equipment or furnished separately by the Division 26 contractor. Starters may be integral to the mechanical equipment or furnished separately. Note that electronically commutated (EC) motors do not require external starters. If there is a VFD, it may provide the starting function. It may also provide the disconnecting means, but if it is not located within line of sight of the equipment, a separate disconnect switch would be required. The VFD may also be furnished integral to the mechanical equipment or furnished separately by either the Division 23 contractor or the Division 26 contractor. All of these items need to be coordinated and communicated in the mechanical equipment schedules and on the electrical plans.

Mechanical Equipment Coordination

Mechanical equipment features that must be coordinated include voltage, amperage, MOCP, disconnecting means, starters, control requirements and equipment options. Options that might be powered separately from the main equipment feed may include

integral electrical convenience receptacles, lights in air handlers, powered exhaust fans in rooftop units, UV lights, energy recovery wheels, electric heating coils, cooling tower basin heaters and actuators for valves and dampers. Electrical power for small split systems should also be included, since some indoor units are powered from the outdoor condensing unit and some are powered separately. Voltage for VAV box controllers and location and responsibility for control power transformers also requires coordination.

Other mechanical items to coordinate include UPS, life safety and standby power requirements, emergency power off (EPO) switches for mechanical rooms, heat trace, combination fire/smoke dampers and building automation system components.

Conclusions

The mechanical and electrical aspects of an HVAC design are interconnected and require team members to have a basic understanding of the other's needs and requirements. Designers should be proactive and establish a firm-wide standard protocol for effective coordination on every project. The approach could include a file folder structure for current mechanical equipment cut sheets, a "live" spreadsheet or other methods. The process should start early in a project design, preferably during concept design, and should continue through construction documents and the submittal phase. The mechanical equipment submittals should be carefully reviewed by the mechanical and electrical designer for both mechanical and electrical features to ensure they align with the electrical design in the construction documents. Failure to coordinate can result in change orders or missed electrical requirements that could result in a catastrophic failure.

Acknowledgments

I wish to thank my colleagues, Laura Brandt, P.E., mechanical technical manager, and Angela Faught, P.E., electrical technical manager. This column is based on information contained in an internal training presentation they created and presented. ■

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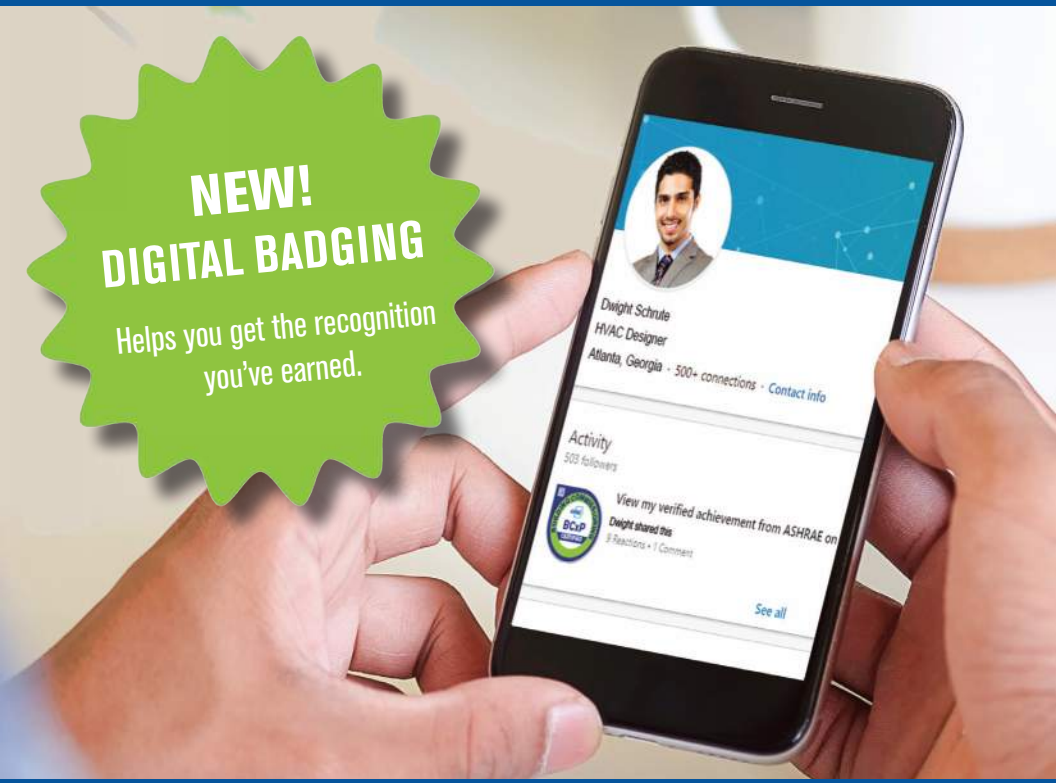

With already more than 3,000 certifications earned to-date, ASHRAE programs were founded to meet the industry needs of today and provide value to thousands of built-environment professionals, employers and building owners.

ashrae.org/certification