

The Whistle

FHEA

VOLUME XXXV11, NUMBER 3

FALL 2020



The upcoming 58th FHEA Trade Show and Annual Meeting has been postponed. Since the Coronavirus is still a pandemic and is significantly impacting Florida and many other parts of the United States, our FHEA Executive officers and Board of Directors reviewed the latest recommendations of the Florida Governor, the CDC, and other medical experts and determined that we cannot put you at risk of contracting this serious disease.

The President's Corner

T. Wayne Gibbs, CHFM

Late last spring, when we decided to continue with the original September dates for our FHEA Trade Show and Annual Meeting, the curve was appearing to have been flattening in the state of Florida. In recent weeks, although there may be some slight improvement now, COVID-19 is still present and none of us know what the rest of 2020 will present.

Our Board understands that, besides health concerns and financial impacts from the Coronavirus on many hospitals and companies, travel bans have been imposed through the end of this year. Some of you may also fall into the groups of those who are most at risk, and who have been advised to avoid areas where the disease is still very prevalent; therefore, in an abundance of caution and concern for you, the FHEA has decided to postpone our 58th FHEA Trade Show and Annual Meeting.

Although the in-person September FHEA Trade Show and Annual Meeting has been postponed, we will be offering a virtual conference on October 13 – 16.

Each day will feature various sessions, from our existing program, *"Policies, Regulations, and Outcome-Based Performance in a Sea of Change"*.

FHEA members may attend and receive **complimentary** continuing education credits.

Up to 11 hours will be available and have been already approved for hospital facility managers by ASHE AND for Florida Professional Engineers. CE credits are still pending for architects and contractors.

If you made room reservations at the Orlando World Center Marriott, they have already been cancelled by the hotel. Any deposits paid for accommodations will be refunded back to your credit card.

We know it's been a trying year and all of us are looking forward to being able to once again gather together for education, networking, fellowship, and even some fun.

Thank you for your participation in the Florida Healthcare Engineering Association. Please contact our Executive Director, Sarah Jeffcoat, or me with any questions.



The FHEA Board realizes that it is important for our members to receive a certain amount of continuing education credits each year. To help our members meet their required CE hours, the FHEA Districts have supplied virtual educational classes that are available to all FHEA healthcare engineer members, not only those in their District.

A webinar resource page has been created on the website to keep track of what is available. The schedule is included in this publication.

Our educational program for the FHEA Annual Meeting, “Policies, Regulations, and Outcome-based Performance in a Sea of Change,” will be offered virtually.

This series of sessions will be complimentary to members and offer up to 11 hrs CE (approved ASHE and Florida professional engineers. *(Approvals are pending for architects and contractors)*)

Several workshops will be offered each day - the schedule and registration will be posted soon!

Sessions that may be included are:

- “An Awesome Career Path, Never Taken” **Mike Canales**, HFL Program Director, Owensboro Community & Technical College
- “Joint Commission Update - What You Need to Know” **George Mills**, FASHE, CHF, CHSP, CEM, CEO, ATG Director of Technical Operations, JLL Healthcare Solutions; former Director for the Department of Engineering at The Joint Commission
- “COVID-19 Effect in the Built Environment - What We Now Know” **Mark L. Smith**, AIA, LEED, AP, VP Florida Operations and **Kenneth S. Garza**, CIH, MS, VP and Partner - GHP Environmental & Architecture
- “Flexible Planning with Wellness Design” **Joshua D. Crews.**, AIA, EDAC, NELSON Atlanta
- “How Technology is Transforming the Future of Healthcare Facilities Management” **David Trask**; National Director, ARC Facilities
- “The Physical Environment, The Achilles Heel of Accreditation” **Mike Canales**, HFL Program Director, Owensboro Community & Technical College
- “Confused about TJC and DNV Testing and Compliance Requirements” **Wayne Klingelsmith**, FASHE, CHF, MBA; Principal, MSL Healthcare Partners, Inc.
- “Healthcare Outside the Hospital-Facility Construction Requirements in the Business and Ambulatory Environment” **Alex Harwell**; Dewberry Engineering and **Drew Underwood**, AIA, LEED, AP, Sr. Healthcare Principle, Thomas Miller Partners
- “4G is Here, 5G is Coming: Is My Hospital FCC Compliant?” **Jeffrey Ebihara**, Waterford Consultants

THE FHEA RESERVES THE RIGHT TO CHANGE OR MODIFY SESSIONS AND/OR SPEAKERS IF NECESSARY.



fhea.org

For webinars offered to the FHEA membership, view the Webinar Resource Page:

<https://fhea.org/webinars>

Check back often for updates to the schedule and registration information on how to participate. CE is available for webinar attendance.

FHEA Webinar Resource Schedule



<p>September 10, 2020 1:00 pm EDT</p>	<p>Innovative Technologies: Part 1 - Battery Storage</p>
<p>October 8, 2020 1:00 pm EDT</p>	<p>Innovative Technologies: Part 2</p>
<p>October 13 -16, 2020 Session Times TBA</p>	<p>FHEA Annual Meeting Educational Program "Policies, Regulations, and Outcome-based Performance in a Sea of Change"</p>
<p>November 18, 2020 2:00 pm EST</p>	<p>"Communicating Your Energy Plans and Achievements"</p>
<p>December 3, 2020 1:00 pm EST</p>	<p>"Communicating Your Energy Plans and Achievements"</p>



FLAMMABLE AND TOXIC REFRIGERANTS

By Bobby Baird, SASHE, CHE, CHFM, CHSP

“Reprinted with permission from the June 2020 issue of the ASHE’s Health Facilities Management magazine.”



In today’s changing world, facility managers have to maintain an abundant knowledge base to ensure a safe environment for their building occupants, including their most vulnerable occupants, patients. This knowledge includes recognizing the often hidden dangers of toxic or flammable refrigerants. Exploring the guidelines, assembled by the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), is an invaluable resource for facility managers seeking clarity.

The ASHRAE standards, that are pertinent to this refrigerant discussion, are ASHRAE 15 which address the Safety Standard for Refrigeration Systems and ASHRAE 34 which addresses Designation and Safety Classification of Refrigerants. These standards are available for free viewing through ASHRAE at

<https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards>

Understanding the history of refrigerants will make clear why the refrigeration manufacturers selected flammable refrigerants. This history began in the 1830’s. First generation refrigerants were picked based upon whatever chemicals worked with the knowledge base of the time period to move heat and make ice. In the nineteenth century, these refrigerants included diethylether, dimethaether, ammonia, sulfur dioxide, and methalchloride. According to a 1989 article (CFC’s: Time of Transition), published by ASHRAE, “Propane (R290) was touted as a replacement for ammonia refrigerant in the 1920s.

Isobutane (R600) was first used as a refrigerant for small systems in the 1920s, but as with other flammable refrigerants (except ammonia), it quickly fell out of use when chlorofluorocarbon (CFC) refrigerants were introduced for commercial use in 1931.” They worked well moving heat, but during those years, the refrigeration equipment was not well regulated and failures were quite dangerous for those unfortunate workers who were present when refrigerant was leaked into the plant.

These first generation refrigerants were dangerous to humans, and for obvious reasons, were generally discontinued.

The second generation of refrigerants spanned through the 1990’s. This generation of refrigerants was primarily non-flammable and low toxicity. Refrigerants were used in stationary and mobile machinery and included R-11, R-12, R-22, R-502, etc. Besides having high btu/pound characteristics, these refrigerants had boiling points and pressure ranges that were complimentary to the heat transfer temperature ranges needed.

These second generation refrigerants are classified as chlorofluorocarbons (CFC’s) and hydrochlorofluorocarbons (HCFC’s). These refrigerants were also determined as damaging to the ozone layer and contribute to greenhouse warming.

In 1987, the Montreal Protocol was initially signed, and today, nearly every country has signed and complies with the treaty.

The Montreal Protocol has phased out halon, and CFC's. HCFC's production is scheduled to cease in 2030.

These second generation refrigerants are significantly safer for humans but harsh on the environment.

Removing these second generation refrigerants created a need for replacement refrigerants that were not only safe for the environment, but also moved heat efficiently and are not significantly dangerous to humans. A quick reference to identify a refrigerant's safety can be found in ASHRAE 34. Figure 6.1 helps users identify the safety and flammability of refrigerants using a simple to understand scale (see sidebar). These new requirements drove significant innovation in the industry and ushered in the third generation of refrigerants. Many of these refrigerants are less efficient at moving heat and thus have driven a change in the size of components.

Additionally, energy efficiency requirements are contributing to the increasing size of components, hence the larger condensers and evaporators.

Third generation refrigerants are Montreal Protocol compliant. The Montreal Protocol does not prohibit hydrocarbon refrigerants. Nearly a century after their first debut, hydrocarbon refrigerants, R290-Propane, and R600-Butane have returned to the market, promising to fill the void established by the Montreal Protocol. Both of these refrigerants have attractive boiling points and generous heat transfer capacity which supports their selection for refrigeration. These refrigerants are found in many healthcare refrigerators. Are these refrigerants allowed in healthcare facilities?

ASHRAE 15 and 34 specifically identify and define Institutional Occupancy in the standard. Hospitals and nursing homes clearly fall within this classification. As a facility manager, you should understand what is permitted and in what quantities.

Fortunately, ASHRAE 15, 7.2 defines the refrigerant concentration limits and references ASHRAE 34 table 4-1 for the quantities. Exception 7.2 states, "*Listed* equipment containing not more than 6.6 lb (3 kg) of *refrigerant*, regardless of its *refrigerant* safety classification, is exempt from Section 7.2, provided the equipment is installed in accordance with the listing and the *manufacturer's* installation instructions."

ASHRAE 15 Exception 7.2.2 states, "*Listed* equipment for use in laboratories, with more than 100 ft² of space per person, regardless of *refrigerant* safety classification, is exempt from Section 7.2, provided that the equipment is installed in accordance with the listing and the *manufacturer's* installation instructions." These two references appear to permit any refrigerant; **however, there are even more stringent guidelines in ASHRAE.**

[View Full Article in ASHE Magazine](#)

ASHRAE 15 7.5.3 addresses Higher Flammability Refrigerants and states, "group A3 and B3 refrigerants shall not be used except where approved by the AHJ ."

"Exceptions to 7.5.3 #3. This restriction does not apply to listed self-contained systems containing no more than 0.331 lb (150g) of A3 refrigerant, provided that the equipment is installed in accordance with the listing manufacturer's installation instructions."

ASHRAE 15 7.5.3 is more stringent than section 7.2.2. In the AHJ world, we operate within the most stringent code requirement prevails. Now 6.6 pounds of refrigerant is no longer applicable and the smaller quantity of 150 gram maximum takes precedence.

(Continued page 6)

FLAMMABLE AND TOXIC REFRIGERANTS

(CONTINUED)

After researching the currently available healthcare refrigerators and ice machines, the typical under-counter healthcare grade refrigerator contains 74 grams of R600 and a double door healthcare refrigerator typically contains 100 grams of R600. This exception appears to permit an unlimited number of devices given none of the individual devices contain more than 150 grams of flammable refrigerant. Some facility managers report the location and quantity of flammable refrigerant containing devices to their AHJ as an added safety measure, although the standard does not require reporting.

The 150 gram maximum charge does carry some limitations. Quick temperature recovery places significant demands on mechanical systems and often require larger refrigerant charges to manage these quick heat transfer requirements. Consideration should be given to the selection process, taking into account the capability of the unit to meet the specifications for cooling medications or food.

One may question why manufacturers would choose to use flammable refrigerants when there are other alternative refrigerants available. The answer is complicated at best, however ASHRAE has determined what levels of flammable refrigerant is required to propagate a fire. The 150 gram maximum limit is based upon the science of the compounds necessary to support a fire. The Lower Flammability Limit (LFL) is the measure ASHRAE has utilized to quantify this requirement. If the LFL is not reached, there can be no fire as a result of a flammable refrigerant leak since there would not be an adequate amount of flammable gas relative to the amount of air in the room to support combustion.

In simpler terms, if the amount of flammable gas is limited, relative to the air in the room, it will not ignite. This would support ASHRAE 15 Exception 7.5.3.3 concerning the 150 gram limit.

To further support the use of flammable refrigerants, consider the fact that most hospitals are fully sprinkled and those that are not will be by 2026. Additionally, hospitals are surveyed regularly by AHJ's to ensure the facilities do not have excessive flammable loads, thereby further reducing the hazard presented.

ASHRAE 15 Chapter 9 Design and Construction of Equipment and Systems specifically addresses how these refrigeration systems should be manufactured to safeguard against unintended failures. This standard provides manufacturers with the necessary guidelines to design and manufacture refrigeration systems that are both reliable and safe. An internet search for catastrophic failures from flammable refrigerant leaks provided few results. There is an occasional household refrigerator that has experienced a failure that caused damage, but none have been reported as catastrophic.

The most notable fire, involving a refrigerator with flammable refrigerant, was in London at the Grenfell Tower which killed 72 occupants. This fire apparently originated in the refrigerator; however, subsequent reporting on November 27, 2018 by BBC News quotes Dr. J Duncan Glover, "The overheating connector in my opinion was the first event that started the burning the insulation on the wires that led to the short circuit."

This professional opinion suggests the fire actually started in the plastic electrical box within the refrigerator's mechanical section, not related to the flammable refrigerant contained inside the sealed system. The fire spread from the apartment to the exterior building cladding, which provided an unobstructed path for the fire to envelop the building.

The Grenfell Tower did not have a sprinkler system installed. This example contrasts the differences in occupancies, no sprinklers, inappropriate cladding, and no central fire alarm system. Hospitals utilize all of the missing components of the Grenfell Tower to alert and protect the occupants

Taking into account all of the standards and information above, facility managers should consider the following when using flammable refrigerants;

Fire and Smoke Alarm- Hospitals are required to have fire and smoke alarm systems. Is an approved alarm system in place? Is the approved system working as designed?

Location- Is the refrigerator in a nourishment room? If so, what other flammables are in the space? Is the refrigerator open to the corridor? Is the refrigerator in a patient room? Given flammable refrigerants are heavier than air, is there a concern about refrigerant settling into a low spot?

Maintenance and repairs - Eventually, all mechanical devices will fail, planning how to manage repairs will make a difference with flammable refrigerants. There are reports of minimal training from manufacturers that is causing delays for repairs and driving up costs. Have your technicians been trained in safe handling of hydrocarbon (flammable) refrigerants? Best practice for all refrigerant repair is to remove the unit to a shop area away from patients and staff, keeping in mind the refrigerant quantity exception in ASHRAE 15 is for listed equipment, not refrigerant in a jug. Is your evacuation equipment safe for use with flammable refrigerants? Is your shop safe for handling and storing flammable refrigerants?

Disposal - At end of life, how will equipment be safely disposed of? Will reclamation of refrigerant be required?

In addition to flammable refrigerants, there is another classification for toxic refrigerants in ASHRAE 34. There are only three toxic refrigerants currently available, R21, R40, and R630. During the research for this article, there were no healthcare refrigerators, freezers, nor ice machines identified that utilize these refrigerants. Knowing the refrigerant type and classification will support the decision to permit or refuse usage toxic refrigerants within your building. The available information for toxic refrigerants in occupied buildings is sparse. My recommendation is to carefully scrutinize any toxic substance before introduction into your facility. Refrigerants containing the "B" classification should not be considered without understanding how the refrigerant will impact those around it if a leak were to occur.

Knowing the ASHRAE Standards, and how to apply them to your facility, will provide the facility manager with the foundation necessary to understand the dangers often hidden within a mechanical system. Refrigerant phaseouts, new refrigerant compounds, and blends will continue to drive change in this industry. Keeping abreast of the ASHRAE Standards will ensure a defensible and safer environment for your building occupants.

ASHRAE is not the only standard in the refrigerant world. This article did not interpret any differences nor conflicts the Environmental Protection Agency (EPA), National Fire Protection Association (NFPA), Air Conditioning, Heating, and Refrigeration Institute (AHRI), Underwriters Laboratories (UL), The International Building Code (IBC), or International Organization for Standardization (ISO) have with either ASHRAE 15 and 34.

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FHEA Membership Portal

<https://fhea.org/member-directories>

Have you checked out the FHEA membership system? The member portal for current Healthcare Engineer and Supporting members can be accessed by individual members' passwords. If you are using the system for the first time, you will be prompted to create your password.

You will be able to update your profile, add a photo, check the status of FHEA educational programs you have attended this year (and your CEs), pay your dues, and find other members easily. Member directories are online for both Healthcare Engineers and Supporting members. The Healthcare engineer member directory is on the private side and you must be logged in as a member to view. The Supporting member directory is on the public side of the website and searchable by name, company, products, and services for easy access when looking for a trusted provider. Check it out today!



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ASHE ANNUAL GOES VIRTUAL

Due to the COVID -19 pandemic the ASHE Annual Conference and Technical Exhibition scheduled for October 5-7, 2020 in Chicago has gone virtual.

The 2020 ASHE VIRTUAL CONFERENCE OFFERS:

- The same trusted, high-quality education you expect from ASHE
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Join your peers to on October 5-7 to learn, connect and grow as we reimagine the health care physical environment together.

Register for only \$149 when you sign up by August 28!

https://s6.goeshow.com/ashe/annual/2020/who_attends.cfm

Update


 58th Annual FHEA Trade Show

The 58th FHEA TRADE SHOW™ has been postponed until it is determined that the pandemic emergency status is lifted and our healthcare engineer members and supporting members are able to travel again.

Many of our FHEA exhibitors have chosen to roll forward their participation and are looking forward to networking with our FHEA members in person at the next FHEA Trade Show.

a-fabco, inc.	Evoqua Water Technologies	MediTrac by OmegaFlex
Airmax Service Corporation	Fire & Life Safety America	Miller Electric Company
All Phase Electric and Maintenance, Inc.	Fire Door Solutions	Mitchell & Lindsey
American Portable Air	Flad Architects	Modular Services Company
Archer Western	FlexCart	MSI - Mechanical Services Emcor
ASCO Power Services Inc	Flow Control Technology Company LLC	Nalco Water an Ecolab Company
ASCO Power Technologies	FSI (Facilities Survey Inc)	Nash Plumbing and Mechanical, LLC.
ASSA ABLOY Door Security Solutions	Garratt-Callahan Company	NewAge Casting
ASSA ABLOY Entrance Systems	GE Current, A Daintree Company	Nexxspan Healthcare, LLC
Automated Door Ways	Grainger	NFS Firestopping
Barton Malow Builders	GTR BUSINESS SYSTEMS	Nora by Interface
BeaconMedaes	Health Care Compliance, Inc.	Original Solutions Company, Inc.
BMS CAT Inc.	Hensel Phelps	P&A Roofing and Sheet Metal Inc.
Brasfield & Gorrie	Hepacart, Inc.	Paladin Healthcare LLC
Building Engineering Consultants Inc.	Hilti	Pantera Technical Services Corp
C.A.R.E. LLC	Hoar Construction	PG LifeLink
Charles Perry Partners, Inc. (CPPI)	Homeyer Consulting Services, Inc.	Phigenics
CIC, Inc.	IDEACOM Healthcare Communications of Florida, Inc.	Portable Air and Power
Commercial Products Corporation	Industrial Engineering Company	Powerex
Communication Access Services, Inc.	Infrared Thermographic Inspections, Inc.	PowerSecure, Inc
Crawford-Tracey Corporation	Inpro Corporation	Premier Medical, Inc.
Creative Contractors Inc.	International Fire Protection	Premier Water & Energy Technology, Inc.
Davidson Sales Company	Interstate Restoration	Professional Service Industries, Inc.
DCI	Johnson Controls, Inc.	Project Management Advisors, Inc
Debonair Mechanical	Johnson-Laux Construction	Pure Air Control Services, Inc.
Delta Cooling Towers, Inc.	KHS&S Contractors	Pureflow Inc.
Dynamic Air Quality Solutions	Kontrol Kube by Fiberlock	RGF Environmental
EcoWater Systems	Lamphier & Company	Robins & Morton
Engineered Energy Equipment, Inc.	Leviton Manufacturing Co., Inc.	S&ME, Inc.
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EOLA	Magnum Door Solutions	Schneider Electric
	MaintenX International	Smith Seckman Reid, Inc.
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(continued)

SOPREMA

SPIRAX SARCO INC

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Tremco Roofing & Building Maintenance

Tropic Mechanical Contractors

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United Electrical Sales / Legrand NA

United Fire Protection, Inc.

Universal Fuel Services

US Water Services

USA Coil & Air

Vertiv's Electrical Reliability Services

Viracon

W+J Construction Corp.

Waco Filters/Sterilaire

Weather-Tech Roofing & Waterproofing, Inc

Wehr Constructors, Inc.

Western Specialty Contractors of America

Winn's Career Education

Yown's Boiler Service, Inc.

*Exhibitors that have requested
to roll over (as of 8-20-20)*

FLAMMABLE AND TOXIC REFRIGERANTS

(CONTINUED FROM PAGE 7)

It is the opinion of this author that flammable refrigerants have a place in healthcare. The refrigerants perform well and pose a minimal risk when used within the standards established. Take the time to evaluate the quantity and type of refrigerant used. Recognize that HCFC refrigerant production is scheduled to cease within ten years and make informed decisions regarding continued purchasing. Use the resources available to you to educate colleagues and administrators

Facility managers may use the following bullet points as reminders to manage flammable refrigerants in their organizations;

- Read and understand standards related to flammable refrigerants
- Ensure quantity of flammable refrigerant per device is no more than 0.331 lbs or 150 grams
- Validate the unit is listed for use in healthcare
- Carefully scrutinize use of flammable or toxic refrigerants in patient rooms
- Establish policies for repair locations and mechanic certification requirements
- Evaluate need for fire detection and suppression



THANK YOU



FHEA FEATURED MEMBER

Adam Mayle, CHFM, CHE, CHC

Adam Mayle Named to Independent Coronavirus Commission for Safety and Quality

FHEA Board member and District IV President, Adam Mayle, has been named to the independent Coronavirus Commission for Safety and Quality in Nursing Homes.

Commission members include resident advocates, infectious disease experts, directors and administrators of nursing homes, academicians, state authorities, clinicians, a medical ethicist, and a nursing home resident.

Commission members were chosen from over 800 applications through a rigorous evaluation process, including criteria of expertise in infection control and prevention of infectious disease, direct expertise in the pandemic and/or other health emergencies, leadership in issues relevant to the commission, and contribution to diversity of viewpoints and representation to the commission's composition.

Convening via teleconference in June, the commission is using virtual collaboration tools to conduct a comprehensive assessment of the nursing home response to the COVID-19 pandemic. This work will inform efforts to safeguard the health and quality of life of vulnerable Americans, as well as prepare for future threats to nursing home residents' safety and to public health.

Recommendations made by the commission will encompass both immediate and long-term actions. To learn more about the Coronavirus Commission for Safety and Quality in Nursing Homes, visit <https://sites.mitre.org/nhccovidcomm/>

WELCOME NEW SUPPORTING MEMBERS (May - August)



STANLEY ADAMS

President
Turnkey Design Build, LLC
Sarasota FL 865-740-8170
turnkeyimaging@gmail.com

DAVID BAEZ

Southeast Territory Sales Manager
Metacrylics
Deland FL 386-785-3552
david.baez@metacrylics.com

SEAN BEILMAN

Manager of Energy Services
BCER Engineering
Melbourne FL
sbeilman@bcer.com

NACOLE CAPUTO

Certified Industrial Hygienist
The Vertex Companies, Inc.
Tampa FL 813-459-6384
ncaputo@vertexeng.com

RICH CHAN

Business Manager
Modular Building Systems International (MBSI)
Winter Garden FL 407-905-9951
rchan@mbsi.com

SANDRO CORNELIO

Vice President
Randall Mechanical
Apopka Florida 407-403-8497
scornelio@randallconstruction.com

ELECTRA COTSIPOULOS

Sole Proprietor
Electra Chem
North Miami FL 786-285-7968
electrachem@gmail.com

THOMAS ENDRE

Principal
Entendre Enterprises
Orlando FL 321-663-8803
tomendre@gmail.com

LISSETTE ESTEFAN

Healthcare Account Manager
Grainger
Plantation Florida 954-394-7762
lissette.estefan@grainger.com

CHRISTIAN EVANGELISTA

Owner
ATC Sales & Consulting LLC
Ponte Vedra FL 321-663-7800
christian@atcsandc.com

SCOTT FAIRBANKS

Healthcare Solutions Provider
Knight Healthcare Technologies
Riviera Beach FL 561-252-3445
sfairbanks@knightcorporations.com

MIKE GERGEL

Sales Executive
Pure Air Control Services, Inc
Clearwater Florida
mgergel@pureaircontrols.com

JEFFREY GRAFF

Regional Accounts Manager
Specialized Pipe Technologies
Sarasota FL 941-780-6031
jeffg@sptpipe.com

ERIKA GRAY

Project Manager
Gilbane Building Company
ORLANDO FL
egray@gilbaneco.com

COLLEEN HAZEN

Marketing Executive
System Tech Services Inc
Sanford FL 4076829881
colleen.hazen@stsi-fla.com

SCOTT KULCZAR

Senior Project Manager
Batson-Cook Construction
St Petersburg FL
skulczar@batson-cook.com

MICHAEL MAFFEI

Account Representative
Asco Power Services
Lake Worth FL
michael.maffei@ascopower.com

GRAHAM MCGEORGE

General Foreman
WW Gay Mechanical Contractors
Pensacola Florida 850-607-9530
gmckgeorge@wwgmc.com

WILLIAM MCGUIRE

Vice President
EXP US Services
Maitland Florida
bill.mcguire@exp.com

DOUG MITCHELL

Senior Account Manager
Shaw Industries (Flooring Manufacturer)
Florida 407-466-8054
doug.mitchell@shawcontract.com

STEVEN NAPIER

Sr. Project Executive
Gilbane Building Company
Boca Raton FL 561-812-5106
snapier@gilbaneco.com

NORM NOBLES

Stevens Construction, Inc.
nnobles@stevensconstructioninc.com

DENIZ NOLFF

Healthcare Sales - National Accounts
SESCO Lighting
Maitland FL 4076296100
dnolff@sescolighting.com

IVAN ORDAZ

Vice President
Belzona Florida LLC
Miami Lakes Florida 305-512-3212
florida@belzona.com

GRANT RAMSAY

Vice President, Director of Technology SE
Osborn Engineering
Orlando FL
gramsay@osborn-eng.com

MICHELE RICHARD

Business Development Manager
BluSky
Tampa Florida 877-251-2798
mrichard@goblusky.com

EDUARDO RIOS

Vice President Building Systems
WSP USA, Inc
Weston Florida
ejr260@gmail.com

MICHAEL ROSSIN

Project Manager
GHP1
Jupiter FL 561-253-9201
mrossin@ghp1.com

XAVIER SALAS

Senior Architect
Ware Malcomb
Boca Raton FL
xsalas@waremalcomb.com

PETER STACKOW

Sales Engineer
Cortez AC and Heating
St Petersburg FL 866-755-5211
petestackow@cortez-ac.com

DAVID TARPEY

VP Sales & Marketing
NABCO Entrances
Muskego WI
dtarpey@nabcoentrances.com

ROBERT UTSEY

Senior Manager Business Development
Gilbane Building Company
Orlando Florida 407-204-4030
rutsey@gilbaneco.com

JOSEPH YANNUCCI

Langan Engineering and Environmental Services
Tampa FL
jyannucci@langan.com

LISA YOUNG

Business Development
REGENCY DRT
Orlando FL 951-675-5534
lyoung@regencydrt.com

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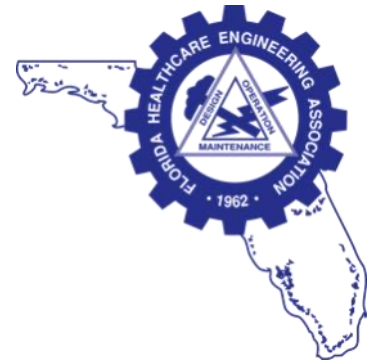
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Florida Healthcare Engineering Association
11812 N. 56th Street, Tampa, FL 33617
813.988.FHEA • www.fhea.org