

SHOW DAILY

Official Newspaper of the 2017 AHR Expo

Published by ASHRAE Journal

Las Vegas

Biggest Show Ever

Industry
Expects
Growth in 2017

LAS VEGAS—Responses to a recent joint survey by ASHRAE Journal and AHR Expo, sent to 1,400 HVAC&R manufacturers worldwide, show growing optimism exists for improving economic prospects in 2017. The survey found 27% believed their business would increase by more than 10% this year, a 6% increase from 2016. Other survey findings:

- Respondents forecasting business growth between 5% to 10% in 2017 increased 5% from 2016, to a total of 38%.

- 22% of respondents indicated business growth of less than 5%, with 11% saying business activity would remain the same for 2017.

- Only 2% anticipated their business would decrease in 2017

See Growth, Page 6

SURVEY RESULTS: Page 32

Labor Shortage Requires New Approach

ATLANTA—The HVAC&R landscape's labor shortage is about to heat up. The Bureau of Labor Statistics (BLS) estimates that the number of HVAC&R mechanics and installers needed will increase by 21% through 2022, nearly twice the growth of employment overall. Most of these jobs are strong middle-skill positions that cannot be outsourced or replaced by technology.

Even with strong demand for HVAC&R workers, the availability of trained workers falls short. The BLS estimates there are 267,600 HVAC&R mechanics and installers in the U.S., and a new study estimates 115,000 new workers must be trained by 2022 to meet demand.

How to Meet This
Growing Need?

HVAC&R jobs remain



Among the most difficult positions to fill in the United States are core HVAC&R installation, maintenance and repair occupations.

strong opportunities for workers with appropriate skills, training, certifications or work experience. In 2014, 70% of HVAC&R job postings were for middle-skill

occupations traditionally offered to workers without a bachelor's degree, according to Burning Glass Technologies (BGT), an employment

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Exhibit Hours

Today 10 a.m. to 6 p.m.
Tues. 10 a.m. to 6 p.m.
Wed. 10 a.m. to 4 p.m.

LAS VEGAS—Welcome to the 2017 edition of the International Air Conditioning, Heating, Refrigerating Exposition (AHR Expo).

Close to 2,000 exhibiting companies are using a record amount of space, surpassing the record set at Chicago's 2015 Show. This year's Show features approximately 14,000 square feet more exhibitor floor space than in Chicago.

Clay Stevens, president of International Exposition Company (IEC), the Show manager and producer, attributes much of the show's growth to renewed optimism in the HVAC&R industry.

"Many exhibitors have taken larger booth spaces anticipating that a more robust economy coupled with the exciting array of new products on display in Las Vegas will energize attendees," Stevens said. "We're expecting over 60,000 industry professionals."

Stevens said the annual economic survey of exhibitors conducted by IEC and ASHRAE Journal confirms industry optimism. According to the survey, 86% of the respondents expect their sales to grow in the coming year.

"There's no doubt that the building industry has improved," Stevens said. "What we see from the economic survey is that there is quite a lot of

See Biggest, Page 6

ASHRAE Offering Four Free
Residential Sessions Tomorrow

LAS VEGAS—An in-depth look at ASHRAE's work in the residential market as well as guidance on several aspects of residential design are offered in four free seminars at the 2017 AHR Expo.

The seminars are free, and no badge is required. They take place Tuesday, Jan. 31, from 11 a.m. until 5 p.m.

"The sessions highlight the growing importance within ASHRAE of residential energy use and the steps ASHRAE has taken to partner with both the public and private sectors to improve residential design and energy standards," said Leon Shapiro, conference chair. "They

See Residential, Page 6

Who Will Win Product of the Year?

LAS VEGAS—The winners of the 2017 AHR Expo Innovation Awards will be recognized during an awards ceremony at the Show tomorrow at 1 p.m. in New Product and Technology Theater A (Room N253 on the second floor of the North Hall).

The 2017 Product of the Year award winner, selected from among the 10 category winners, will also be announced at that time.

"The innovative and creative

product development demonstrated by this year's Award winners has served to confirm the HVAC&R Industry's ongoing vitality and forward thinking. It is exciting to see all the emerging technologies that are bringing about better and better solutions to the challenges we face," said Clay Stevens, Show manager for International Exposition Company.

For more information, see Page 14.

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PRESENTATION TIMES

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4:30 pm

Tuesday, Jan. 31
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ASHRAE Journal's Official Show Daily provides attendees with a review of products and services offered at the International Air-Conditioning, Heating, Refrigerating Exposition. Publication of editorial material or advertisements in ASHRAE Journal's Official Show Daily does not constitute endorsement by the Society, nor does ASHRAE necessarily agree with the statements or opinions in this publication.

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Welcome from ASHRAE

ASHRAE is pleased to welcome you to Las Vegas for the 2017 AHR Expo and ASHRAE Winter Conference.

Las Vegas is known as a vibrant showcase for the extraordinary, offering the grandest hotels, the biggest stars in entertainment and, of course, the brightest lights. We gathered here for the first time in 2011, marking a record-breaking Show and Conference.

This year's Expo and Conference promises to be no less extraordinary. Through technological developments, educational offerings and networking opportunities, we offer you solutions today for the industry of tomorrow.

The industry's goal is to design, build and operate buildings today that are efficient and sustainable, and that are intended to remain efficient and sustainable into the future. How do you accomplish that if tomorrow promises to be notably different than today? No sensible design decisions can be made without taking into account not only the world as it has been or is, but also the world as it will be. The technology you see here attempts to bridge this design challenge. This is highlighted in the Innovation Awards, which celebrates the creativity and innovation shown by the exhibitors.

The industry leaders sharing their knowledge at ASHRAE Conference also helps with that bridge. I encourage you to take time to visit the Conference, a short shuttle bus ride away at Caesars Palace. Featured are a Technical Program with eight tracks, 248 presentations and 331 speakers, as well as 20 educational courses consisting of Professional Development Seminars and Short Courses.

I encourage you to become more involved with shaping the future of the industry. ASHRAE offers more than 300 technical and standards committees that oversee research and standards. You can learn more at the Conference or at www.ashrae.org/volunteer. I also encourage you to stop by the ASHRAE booth (C3006) for the latest information about the Society.

Jeff Littleton, ASHRAE Executive Vice President



Littleton

Welcome from AHRI

Welcome to Las Vegas and the 2017 AHR Expo! We are pleased to have so many of AHRI's member companies here at the show, showcasing the latest in HVAC&R equipment and services. We proudly join our friends in ASHRAE and nearly 2,000 exhibitors as we welcome nearly 60,000 visitors from all over the world. The AHR Expo continues to grow each year, and this year is surely no exception. In fact, this Show promises to be the largest in its history.

With its glitz and glamour, Las Vegas is an attractive venue for our member companies and others to offer contractors, architects, engineers, specifiers, and building owners an exclusive look at the newest, most technologically advanced and energy-efficient HVAC&R equipment in the world. Our member companies have made significant advances in technology and efficiency—visit their booths to see what's new! Highly efficient equipment, using the latest innovations in safety, controls, motors, and refrigerants, is what you will find in aisle after aisle of the Las Vegas Convention Center over the next three days.

The products you will see represent the best our industry has to offer—residential and commercial heating and cooling and water heating equipment, and commercial refrigeration equipment, much of it independently tested and certified for performance by AHRI. Look for the AHRI Certified® mark on equipment as you roam the aisles, and visit AHRI's booth (C3506), to learn how certified products offer performance predictability, thanks to third-party verified ratings.

From our Directory of Certified Product Performance (www.ahridirectory.org) to our globally recognized standards, to our domestic and international industry advocacy, AHRI provides contractors with the resources they need to help sell efficient equipment, certified matched systems, service agreements, quality installations, and much more. We look forward to seeing you!

Stephen R. Yurek, President & CEO, AHRI



Yurek

Welcome to the 69th AHR Expo

Thank you for joining us in Las Vegas for the 2017 AHR Expo, the HVAC&R industry's global marketplace for new products and technology. Just when we wondered how this event could possibly get any better, this year's Show has grown into the largest AHR Expo ever with more than a half million square feet of exhibits—the equivalent of more than 10 football fields.

We would like to thank all of the exhibitors who are here to showcase their latest products, many introducing them for the first time. Nine exhibiting companies have received special recognition as winners of the coveted AHR Expo Innovation Award presented in ten product categories.



Stevens

We would also like to thank the 39 sponsoring and endorsing associations of the Show for the key role they play in informing and educating the industry. Many of these groups are offering seminars and courses during the Show.

Every conceivable product, technology, and solution available to the HVAC&R industry has been assembled here for you to explore. We hope that you will take full advantage of this unique event. It is your best opportunity to gather the information that will help you and your business succeed this year and on into the future.

**Clay Stevens, Show Manager,
2017 AHR Expo**



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TODAY Free AHR Expo Educational Sessions

TIME	ROOM	SESSION TITLE	PRESENTED BY
8:00 AM	N234	How to Sell Profitable Hydronic Radiant Systems	Radiant Professionals Alliance (RPA)
8:00 AM	N235/237	Global Trends in the HVAC Market	BSRIA Ltd.
9:00 AM	N239	The Future of Building Automation - The Self Learning Edge Revolution	AutomatedBuildings.com
9:00 AM	N232	HC Refrigerant Safety	RSES / RSES Journal
10:00 AM	N242	BACnet 101 - Introduction to BACnet	BACnet International
10:00 AM	N243	AHRI's NextGen Directory of Certified Product Performance	Air-Conditioning, Heating, and Refrigeration Institute (AHRI)
10:00 AM	N234	No Sweat Radiant Cooling Case Studies	Radiant Professionals Alliance (RPA)
10:30 AM	N239	Sedona Framework - Best Opportunity for Open Control	AutomatedBuildings.com
10:30 AM	N239	Psychrometrics Without Tears	Green Mechanical Council
11:00 AM	N241	Humidity and Occupants: What the Latest in Humidity Research Means for You	Air-Conditioning, Heating, and Refrigeration Institute (AHRI)
11:00 AM	N242	BACnet to the Cloud: From Concept to Reality	BACnet International
11:30 AM	N243	How to Read and Interpret a Test and Balance Report	National Balancing Council (NBC)
12:00 PM	N242	Unify Your Building and Reduce Energy Consumption with BACnet	BACnet International
1:00 PM	N238/240	Necessity of Filtration on an Open Cooling System	Puroflux Corporation
1:00 PM	N235/237	Cooling Tower Water Treatment Fundamentals	Cooling Technology Institute (CTI)
1:00 PM	N232	Make More Money by Identifying Where Your Market Really Is and Saying “No” to Where it Isn’t	Women in HVAC&R
1:00 PM	N241	Measure and Score Installed HVAC System Performance	National Balancing Council (NBC)
1:00 PM	N234	How to Specify Heating and Cooling Sources	Radiant Professionals Alliance (RPA)
1:00 PM	N242	Follow the BACnet Yellow Brick Road: Panel Discussion on Major Facets of BACnet	BACnet International
1:00 PM	N243	Business UN-Complicated! Create the Business and Life You Want	Phc News (Plumbing & Hydronic Contractor News)
1:30 PM	N239	Analytics and Data: Are We Focusing on the Most Important Thing - Productivity?	AutomatedBuildings.com
2:00 PM	N235/237	Cooling Tower Fundamentals	Cooling Technology Institute (CTI)
2:30 PM	N238/240	Practical Strategies for Condensing Boiler Retrofits in Existing Systems	American Boiler Manufacturers Association (ABMA)
2:30 PM	N232	Protection of Gas Piping Systems from Lightning Damage	Air-Conditioning, Heating, and Refrigeration Institute (AHRI)
3:00 PM	N242	How Facility Managers Can Use BACnet to Implement an Internet of Things (IoT) Strategy	BACnet International
3:00 PM	N234	Troubleshooting Hydronic Radiant Systems: What is in the Water?	Radiant Professionals Alliance (RPA)
3:00 PM	N241	GWAC Smart Buildings and the Smart Grid: Moving from Theory to Practice	GridWise™ Architecture Council (GWAC)
3:30 PM	N243	Measuring VOCs in Indoor Air	Indoor Air Quality Association
4:00 PM	N238/240	Development of Flat Oval Duct Reinforcement Tables	Spiral Duct Manufacturers Association (SPIDA)
4:00 PM	N242	Thing Connectivity in Your Buildings and Data Centers	BACnet International
4:30 PM	N232	Using Wireless Technology as a Revenue Stream	Women in HVAC&R

ASHRAE Short Courses and Seminars			
			COST
8:30 AM	N258	Air-to-Air Energy Recovery Applications: Best Practices	\$184 (\$139 for ASHRAE members)
8:30 AM	N260	Designing Toward Net-Zero Energy Commercial Buildings	\$184 (\$139 for ASHRAE members)
8:30 AM	N262	Energy Management Best Practices	\$184 (\$139 for ASHRAE members)
8:30 AM	N264	High-Performance Building Design: Applications & Future Trends	\$184 (\$139 for ASHRAE members)
2:45 PM	N258	Complying with Standard 90.1-2016 Appendix	\$184 (\$139 for ASHRAE members)
2:45 PM	N260	Design of Affordable and Efficient Ground Source Heat Pump System	\$184 (\$139 for ASHRAE members)
2:45 PM	N262	Fundamentals and Application of Standard 55	\$184 (\$139 for ASHRAE members)
2:45 PM	N264	Successfully Managing the Risk of Legionellosis Using Standard 188-2015	\$184 (\$139 for ASHRAE members)

Certification Exams				
			COST	PRESENTED BY
8:00 AM	N236	NATE Testing - Morning Session	\$135	NATE (North American Technician Excellence)
1:00 PM	N236	NATE Testing - Afternoon Session	\$135	NATE (North American Technician Excellence)

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MULTI ZONE SYSTEM (FJM)



HIGH WALL UNITS (RAC)



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optimism. It may be that after a downturn, now we're making up for it." For more on the survey, including responses from exhibitors about what they consider the most important trend or issue in the HVAC&R industry, see Page 32.

The size of the Show and number of options for visitors make it imperative for visitors to plan ahead.

"Visitors will be well-served spending some time on our website [ahrexpo.com] and doing some research, so they don't do what I do at the supermarket, which is walk up one aisle and down the next. They need to plan," Stevens said. "If people know what they want to see in advance and plan ahead, the Show can be done without being overwhelming," Stevens added.

At ahrexpo.com, you can search for exhibitors, specific types of products, and educational sessions. And visitors can create their own itinerary on the web-

site. Go to the "Attend" tab and click on MyShow Planner to create the itinerary.

The AHR Expo app, available for tablets and iPhone and Android devices, provides Show information and enables attendees to search exhibitors and education programs, view an interactive floor plan, make appointments with exhibitors, and create a custom agenda.

These tools will help in searching through more than 760 types of products on display.

There are three distinct product sections on the Show floor—the Building Automation and Control (BAC) Showcase, the Software Center, and the Indoor Air Quality Association Pavilion. These special sections allow attendees to focus their time in a single area with a range of similar products.

The BAC Showcase is designated for these products and services: building automation, energy and facility management systems; climate controls; monitoring systems; wireless and cloud-based

options; and other networked building systems including lighting, security, fire alarms, and more.

For this year's Show, the BAC Showcase has grown to 175 exhibiting companies, setting a new record. This 320% increase since 1996 is consistent with the critical role played by this product grouping in today's modern buildings, Stevens said.

The Software Center is designated for HVAC&R-related software, both off-the-shelf and customized solutions, for project and field service management, including estimating, inventory control, GPS tracking; systems design, specification and analysis; remote-based and cloud-based software; and more.

The Indoor Air Quality Association Pavilion is designated for member companies of the Indoor Air Quality Association. These exhibitors will be showing products related to indoor air quality, such as air quality monitors, exhaust fans, environmental testing sys-

tems, dehumidifiers, and more.

Show organizers note that these special sections may not include all exhibitors who manufacture a particular product. Many exhibitors produce multiple product types and therefore cannot be grouped into one particular section on the Show floor.

There are nearly 200 educational sessions. "There's always something new to learn at the Show. Whether it's attending a few of the dozens of free seminars or 'for credit' technical courses from ASHRAE, sitting in on presentations of new products, or taking exams proctored by industry certification providers—the education program is designed to help professionals keep current with the fast pace of change," AHR Expo organizers said.

More than 100 presentations will be held in the Show's New Product and Technology Theaters, with the latest innovations from exhibitors. Attendees can participate in these free 20-minute overview sessions and better understand the products and technologies displayed on the floor.

Attendees also can participate in more than 50 free seminars on a range of topics presented by endorsing associations and other industry groups.

Growth, From Page 6

(compared to 8% surveyed in 2015).

The survey found that 61% of the exhibitors plan to introduce new products, with energy efficiency remaining a key focus.

"It is always interesting to see how trends across the exhibitor landscape continue to shift," said Clay Stevens, president of International Exposition Company. "We're pleased to note the increase in responses around anticipated business growth, as well as an increase in good and excellent outlook responses regarding a majority of the HVAC&R industry's various market segments. Combining these positive predictions with the fact that the 2017 AHR Expo will be the largest held in the Show's 88-year history, we are anticipating a stellar year for business activity among exhibitors and attendees."

Residential, From Page 1

also serve to increase public awareness in residential energy efficiency."

He notes that design and installation have a tremendous impact on residential HVAC capacity and efficiency, so one of the seminars highlights the consequences when residential design and installation standards are not adhered to. Another session provides best practices for distributing heat in residential HVAC air and hydronic systems, while another offers real world experience on how actual energy use and thermal comfort can differ from the homeowner's expectations.

The seminars are:

- Did It Really Work?;
- ASHRAE's Residential Initiative: Why We Care;
- International Experience and Contractors' Perspectives on Residential Aspects that Need to be Considered on Every Job; and
- Flex Ducts, Hard Ducts and No Ducts: Migration Patterns for Duct Hunters (Or Not) in the Land of Thermal Comfort.





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AHR Expo Moves With the Industry

WESTPORT, Conn.—It's exciting news that the 2017 International Air-Conditioning, Heating, Refrigerating Exposition (AHR Expo) has returned to the glitter of Las Vegas. Behind the glitz of a city to which many exhibitors and attendees love to flock, however, lies numerous years of advance, strategic planning by the Show's management.

Las Vegas will be the latest city to which the AHR Expo has returned over the course of its eight-decade history, and is one of several cities Show Management recognizes as prime for attracting exhibitors and attendees alike.

"With an audience that spans the continent and crosses international borders, we want to make sure AHR Expo remains an accessible, not-to-be-missed experience for as many exhibitors and attendees as possible," said Clay Stevens, president of International Exposition Company. "We track the number of attendees, exhibitors, media and other personnel at every Show—in addition to conducting in-depth research of venues, accommodations and travel to and from potential cities—and use this information to plan the locations for AHR Expo years in advance."

According to Stevens, U.S. cities are primarily chosen based on available exhibition space and ancillary amenities to accommodate the Show's thousands of annual attendees and exhibitors. Ease of travel to/from and within a city, as well as its core market strength in specific HVAC&R segments, is also closely evaluated.

Additionally, AHR Expo's planning team recognizes the importance of choosing cities that address the broad and notably varied needs of attendees and exhibitors.

"The team is always thinking about which locations will be as enjoyable as they are of value for doing business, making sure that we are 'mixing it up' and keeping it interesting each and every year," said Stevens. "We know that this is a big part of companies' annual investments, and in many cases a destination event for our exhibitors and attendees. It's important that the business value of AHR Expo is supplemented by the overall appealing nature of the selected venue."

"HVAC&R is used and/or required everywhere in the U.S., and with that in mind, the AHR Expo planning team ensures that the variety of our attendees' and exhibitors' regionally specific interests and needs are addressed through the venues we choose for the Show," Stevens explained. "We welcomed a record-breaking number of visitors to the 2016 Show in Orlando, including 36 percent from nearby regions, which underscores that our strategy was on-mark for returning to the Southeast after numerous years."

Ring in the New Year—Year After Year

It's no coincidence that each year's AHR Expo is held in mid-to-late January or early February. Following careful research—and proven performance—of

this time period's "golden factor" for attracting industry professionals, it remains a consistent foundation for successful Show planning.

"We have found that this time—after the heating season is under way and before the air-conditioning season commences—is the time when we have an ability to cast the widest net for attendance at AHR Expo," said Stevens. "At the end of the day, the Show's core value is in cultivating the product knowledge and networking opportunities that translate to business—hard dollars and cents—for our exhibitors and attendees alike. We want to make sure the timing of the Show capitalizes on the HVAC&R industry's least busy season for both exhibitors and visitors."



Each year, AHR Expo draws tens of thousands of attendees from all over the world and from all segments of the HVAC&R industry.

Similarly cognizant of this ideal timing, HVAC&R industry manufacturers are hard at work preparing for the launch of new products, systems, technologies and services in January and February.

"Manufacturers understand that they have a yearly opportunity to engage a receptive audience that is ready to learn

about the latest and greatest," said Stevens. "Keeping with our reputation for being the world's largest HVAC&R marketplace, we are proud to create an experience that serves as a launching pad for our exhibitors' annual sales and marketing efforts."

VFD-Induced Bearing Currents Kill HVAC Motors!



Electrical bearing damage causes unplanned downtime

VFD-induced electrical discharges can blast millions of pits in metal bearing surfaces. These discharges burn and contaminate bearing grease, drastically reducing its effectiveness. They also result in bearing fluting failure and costly, unplanned downtime — often in as little as 3 months!

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data analytics firm. On average, these HVAC&R middle-skill occupations offered strong average advertised salaries of \$49,259, according to BLS, and many pay more than \$80,000 annually.

Despite great opportunities, employers are struggling to fill openings. Among the most difficult to fill in the United States are core HVAC&R installation, maintenance and repair occupations. HVAC&R mechanic and installer jobs have the 11th longest posting duration of all middle-skill jobs, and refrigeration technician postings remain open the longest.

To help contractors meet their employment needs, North American Technician Excellence (NATE), the nation's largest non-profit certification organization for heating, ventilation, air-conditioning and refrigeration technicians, developed two new levels of testing and training last year to help contractors recruit and retain new talent—including talent from outside the HVAC&R industry.

"At NATE, we continually hear from contractors about the challenges of hiring good, qualified people, folks coming through trade programs, and trade in general," said Valerie Briggs, director of Marketing and Business Development at NATE, "We heard anecdotally that people would meet someone, for example, working as a server in a restaurant who had great customer service skills, great soft skills, and they wanted to have the opportunity to invite them to consider joining their team. We created an HVAC&R support exam to meet that need."

Briggs explained that the new tests measure a person's ability to understand the basics of HVAC from a safety standpoint, and other important skills like ability to be trained. "For example, can they move from a helper to an installer to a service technician?" Briggs explains. "We are continually looking at nontraditional ways of filling the unemployment gaps." The two new certificate

exams, Ready-to-Work and HVAC Support Technician, were developed by the NATE Technical Committee, comprised of experts from industry sectors including manufacturing, distribution, education and training and contractors.

Following are some tools and creative approaches to consider when solving your labor shortage issue.

1) Think outside the box. Consider people you meet in your everyday life who have great customer service skills. Might they be interested in an opportunity to learn a trade that pays well and has a future? "Look outside the traditional methods of recruiting at high schools or trade schools," says Briggs. "Consider other candidates—not just millennials—who are employed, unemployed, or displaced. Engage people who have good soft skills and might be interested in a career with a great future."

Rather than looking for experienced candidates, "businesses need to open doors to inexperienced people," says Re-

nee Cardarelle, executive director of the Nextstar Legacy Foundation, a nonprofit group promoting careers in HVAC&R.

2) Recruit minorities. While whites make up an overwhelming percentage of HVAC&R technicians in the U.S. (as much as 80% according to NATE), great opportunities exist to engage minorities who might not know about the benefits of an HVAC&R career. For starters, consider the demographics already in your area.

"It makes good business sense to hire technicians who look like the people who live in your community," says Briggs. Make sure your outreach efforts include images and information that welcome minorities into these careers, and consider translating recruiting materials into Spanish.

3) Tap veterans. Many companies are turning to our nation's veterans to fill unmet labor needs—with great success. "Veterans often have great soft skills," says Briggs. Plus, through the GI Bill, vets may be able to cover the cost of training and testing.

Danial Gilbert, a Navy veteran, joined the HVAC&R industry in Orlando in 2012. He received on the job training with his dad, who was a service manager. He is now a service technician.

"I realized that if I had kids, I'd be able to provide for them well in this profession," Gilbert said. He cites job security as a great selling point for veterans. "Veterans are hard-working and driven," Gilbert says that for him personally, the profession has helped him "keep my mind off things, especially when it comes to PTSD. It keeps your mind off thinking about what happened."

4) Mobilize as an industry. Even with abundant scholarships and career opportunities, spots remain stubbornly unfilled. While Nexstar has sponsored \$350,000 in scholarships since it began offering them in 2006, Cardarelle says \$150,000 went untapped last year. Why? A shortage of interest in the profession overall. She believes the HVAC&R industry thus far has come up short in helping combat negative perceptions. "We have to address the barriers. Why aren't people coming over to our industry? The trades have a stigma as working class, as lower class jobs, that you are dirty all day or don't have skills or knowledge. At high schools they say 'not everyone is meant for college,' which creates a stigma. Consequently, many students don't even know about these jobs and aren't given information."

Cardarelle says other industries are doing a better job of marketing their profession—citing trucking and nursing as examples. "It's not as easy as creating a scholarship program or offering a new training program, or talking to someone once at school," says Cardarelle. "It's going to take a sustained effort by the whole industry to address the issue. We have a lot of competition out there. We can't sit there and say, 'where is everyone?' and not do things to address it."

Web Resources:

NATE (North American Technician Excellence): www.natex.org

Nexstar Legacy Foundation (Scholarships): nexstarfoundation.org

Troops-to-Trades (Scholarships): troopstotrades.org



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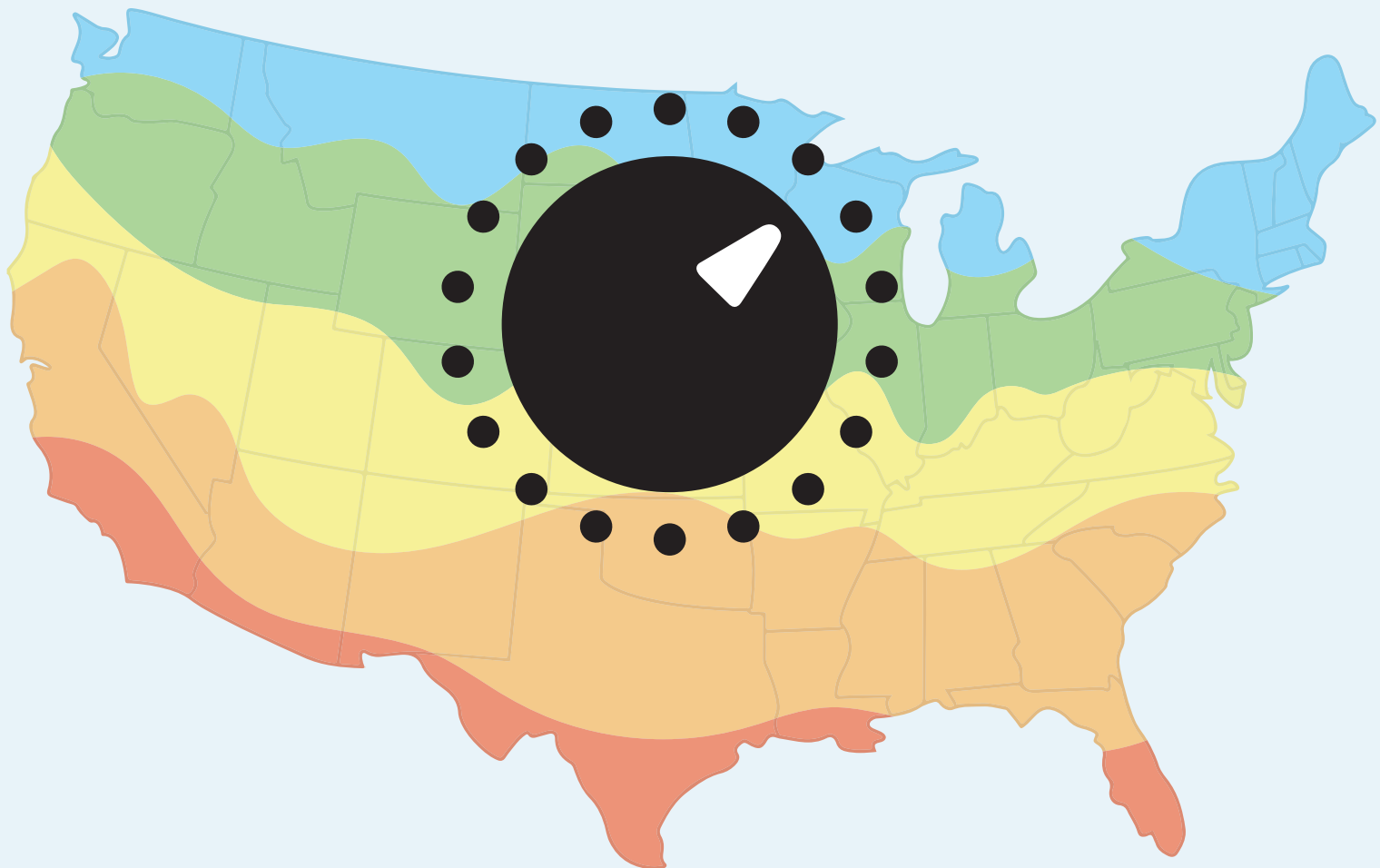
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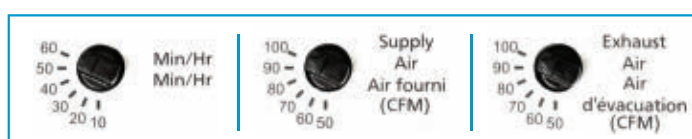


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Passive House Raises the Green Bar

By some definitions, Darren Macri is a futurist – fully focused on exploring the possibilities about how humans will experience life here on planet Earth in the future.

Macri’s focus is our living environment. To slice it even closer to the core: how passive homes have become the future of green building.

As CEO of Bleu Nest Builders, a Ramsey, NJ-based building and consulting company for high performance homes, Macri is a thirty-something, mostly restless evangelist for the cause. He’s become a champion for everything the passive house concept represents.

Today, he’s in the throes of building New Jersey’s first internationally certified Passive House – one that will consume 90 percent less energy than a traditional, code-built home.

Macri says there are six essential principles to achieve Passive House status:

1. Wrap it in a blanket. The building shell consists of 100% continuous, highly insulated exterior walls, roof and floor slab.
2. Fresh air. These high performance homes complete seven air exchanges within a 24-hour period.
3. Keep it tight. With super tight construction, air infiltration/exfiltration can be no greater than 0.6 air changes per hour, at 50 pascals.
4. Triple-paned windows. Highly efficient triple-pane windows with low-e glazing, argon gas and airtight frames have R-Values as high as R-125.
5. Smart, thermal bridge-free design.
6. Orientation. The house should be positioned in a way so the sun can



Bleu Nest Builders built this roughly 5,000 ft² house to consume 90% less energy than the average house.

heat it in the winter and shade is provided in the summer.

Macri says the amount of power it takes to heat and cool a passive house is comparable to the power it takes to run a hair dryer.

The home’s active source of heating and cooling is a surprisingly small Fujitsu (Booth N10113) Halcyon multi-zone heat pump system.

“The [Macri’s] home has a two-ton,

or 24,000 BTU, multi-zone system with three indoor units connected to one outdoor unit,” explained Mike Psihoules, national energy solutions manager at Fujitsu General America.

The upstairs and downstairs are each equipped with concealed Slim Ducted indoor units, which deliver conditioned air through ductwork to each of the rooms. Basement areas are served by a small wall-mounted indoor unit.

“The small Fujitsu multizone system was a perfect fit for the home’s occasional heating or cooling needs, while providing great energy efficiency,” said Macri.

While Fujitsu offers the world’s most efficient single-zone mini-split system, rated at 33 SEER, Macri chose a multi-zone system to serve as the secondary source of heating and cooling (because, by definition, the Passive House is the primary source of heating and cooling).

“And when the system is needed, it’s not active for long because the home is so tight and well insulated; none of the heating or cooling escapes,” said Lorino.

“The whole house will be a steady 68°F year round,” added Macri. “Every single room, every single surface, all of it inside—that’s the beauty of a passive house. The idea of controlling interior temperature with a thermostat is so wasteful and passé. The ERV will constantly move and circulate the 68 degree air around the house – equalizing inside temps while adding fresh air 24/7.”

Carrier Donates Heat, Volunteer Hours

INDIANAPOLIS—From construction to dedication, Carrier (Booth C1510) and its employees are proud to support the latest Habitat for Humanity® home in Indianapolis. The home, on the northeast side of Indianapolis, was built with the aid of Carrier employees who spent hundreds of hours volunteering.

“Carrier has been recognized as experts in making people comfortable in their homes for more than a century and building homes for some of our community’s most deserving residents is a wonderful opportunity to share our expertise,” says David Meyers, vice president, sales, Carrier. “It’s a tremendous privilege to know our efforts have provided comfortable homes for at least 20 central Indiana families since 1996.” Habitat for Humanity of Greater Indianapolis expressed its appreciation for the company’s support.

“We’re indebted to Carrier’s commitment to provide the life-changing opportunity for deserving families to purchase and own simple, quality, affordable homes,” says Jim Morris, president, Habitat for Humanity of Greater Indianapolis.



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Bosch Contributes Equipment For Student Training Lab

In September 2016, Bosch Thermo-technology Corp. (Booth C5115) in Fort Lauderdale contributed a 5 ton Inverter Ducted Split System Condensing Unit and Air Handler to the HVAC laboratory at Atlantic Technical College Coconut Creek campus. With the encouragement of Ft. Lauderdale Site Manager Brian Murphy, Bosch Technical Service Associate Omar McIntosh and Warranty Administrator Maryna Kamkova helped arrange shipment and installation of the units with ATC's HVAC&R Educator Brian Youngblood and Assistant Principal John Felser.

State-of-the-art IDS system heat pump is a great resource for the lab.

According to Brian Youngblood, Certified Master HVACR Educator (CMHE) at the Coconut Creek Campus, the IDS Air Handler and Condensing Section will be used for training HVAC students in the Florida DOE Architecture and

Construction Career Cluster program "Air-Conditioning, Refrigeration and Heating Technology (8723000)."

"We currently have 36 full time adult students and 5 dual enrolled part time high school students (from outside schools) in the morning class and 2 part time Magnet high school students (from our high school) in the afternoon class. Our 2 afternoon Magnet High School senior students have just completed the installation of the equipment on a rolling/portable trainer, and they are currently building ductwork. This system will be a great tool in our classroom for training future HVAC&R technicians, especially in this system's modern electronic control systems."

Brian Murphy, site manager for Bosch Ft. Lauderdale facility, remarked "We are delighted to provide a modern system to Atlantic Technical College. Students of today will be installing and maintaining



Atlantic Technical College received a ducted split system and other units from Bosch.

the HVAC systems of tomorrow."

Founded in 1973, Atlantic Technical College is an innovative career and technical education center providing a wide range of educational opportunities for adults and select secondary students. ATC places major emphasis on high skill and high demand occupational programs designed to meet the current and future needs of business, industry, and the community.

Titus Ushers in Virtual Reality Era of HVAC

LAS VEGAS—Virtual reality, once reserved for gaming, is now being ushered in as the HVAC industry's next training platform. For the first time, air distribution company Titus will have a virtual reality experience available at their AHR Show booth (C3137), allowing users to see how individual components can fit into larger systems and their own projects.

With standard HVAC systems representing up to 40% of a commercial building's total energy use, manufacturers understand that to reduce energy usage their systems cannot be siloed. That's what makes Titus's Total Systems Approach so vital. Its highly-integrated approach to HVAC systems solutions, to be featured at AHR Show 2017, aids engineers, contractors and building owners in achieving operational efficiencies and realizing long-term cost savings.

Titus will showcase over 15 products in the booth, further emphasizing the importance of using a Total Systems Approach. The company will feature its new and extended line of chilled beam products, which includes both active and passive chilled beams and floor mounted displacement chilled beams, along with Helios and VENTUS LUX. Helios, which won an AHR Innovation Award in the Ventilation category, is the industry's first digital diffuser powered by both ambient and direct sunlight. VENTUS LUX is a premium chilled beam system that is visually appealing and combines the efficiencies of chilled beams and LED lighting.

DuctSox, Involta Collaborate

DuctSox (Booth C5931), manufacturer and innovator of fabric HVAC air dispersion systems, has collaborated with Involta™, a provider of highly reliable data centers, cloud services and IT outsourcing, for the purpose of improving cooling energy efficiency and efficacy for data center operations.

The research and development (R&D) collaboration has recently developed DataSox™, the HVAC and data center industries' first customizable air displacement ventilation dispersion (ductwork) system with onsite directional-adjustability, and plans additional HVAC innovations.

The collaborative development of DataSox's design resulted in reduced turbulence and sound levels, and better efficiency measured in power usage effectiveness (PUE), which generated a significant difference in the bottom line cost of operations, according to Jeff Thorsteinson, chief security officer, Involta.

DataSox is a round, overhead and porous/diffuse fabric HVAC diffuser system that's specifically designed to distribute a large volume of air down into data center cold aisles, but with low 400-FPM velocities. The controlled velocities don't upset critical equipment air intake and greatly reduce the volume of entrained air from hotter regions. It also offers the optional flexibility of directional spot cooling capabilities with adjustable nozzles for high density IT equipment racks.

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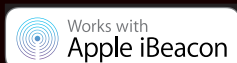
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Pioneering the Future of HVAC&R Technology



Representatives from last year's Innovation Awards winning companies, ASHRAE, AHRI, and Show manager International Exposition Company pose following last year's awards ceremony.

LAS VEGAS—2017 AHR Expo Innovation Awards have been given to the most inventive and original products, systems, and technologies that will be showcased at the 2017 AHR Expo. In all, 10 Winners and 24 Finalists were chosen. The 2017 Product of the Year will be announced at an awards ceremony at the Show on Tuesday, Jan. 31, at 1 p.m. in New Product and Technology Theater A.

The annual competition is sponsored by ASHRAE, the Air-Conditioning, Heating, and Refrigeration Institute (AHRI) and the International Exposition Company (IEC).

Descriptions of the Winner and Finalist products are presented on the following pages.





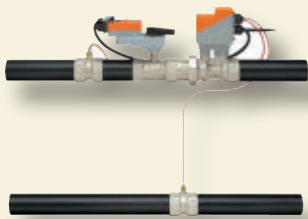
WINNER | Building Automation

Danfoss's cloud-based service delivery platform, **Danfoss Enterprise Services (DES)**, collects all types of data through connected devices to provide powerful insight into food retail stores' performance.

Customers get specific, real-time, actionable information, which enables stores to make fast decisions to save time and money. DES provides a comprehensive, unique offering that touches almost every aspect of HVAC&R operations, energy management and use, benchmarking, and safety. **Booth C4506.**

FINALISTS | Building Automation

The enhanced **Belimo Energy Valve™** from BELIMO Americas documents, optimizes, and improves water coil performance. It uses a Delta T Manager™ algorithm to boost AHU coil efficiency and is now an Internet of Things (IoT) device with cloud-based services that can benchmark coil performance, determine glycol concentration, collect and store data, send alerts, and fine-tune the coil for optimal performance. **Booth C1252.**



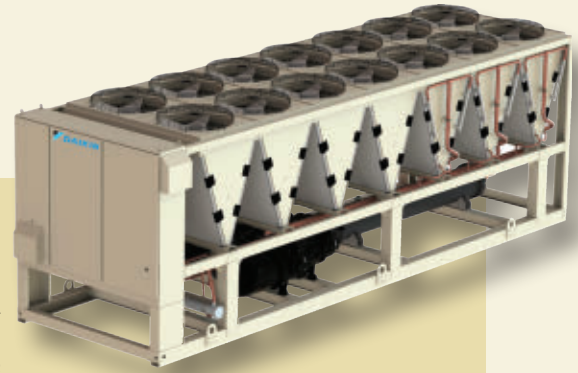
Daikin Applied's Intelligent Equipment® for System Performance Measurement monitors equipment energy consumption for more accurate performance measurement. While the benefits are enormous, the solution itself is simple: a gateway and sensors are installed on each unit, and a software subscription provides data into any connected device (PC, tablet, or phone) to create insights to optimize system performance. **Booth C2509.**

The **eZNTW-Delta Wireless BACnet Thermostat** from Delta Controls Inc., revolutionizes how BACnet thermostats communicate. Its dual onboard Wi-Fi and wireless EnOcean modules provide tremendous flexibility on installation and device connectivity. Wi-Fi allows optimal placement of the thermostat, while EnOcean provides wireless connectivity for in-room sensors, lighting, blinds, and HVAC control. eZNTW is suitable for retrofit projects where wiring is difficult. **Booth C1052.**



WINNER | Cooling

The new **Pathfinder® Air-Cooled Screw Chillers with Variable Volume Ratio (VVR) Technology** from Daikin Applied features variable volume ratio technology. The chiller's compressor senses the amount of lift needed and adjusts the compression ratio automatically to provide optimal efficiency under any operating condition, reducing energy use, cost of ownership, and carbon footprint. The chiller also



features variable volume ratio slides that operate on the discharge side of the screw to control the refrigerant compression ratio without altering the per-stroke refrigerant volume. Variable frequency drives (VFDs) are used in conjunction with the VVR slides to control motor speed and subsequently compressor capacity. **Booth C2509.**

FINALISTS | Cooling

Imagine a positive displacement screw compressor with integrated VFD that rivals the IPLV performance of complex, oil-less centrifugal compressors. BITZER US, Inc.'s **CSVH Series Screw Compressor w/ Integrated VFD** is now UL-approved for the U.S. and is available in three sizes. The inverter is cooled by a cold plate to ensure high performance under any conditions. **Booth N7935.**

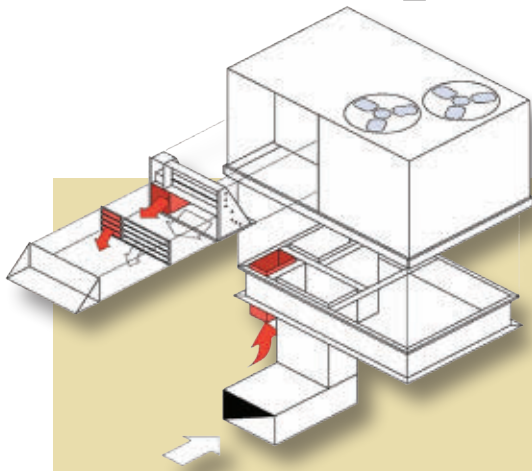


The **YORK® YVFA Free-Cooling Chiller** from Johnson Controls, Inc., is the first AHRI-certified, integrated VSD screw chiller with efficient free-cooling coils. The high-efficiency, air-to-liquid free-cooling coils reduce or eliminate the need for mechanical cooling when ambient conditions allow. Intelligent controls optimize energy use year-round, constantly evaluating conditions and controlling bypass valves to reduce pump energy when free cooling is not available. **Booth C2929, C3124, C3329.**

The modular **NYB Chiller and Integrated Free Cooling Chiller** from Mits Airconditioning Inc./AERMEC S.P.A., will reshape how the U.S. market thinks about free cooling. The air-cooled chiller with optional integrated free cooling coils meets both IECC code and ASHRAE Standard 90.1-2013 minimum efficiencies as a chiller/free-cooling chiller. **Booth N7917.**



AHR Expo Innovation Awards



WINNER | Green Building

Carrier's **Dual Stage Relief Economizer (DSRE)** for light commercial rooftop units combines a traditional economizer

with a means of relieving building pressure without using a power consuming device. During normal operation, the first stage relief system relieves excess building pressure caused by space ventilation. During economizer operation, the first- and second-stage relief systems work together to relieve excess building pressure caused by free cooling with outdoor air. **Booth C1510.**

FINALISTS | Green Building

A future-proof alternative for chiller systems in preparation of efficiency standards and refrigerant regulations, the **Danfoss Turbocor® TG Compressor** series from Danfoss operates with environmentally friendly HFO1234ze—or other low-GWP refrigerant options—and provides optimum energy efficiency at full and part loads. The compressors are designed for air- and water-cooled chillers ranging from 40 tons to 500+ tons (141 kW to 1758 kW) when manifolded or used in multiple circuits. **Booth C4506.**



Yaskawa America, Inc.'s **Z1000U HVAC Matrix Drive** features exclusive Matrix technology to provide low harmonics and high efficiency. The drive enables building automation systems to precisely match the speed of electric motors to the load required to meet the demand for HVAC applications such as fans, pumps, and compressors without the extra components often required to meet the harmonics requirements of IEEE-519. **Booth C1140.**

WINNER | Heating

Noritz America offers a new hydronic heating product to consumers who wish to install one appliance to meet both domestic hot water and space heating needs. The **Noritz Combination Boiler** uses high-efficiency condensing technology to deliver hot water to both plumbing and hydronic heating applications. The Combi delivers up to 9.2 gpm

(0.58 L/s) of domestic hot water and can be used on a wide variety of hydronic and forced-air applications such as radiators, in-floor radiant, and snow melt, as well as forced-air applications. **Booth C5917.**



FINALISTS | Heating

The **Eichenauer Electric Duct Heater**, using highly efficient Zig Zag technology, fits existing standard-size forced-air duct systems with greater longevity and lower heat loss. The Eichenauer Inc., product's superior serpentine flat resistive alloy generates maximum heat transfer. Results are a dynamic heater system, with fast heat up and cool down, lower operating temperatures, and longer heater life. **Booth N11507.**



Honeywell International Inc.'s **Equipment Remote Module (ERM)** connects a heat pump or air-conditioning compressor to control devices—without wires. It controls outdoor equipment on a heat pump or conventional cooling system. With the ERM outside and the Equipment Interface Module and a RedLINK-enabled thermostat inside, installations of complete systems have never been simpler. Simply put, the ERM lets you keep the wall and lose the wires. **Booth N8106.**

The **Samsung DVM S Max Heat VRF System** from Samsung HVAC is an air-to-air electric heat

pump and a one-of-a-kind VRF system boasting superior heating performance at extremely low ambient temperatures. It uses innovative technology like Flash Injection and Intelligent Defrost to achieve 100% heating performance at -13°F (-25°C), ensuring users peace of mind in the harshest weather. **Booth N8117.**



FINALISTS | Indoor Air Quality

InSpire Solar Air Heating Wall Panel from ATAS International, Inc., reduces heating costs and can help meet air ventilation rate requirements. Sunlight strikes the panel mounted a few inches from the building's outer, south-facing wall. Solar-heated air is drawn through perforations in the panel,

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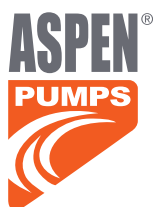
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See Awards, Page 18

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AC lineset installation
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SLIMDUCT®

Professional grade lineset duct & fitting system.
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WINNER | Indoor Air Quality

A gas-fired iso-thermal humidifier producing hygienic and atmospheric steam, the **GS Series – CS Model (Nortec GS CS) Humidifier** from Nortec Humidity fulfills a wide range of humidification requirements for indoor environments. Direct building management integration allows the GS CS humidifier to deliver

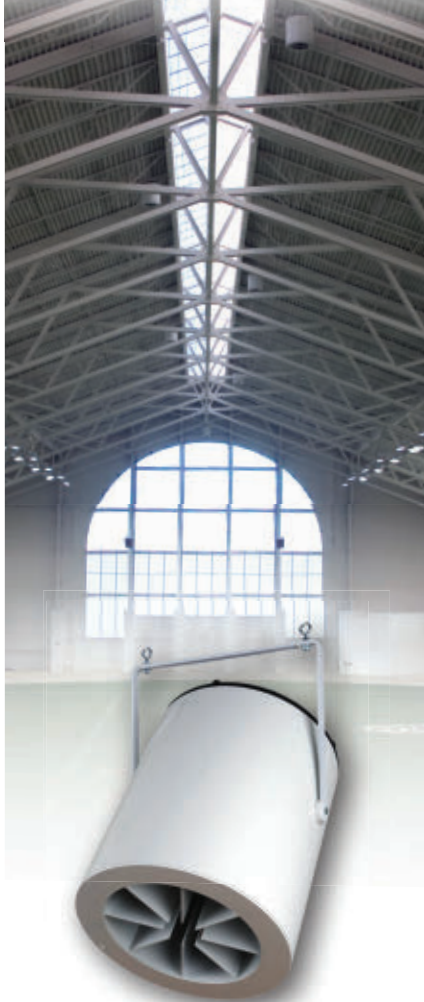
necessary steam quantities both inside duct systems and directly into a space, quickly elevating indoor humidity conditions to required setpoints. Its gas-fired operation is powered with either natural gas or propane, allowing for flexible and economical function. Delivering more than 93% percent total efficiency, the humidifier also employs a secondary heat exchanger to preheat water before entering the tank, while cooling down combustion exhaust gasses. **Booth C4706.**

into the chamber between the panel and wall, and distributed through the building's ductwork. **Booth N11917.**

Friedrich Air Conditioning Co.'s **VRP Single Package Vertical Heat**

Pump System with Built-In Conditioned Makeup Air is the first inverter-driven single-packaged vertical heat pump, with the highest SEERs in the category. Its innovative, patents-pending system introduces conditioned makeup air into the space, including an optional reheat coil for humid climates. This packaged unit simplifies building design and delivers exceptional performance and maximum comfort. **Booth C2127.**

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WINNER | Plumbing

The **SmartPlug Smart Hot Water Recirculation Control** from Taco, Inc., learns and records a homeowner's hot water use pattern and uses the data to operate a home's hot water recirculation pump precisely when hot water is typically required. The plug-in 115-volt control is installed onto the existing domestic hot water recirculation pump system. The SmartPlug system refreshes

data and adjusts any changes to hot water use patterns. The result is a significant increase in water heater operational efficiency, promoting a simple way to save on residential energy costs. **Booth N7926.**



FINALISTS | Plumbing

A key problem with hydraulically driven automatic self-cleaning screen filters has been the immense amount of water required. The **Model ORZ Automatic Self-Cleaning Screen Filter** from Orival Water Filters uses about one-third the water. Models are available with 2 in. to 24 in. (51 mm to 610 mm) connections and screen areas up to 2,500 in.2 (1.6 m2). **Booth C4346.**

RIDGID's **STRAPLOCK Pipe Handle** allows you to grip plastic pipe from 3 in. to 8 in. (76 mm to 203 mm), allowing force to be applied confidently in all directions, simplifying installation and maintenance of large-diameter plastic pipe applications. **Booth C1310.**



WINNER | Refrigeration

The **Danfoss CTM (Electrical Controlled Transcritical Multi Ejector)** is designed for the warm climate operation of transcritical CO₂ systems in food retail applications. The CTM ejector recovers energy while controlling the high pressure of the transcritical application and provides 20% or greater improvements in energy efficiency. It employs energy recovered from the gas cooler and transfers it to increase the pressure of gas being compressed by parallel compressors, reducing overall compressor load. **Booth C4506.**

FINALISTS | Refrigeration

The **EVD Ice Electronic Valve Driver** from CAREL INDUSTRIES S.p.A., is an electronic superheat controller for Carel unipolar expansion valves for harsh environments. It is designed to be installed near the valve, directly on the refrigerant circuit, simplifying installation and making electronic expansion valve technology available direct-ly onboard the evaporator unit. **Booth C4140.**

Opteon™ XP40 (R-449A) Refrigerant from Chemours is a non-flammable, low global warming potential hydrofluoro-olefin-based refrigerant. It was developed as a replacement for R-404A and R-22 in DX, low- and medium- temperature refrigeration applications. It can also be used in efficient new equipment designs. It can improve system energy efficiency up to 12%. **Booth C3113.**

See Awards, Page 20



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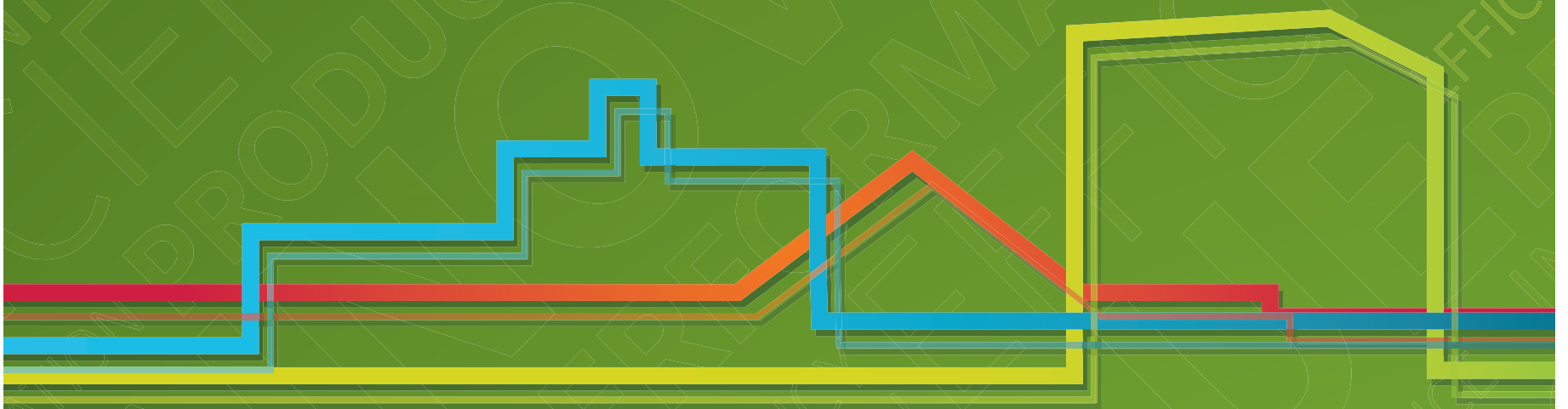
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Awards, From Page 18



WINNER | Software

To provide HVAC&R service contractors the ability to program a replacement blower motor at the point of installation, Nidec Motor Corporation

offers the **Rescue Select Programming App**. The app is driven by a continuously updated database populated with thousands of motor profiles. It provides contractors with options to customize or develop new performance profiles that match unique application requirements. The app can be accessed via any smartphone or compatible Wi-Fi-enabled device. **Booth C3924.**

FINALISTS | Software

Coolfront Technologies' **Coolfront Mobile**—the zero-cost flat rate pricing app—is a web-based mobile application developed and designed by Coolfront Technologies for service companies involved primarily in the HVAC, plumbing, electrical, appliance, and irrigation trades. It provides a fully functioning work order and invoicing system and provides access to Coolfront's database of over 25,000 flat rate repairs. **Booth N11938.**

The **PredictAir™ Application Software for the SMART Air Hood™ Balancing Instrument** from Dwyer Instruments is a reporting tool used to interface with the SMART Air Hood™ Balancing Instrument. It guides a user through the balancing process by using Proportional Balancing or Predictive Balancing methods. It determines the most efficient path and calculates the optimal airflow values for each register to balance the system. **Booth C4124.**

WINNER | Tools and Instruments

The **PEXGUN** from PEX-LOGY, Inc., attaches PEX tubing to rebar and wire mesh five times faster than plastic zip ties and two times faster than plastic staples. The fast, lightweight, economical handheld tool wraps galvanized wire around PEX tubing and wire mesh, then twists, ties, and cuts the wire to securely fasten with a pull of the trigger. The tension dial allows for a



secure wire tie without ever dimpling pipe. One-hand operation reduces potential risk of carpal tunnel injuries, and using the optional extension arm prevents the user from having to bend over and risk back injuries. **Booth C6618.**

FINALISTS | Tools and Instruments

The **Pro-Fabriduct® Manufacturing System** from Mestek Machinery is a modular designed processor that integrates over 20 fabricating processes into one combination residential/commercial rectangular duct manufacturing system. It is the market's fastest, most integrated, accurate, and reliable processor, taking a six-person operation down to one. With a coil line control system capable of receiving input thru download, it saves production time and steps at all points of the manufacturing process. **Booth C1530.**

Milwaukee Tool's new brushless **M18 FORCE LOGIC™ Press Tool** is the smallest, lightest, and most intelligent press tool. It's 20% lighter than the leading competitor, and more compact than its predecessor. It offers 20% more run-time, 10% faster cycle time, and the industry's longest calibration interval at 50,000 cycles. **Booth C3142.**

The **Stable Vortex II® Fume Hood Conversion Kit** from Triatek adapts conventional fume hoods into high performance, low-flow hoods that deliver superior safety while providing substantial energy savings. Features include a horizontal sliding sash, Hood Alert Monitor that measures face velocity, VFV™ Baffle Controller that adjusts the rear baffle to maintain hood containment, and CFM Monitor that provides an accurate method of verifying exhaust volume. **Booth C1367.**



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WINNER | Ventilation

The **Helios Digital Diffuser** from Titus is a digital diffuser powered by both ambient light and direct sunlight. The wireless digital variable air volume

(VAV) diffuser provides ventilation for indoor spaces to elevate occupant comfort and improve IAQ. Suitable for use in a wide range of applications, the Helios provides highly efficient, industry leading technology for promoting a healthy indoor environment. **Booth C3137.**

FINALISTS | Ventilation

The fabric sound attenuator **DuctSox Silencer** from DuctSox Corporation addresses one factor for fabric duct—noise. Noise from AHUs, volume control dampers or fan-powered boxes can create an uncomfortably environment. The Silencer can be used in place of a metal silencer or acoustically lined ducting to absorb incoming noise from reaching the occupied space. **Booth C5931.**

The **RadiPac Blower** motorized airfoil impeller from ebm-papst Inc., consists of hollow three-dimensional blades, EC motor, aerodynamically optimized blade channel, rotation diffuser, and angular trailing edge. The design increases airflow and efficiency while lowering acoustics. **Booth C4528.**

Innovation Awards Donates \$22,500 To Charity

LAS VEGAS, Conn.—Each year as part of its submission process, the AHR Expo Innovation Awards Competition collects entry fees that are donated in full to a charitable organization within regional proximity to the corresponding year’s show.

For 2017, the AHR Expo announces Opportunity Village as the recipient of \$22,500 in AHR Expo Innovation Awards proceeds, to be directly applied toward HVAC&R upgrades and new equipment purchases at three existing and one new campus location.

Founded in 1954, Opportunity Village serves children and adults with intellectual disabilities in the southern Nevada community—aiming to enhance their lives via vocational training, community employment, day services, advocacy and arts,

and social recreation. Through its success in helping severely disabled citizens build friendships, career paths, independence and creative passions, Opportunity Village has grown to become Nevada’s largest nonprofit community rehabilitation program.

In its 62 years of service to southern Nevada, Opportunity Village has served tens of thousands of families, increased positive community awareness of people with disabilities, provided programs that are germane to individual needs, jobs and the local economy. They have fought for the civil and social rights everyone expects and deserves and offered choices to people and their families that further their work and social lives.

“At its core, AHR Expo exemplifies all the ways in which HVAC&R can contribute toward making the world a more pleasant and productive place,” said Clay Stevens, president of International Exposition Company, the Show managers. “We are proud to be able to extend this sentiment through donations to the HVAC&R needs of worthy organizations, and particularly those located right in the backyard of each year’s Show. With 2017’s donation, Opportunity Village receives the chance to increase its capacity to help Nevada’s disabled citizens—upgrading and expanding existing facilities that provide them with valuable support services from teaching life skills, to providing social recreation, to offering vocational and career-oriented training.”

Proceeds will specifically be applied to thermostat replacements and other HVAC&R system retrofits throughout Lied Center, located on the Opportunity Village West Oakey Campus. Constructed from 1990 to 1992, this is the oldest of the organization’s three current campuses, and as the organization’s primary location, houses numerous programs and services provided to its nearly 3,000 community clients.

In total, the organization owns three locations—the West Oakey, Ralph & Betty Engelstead and Walters Family campuses. Activities at a fourth North Campus location, currently leased by Opportunity Village, will eventually be moved to a new campus (on which construction is slated to commence in 2017).

“Opportunity Village is a primarily self-funded, not-for-profit organization and is the largest of its kind in Nevada,” said Cary Harned, senior grants and major gifts officer at Opportunity Village. “The Oakey Campus is home to most of our special fundraising events that support the programs and services we provide, and is just one part of an entire set of sites that require HVAC&R retrofits to better suit the clients and our events.”

Additionally, the funds will be applied toward transforming all campus sites into updated, efficient and dynamic spaces for Opportunity Village clients, staff and visitors. According to Harned, they will also increase the organization’s capacity for remaining a financially self-sufficient entity.

“We are incredibly grateful to the AHR Expo for their support of our organization,” continued Harned. “Every penny and in-kind donation counts when it comes to ensuring our clients are provided with the best facilities, programs, services and staff we can give them. We welcome this gift from the AHR Expo to provide amenities that will truly enhance our clients’ lives.”



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Infrared Heaters Melt Away Winter Safety Concerns

During construction of the 190-unit, 15-story JeffJack Apartments building in downtown Chicago, the owner sought an effective method to prevent snow and ice build-up on the building’s parking garage ramps during winter. Infrared heaters from Marley Engineered Products paved the way.

Situated on the corner of Jefferson and Jackson streets, the JeffJack building features an open air, naturally ventilated two-level parking garage. One side of the garage features a chain link fence wall that opens the space to the elements.

“Chicago winter weather can wreak havoc on streets and quickly make driving and walking conditions unsafe,” said Kenneth Maruyama, AIA, of Thomas Roszak Architecture, the firm that directed the construction.

Maruyama turned to Chicago-based electrical contractor Kelso-Burnett, and Thomas Sales & Marketing, an electrical equipment manufacturer’s representative, for a solution.

After careful consideration, the subcontracting team recommended installation of 40 Berko® (Booth C1231) 4800-watt, three element infrared heaters manufactured by Marley Engineered Products® (Booth C1231).

Berko infrared heaters are designed to provide total or supplemental spot heating in commercial and industrial areas, and feature heavy gauge bright anodized aluminum reflectors and a steel enclosure.

“Infrared radiant heat warms objects and people but not the air, and are ideal for parking ramps,” said Thomas Molk, president of Thomas Sales & Marketing. “Infrared heaters also are ideal for taxi stands, overhangs, hotels, airports, rail transport stations, work stations in buildings and much more.”

Jeff Weir, branch manager with Kelso-Burnett, and Molk, oversaw the design and installation of the system.

“I usually recommend infrared heating over slab heating cables in ramps,” said Molk. “Cars cause a lot of vibration with concrete and the failure rate of slab systems can be a real concern in these applications.”

The design of the space did pose some challenges. Infrared heaters are typically installed on the ceiling above, but there wasn’t enough clearance in some areas for vehicles to pass through.

“The height of the garage was limited in some areas,” said Weir. “Thus, we needed a design that allowed us to heat those spaces another way.”

Where overhead clearance was limited, the team decided to mount the heaters along a side wall. However, this method required a special mount because the standard mounting bracket didn’t allow for the heater to be tilted.

“We had a sheet metal shop fabricate a special mounting bracket for the side wall heaters that would allow them to be angled downward toward the floor,” said Molk.

Where vertical space was ample, the heaters were installed above and parallel to the ramp with the standard mount that comes with the unit.

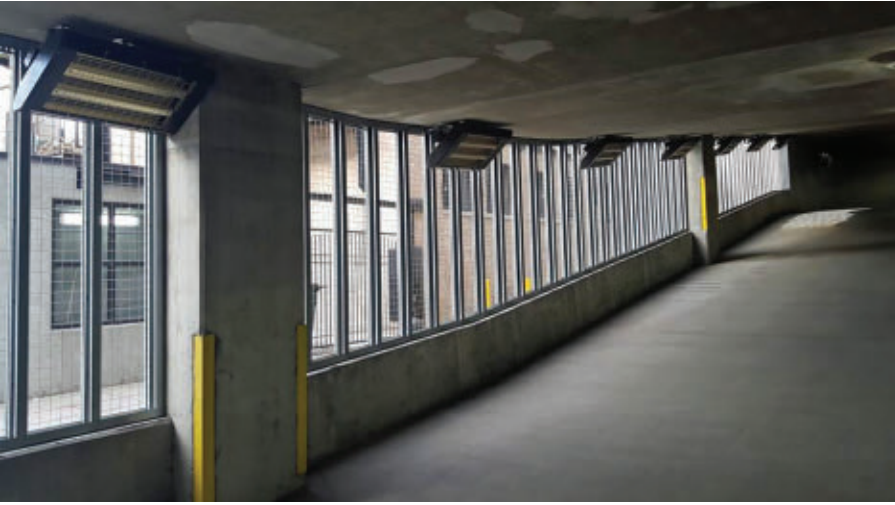
Conduit and junction boxes were

placed in the concrete during construction and wire fed to the units to provide electrical power.

With the units mounted, the heaters were then connected to a sensor that detects and measures moisture and temperature. This allows the system to turn on automatically when temperatures drop to a certain level or if it detects moisture. The units also can be controlled manually.

Carlos Rosario, chief engineer of the JeffJack Apartments, attests to the effectiveness of the radiant heaters and the automatic sensor system.

“The radiant heaters have worked efficiently through our second winter now with no issues whatsoever,” said Rosario. “The units prevent snow from accumu-



Infrared heaters prevent snow and ice buildup in this parking garage.

lating on the ramps and freezing, which would be a major issue for residents trying to drive on or walk down the ramps.”

Rosario keeps the units operating on automatic so they activate when needed.

“I always have the sensor on because it’s more efficient, and I don’t always

have time to monitor the conditions myself,” said Rosario. “The heaters activate when the conditions warrant it.”

Another time saver, according to Rosario, is that he doesn’t have to salt the ramps to keep cars and residents from slipping.



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Radiant Helipad Helps Patients Land Safely

WellSpan York Hospital, located in south central Pennsylvania, is one of the only Level 1 regional resource trauma centers in the surrounding counties.

The hospital built a new, cutting edge helipad as part of an ongoing \$50 million modernization of the emergency department, improving the hospital's ability to administer advanced, life-saving specialty care to the region's sickest and most seriously injured patients.

The new helipad adds yet another measure of sophisticated technology to combat one of the last remaining obstacles to safe air transport of patients for medical care: winter weather. Ice and snow accumulations on flat helicopter pads can pose great risk to airborne patients, and those flying the craft as well.

The hospital's elevated helicopter pad

is 34 feet off the ground and measures 7,200 sq. ft. – more than 3,000 sq. ft. larger than the hospital's old helipad. The early pad required larger birds to land at an alternate location, over half-mile away, where ambulances would meet them.

"In trauma care, every second counts," said Keith Noll, president of WellSpan York Hospital and senior vice president of WellSpan Health. "York Hospital received 190 trauma patients by helicopter last year." Three primary aeromedical systems provide helicopter transport to York Hospital.

Maintaining York Hospital's new helipad in the winter months is now simple, as it features an automatic snowmelt system with three miles of snowmelt tubing installed beneath the surface to keep



Radiant heating keeps York Hospital's helipad snow- and ice-free.

snow and ice from accumulating.

One of the oldest mechanical contracting firms in the area, James Craft & Son, founded in 1900 – is the lead mechanical contracting firm for the ongoing

HVAC and plumbing renovations at York Hospital.

Jeff Ream, the project manager there, chose to subcontract out the helipad project to Yates' firm, well-recognized regionally for their hydronic, radiant heat and snowmelt expertise.

F.W. Behler, Inc. is the other oldest mechanical contracting firm in the area (also founded in 1900), and under Yates' guidance, the firm has undertaken hundreds of radiant heat and snowmelt jobs.

At the hospital, the project called for snowmelt not only under the helipad, but also for an access road that was built after the old helipad was demolished.

More than 16,000 lineal feet of ¾" Watts Radiant PEX tubing (Booth N8312) was installed before the helipad's cement surface was poured.

The pad's design included several areas to not have any tubing – as they were left open to the space below – just in case there were ever a crash landing or ruptured fuel tank.

"The biggest challenge was working the three-quarter inch Radiant PEX+ into place in subzero weather," continued Yates. "Un-coiling the material in such cold temperatures takes practice."

They found the formula to getting the job done quickly was to wire the tubing to rebar. This required three people: one person to lay the tubing out, one to wire it to the rebar and one to stand on the cold-hardened tubing. They used a motorized wire tie tool to save time. A 50% glycol mix solution runs through the radiant tubing.

"Another design challenge was that the manifolds for the helipad needed to be installed inside of the loop area - where ordinarily with snowmelt - manifolds are off to the side and termination points come straight out," explained Yates.

Because of the bump-out areas for sidewalks around the pad and certain areas not getting snowmelt for emergency fuel drainage, the tubing had to be installed - and terminated - in all different angles. At times, Yates only had five inches of space to work with.

Dozens of brass Watts manifolds were installed inside vaults ranging from 5 inches to 5 feet deep. Yates implemented reverse return piping, ensuring that each loop have the same flow rate.

In all, eleven miles of ¾" Watts Radiant PEX+ with the same 50% glycol mix will have been installed between both phases of the access road and the ambulance bay.

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25-Year-Old Pool Retrofit Into Cutting-Edge Facility

FOREST HILLS, Mich.—A 25-year-old aquatic center’s retrofit has improved air comfort, boosted IAQ, and helped protect the environment with energy recovery and reduced refrigerant HVAC equipment, thanks to a cutting-edge design and installation by engineers and contractors.

The Forest Hills Public Schools Community and Aquatic Center needed to replace two aging 24-ton dehumidifiers for its 12,000 square-foot natatorium. Rather than a drop-in replacement, the school district saw the retrofit as an opportunity to improve spectator comfort and swimmer IAQ issues, while also cutting future operational costs with state-of-the-art HVAC equipment.

Previously, the 300-seat, 2,400 ft² spectator grandstands received the same 82°F temperatures as the pool area. Furthermore, pool and deck surface chloramines accumulation affected swimmer breathing, especially during heavily-attended swim meets. “The difference in air comfort and air quality for the spectators as well as the swimmers after the retrofit has been incredible,” said Kelly Swieter, CPO, aquatic supervisor, Forest Hills Public Schools.

The retrofit didn’t come without challenges for consulting engineer James B. Harrison, P.E., associate lead project engineer at GMB Architecture + Engineering, Holland, Mich. Harrison faced a mechanical room that was inaccessible and lacked floor space to accommodate new units large enough to increase room air change rates. Equally challenging was return and supply ductwork sizes incapable of providing new room air change rates code-compliant with current standards.

Instead of altering the original mechanical room’s access doors and cramped floor space, Gernot Ruenschke, AIA, project architect, GMB, designed a 720 ft² mechanical room add-on to accommodate the new 32-ton NP-Series Protocol replacement dehumidifier, manufactured by Seresco USA (Booth N7135), Decatur, Ga. The new ground-level mechanical room was favored over

a rooftop placement, because it provides easier maintenance staff access and a controlled climate.

The energy-efficient unit dehumidifies the space to 50 percent RH, uses compressor waste heat for free 80°F pool water heating, cools and heats the space to 82°F, and uses exhaust air to preheat the outdoor ventilation air. In the event of extreme cold weather, the natatorium can tap into the pool’s 995-MBh hot water/pool water heat exchanger by Taco (Booth N7926), Cranston, R.I., and supplied by the building’s two Copper Fin II, 1,220-MBh hot water heating boilers by Lochinvar (N8306), Lebanon, Tenn. The heat and energy recovery, combined with recent HVAC industry technological advancements such as direct-drive fans and variable frequency drives (VFD) make the new units significantly more efficient than the original dehumidifiers, according to Harrison.

As per Swieter’s request and with the design help of manufacturer’s representative, Paul McWatters, president, MacAIRE, Grand Rapids, Mich., the unit’s capacity was sized larger for more demanding swim period humidity loads, such as warmer water and space temperatures for senior swimming, or cooler water and space temperatures during swim meets.

Named for the 1997 Kyoto environmental treaty, the Protocol uses up to 80 percent less refrigerant than a conventional DX dehumidifier by substituting glycol for heat rejection to an outdoor split system dry cooler. The unit’s internal dehumidification refrigeration circuit is factory-sealed, which eliminates the expense of onsite EPA-certified installers. The reduced refrigerant design also eliminates oil migration, and its PVC piping lessens potential environmental damage from leaks associated with copper refrigerant lineset runs to condensers. Using less refrigerant also complements the community’s ongoing environmental stewardship efforts, such as the neighboring LEED Silver-certified, 62,000 ft² Forest Hills Fine Arts Center.

GMB reused the original mechanical



This outdated pool facility received an IAQ-oriented overhaul.

room to house an eight-ton Seresco NE-200 Series dehumidifier that’s dedicated to quadrupling the spectator section’s air changes/hour to eight while providing a more comfortable temperature and humidity of 76°F and 50 percent RH.

Both the spectator section and main pool area dehumidifiers use a Seresco WebSentry web-based monitoring program that connects each unit’s Command Center to any authorized user’s smart phone or personal computer. Swieter can periodically check the natatorium’s temperatures and humidity, as well as more than 60 other dehumidifier operating parameters onsite or remotely. Factory technicians can also troubleshoot operational challenges and recorded historical operational conditions via the Internet. A building management system

(BMS) manufactured by Siemens (Booth C4720), Buffalo Grove, Ill., monitors the natatorium conditions, but controls the rest of the 20,000 ft² of space outside the pool area that consists of air-handling equipment by Trane (Booth C3106), Tyler, Texas.

Included in the retrofit was the replacement of the existing spiral round perimeter supply duct system with a new larger diameter Universal Spiral Air spiral round duct system. The new 72-inch-diameter main perimeter supply ductwork was the largest possible size for fitting through ceiling joists. The larger ductwork helped double the room air changes/hr. to four, which complies with the four to six air changes/hr. natatorium design guidance of ASHRAE (Booth C3006).

Regal Gives Back Globally to Charity

FLORENCE, Ky.—Regal (Booth C3318), a leading manufacturer of electric motors, electrical motion controls, power generation and power transmission components, has made many company and employee community contributions.

Regal employs more than 25,000 across the world, and the company not only converts power into motion to help the world run more efficiently, the company seeks opportunities on a global level to help those in need. The company and its employees often donate time and money, giving back to the communities in which the company employs throughout the Americas, Europe, Asia, Africa and Australia.

Recently, the company donated \$10,000 to the Italian Red Cross to support those impacted by the most powerful earthquake in Italy since the 1970s. Approximately 50,000 people were displaced due to the earthquake. Dona-

tions made to the Italian Red Cross have helped the organization provide food services, medical support, medicine distribution and psychological assistance.

Regal’s support also recently reached a local orphanage in the Zhangzhou, China, community. Employees held a charity auction, with all proceeds benefiting the orphanage, and the company anticipates holding similar events in the future to support the community. In Australia, employees donated gifts and non-perishable food items to the Salvation Army Christmas Appeal, Australia’s largest Christmas gift appeal, to benefit families and individuals in need. In other areas of the U.S., the company’s employees provided more than 150 gifts to a Salvation Army Annual Angel Tree, a total of \$1,675 in gifts for a local family as part of an adopt-a-family program and gifts for 20 children as part of a holiday adopt-a-child program.

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Mushroom Farm Cuts Costs With UV Lighting Systems

MIAMI, Okla.—Unfortunately for indoor mushroom farmers, the same environmental conditions that produce bumper mushroom crops—subdued light, high humidity and cool temperatures—also promotes mold growth in farm air-conditioning systems, resulting in their premature failure, lower heat transfer efficiencies and exorbitant maintenance costs.

At J-M Farms, one of the nation’s top 10 mushroom farms and a producer of 27 million pounds of produce annually, HVAC maintenance and energy costs for dozens of mushroom growing quarters were escalating exponentially and cutting into profits. J-M Farms is a wooden tray operation in which final growing and harvesting phases occur inside unique satellite Quonset huts.

Mushrooms thrive in 85 percent (± 2 percent) relative humidity (RH) and cool 59°F to 64°F temperatures. Unfortunately, so do a myriad of undesirable mold varieties when harbored in an air conditioner’s dark spaces and nourished by a perpetual supply of condensed humidity during 24/7 operation.

“All mushroom farmers experience similar HVAC coil mold challenges,” said Scott Engelbrecht, J-M Farms’ growing operations manager, who is also active in mushroom trade associations such as the American Mushroom Institute (AMI).

Hospitals, schools and other commercial buildings have installed ultraviolet germicidal irradiation (UVGI) in HVAC systems for years to keep coils clean of microbial growths for both maintenance



The environmental conditions that promote mushroom growth also promote mold growth in AC systems. Therefore, they must be managed properly.

and IAQ reasons, but the technology is new to mushroom farms, according to Engelbrecht. Like many newcomers to UVGI, Engelbrecht was somewhat skeptical, therefore he took advantage of the “Free UV Trial Demonstration Program” offered by air purification manufacturer Fresh-Aire UV (Booth C3840), Jupiter, Fla. The program offers building owners a free UV installation and 90-day performance analysis conducted by a certified

HVAC service technician. The facility owner can choose to purchase the equipment or have it installed at no cost. “I was impressed they flew an installer to Oklahoma for a free installation,” said Engelbrecht.

The free installation included Fresh-Aire UV’s Tubular Rack UV System mounted to a recently cleaned air conditioning coil. It featured a 60 in. long, 254 nm UV lamp with a Teflon-coating that minimizes breakage and contains shattered glass and lamp gases if accidentally broken. The only maintenance required is a quick lamp replacement every two years to guarantee optimum performance.

The trial coil showed no signs of the black, brown and slimy mold that typically coats coils after three months of 24/7 operation. Now Engelbrecht is rolling out the UV light retrofit of 42 remaining Quonset hut air handlers expedited by Service Solutions and assisted by in-house technicians trained by Fresh-Aire UV to install systems and replace lamps. Engelbrecht expects a payback of less than one year on each UV light system when considering the reduced maintenance costs and the HVAC units’ extended lifecycles due to less cleaning chemical exposure.

UV light systems offer additional benefits beyond coil cleaning, such as killing airborne mold spores related to diseases that affect mushrooms and reduce harvest outputs. “What mushroom farmers grow is technically a type of mold,” said Engelbrecht. “so our environments can potentially create undesirable competing mold or mold-generated diseases that affect the mushroom crop.”

Conventional particulate media filters can entrap mold spores. However, they continue to live and reproduce within the system. UV light systems provide disinfection that scrambles the microbe’s DNA so it can’t reproduce. Before installing UV light systems, J-M Farms satellite operations was hiring a local HVAC contractor for quarterly in-unit cleanings on more than 40 Quonset hut air handlers.

The air handlers run 24/7 and typically bring in large amounts of outdoor air to maintain CO₂ levels at 1,000-2,000-ppm. CO₂, temperature, humidity and even compost temperatures are all monitored and controlled by a BAS that controls all the set points via the 8,000-cfm air handlers manufactured by Carrier (Booth C1510). The Quonset hut air handlers are each supplied typically by two 80 ton Carrier chillers. Air is distributed through clear plastic duct runs in the middle of each Quonset hut. The Quonset huts themselves are steel framed structures with concrete pad foundations and R-20 insulated, nylon-reinforced plastic walls and ceilings.

For Engelbrecht, UVGI represents a chemical-free, maintenance-free cleaning process.

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Industry Assets are People, Not Technology

By Ken Sinclair, editor/owner/founder, AutomatedBuildings.com

The Internet of Things' (IoT) transformations are bringing significant industry disruption.

Disruption is good because it causes our people assets to be employed to review our core values, our reason for being, and adapt to change for survival. These are things that only the people of our industry can do, not our existing technologies.

Our industry, as all industries are undated with the movement to the cloud and the self-learning edge, IoT is in our face everywhere. Instead of the necessary action of how we might repurpose our only assets, our people, we focus on our existing technologies their high cost, lack of function, and the general lack of flexibility/speed of our technologies and outdated procedures. We need to focus

instead on our only assets, our people who have all been through several technology shifts in their lives. People that are deeply attached to their existing technology are very vulnerable because the change is coming fast and is very disruptive.

So rally your people, your only true asset, to set in place a plan as to how best to work with today's IoT tools and technology shifts.

Has your company been reinvesting by adding new people, to grow your company younger and increasing your industry relevance?

Our evolving people's skills create our reasons for being, not our technological flavor of the day.

How much money have you spent updating your only asset, your people? Yourself? Your procedures? Your IoT

connections and knowledge?

Being an old guy, I simply see another radical change that increases the value of the folks that understand our industry. There are quite a few of us old "huff and puff" pneumatic guys still in the industry today. The DDC revolution of the 1980's did not kill anyone; it just made us more powerful and socially acceptable. We moved from being in the weeds of public understanding to the center stage of IoT extension. The greatest value of the DDC revolution was the injection of the myriad of new minds with fresh thinking. With these new minds, we moved from physical devices to software control languages in microprocessors, while developing open protocols and learning how to use the Internet.

Do you think that our IoT future is in the minds of those young Millenni-

als who are questioning all that we do? I do, "The Times They Are A Changin'" Again!

The IoT world is a challenge. To achieve a successful transition to the new way we need embrace the new folks of the millennium while retreading old existing minds. As we build our people assets in our companies, our value as an industry will increase. We need to attract self-learning assets that come with a continuing self-learning growth to our company cultures because it is organic and natural, but most of all sustainable. If you can hire good people, train them well, and ensure that they continue to learn, we will see our industry, from the operators to the engineers, achieve the potential we all know is there.

Please join us as we embrace the changes upon us.

Lucas-Milhaupt Celebrates 75 Years

LAS VEGAS—Lucas-Milhaupt Inc. (Booth C1545), a manufacturer of metal-joining products and technology, celebrates 75 years of brazing excellence. The first event to kick-off this monumental anniversary will be held at the International Air-Conditioning, Heating, and Refrigerating Exposition (AHR). At the Expo, Lucas-Milhaupt will highlight its high reliability metal joining solutions to meet the needs of the latest generation of HVAC&R systems and components, along with providing show-goers with learning opportunities.

Over the past 75 years, Lucas-Milhaupt has developed a unique business with comprehensive custom fabricating services, technical expertise and knowledgeable technical support. They have supply brazing and soldering materials, not only offering an extensive assortment of innovative products, but also supplying custom formulations meeting any size or shape requirements. From the beginning, there has always been an emphasis on high-level technical support and training, and that philosophy has only grown over time.

"We are excited to kick-off our 75th year anniversary at AHR Expo, as well as offering demonstrations of our latest techniques at the show," said Gary DeVries, global marketing manager, Lucas-Milhaupt. "As always we will continue to educate our customers through brazing audits, classroom and hands on training, which provides a solid foundation in brazing fundamentals. This type of support is truly what separates us from the rest."

As a brazing legacy, Lucas-Milhaupt is a division of the widely diversified Handy & Harman, Limited. Coinciding with their anniversary celebration is the parent company Handy & Harman's 150th Anniversary. They hold the original patent and trademarks of many of the brazing alloys used by manufacturers and contractors within the HVAC&R industry today.



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January 30, 2017

ASHRAE Journal's Show Daily: Official Newspaper of the 2017 AHR Expo

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HOBO Helps Museum Record Climate Data

The Hunter Museum of American Art in Chattanooga, Tennessee is a 77,000 square foot facility perched on an 80-foot bluff overlooking the beautiful Tennessee River. Established in 1952, the museum features an extensive collection of American art from the Colonial period to the present.

To preserve its assets, the museum needs to maintain a stable interior climate and prevent unfavorable environmental conditions that can harm objects and cause deterioration. Temperature and relative humidity (RH), in particular, must be closely controlled and kept at suitable levels (temperature of 68° to 72°F, and RH of 50% with +/- 5% fluctuation). These parameters are significant because warmer temperatures can cause

heat damage to certain objects, and high RH levels can bring about mold formation and cause objects to corrode, warp, crack, or cockle.

Environmental control is a particular challenge at the Hunter Museum, as it houses objects made from a variety of different materials. Another key challenge is balancing optimal conditions for preservation and occupant comfort.

To achieve greater environmental control, registrars Elizabeth Le and Theresa Slowikowski, who are responsible for implementing procedures relating to the care of the facility's permanent collection, rely on an internal climate-control computer system. This system also documents and stores all historical data. A failure in the existing system caused

a loss of historical climate data, which jeopardized the museum's ability to receive exhibitions from major museums. At the time, the building maintenance staff had no choice but to manually record temp and RH data every two weeks to begin building up years of data history.

Slowikowski and Le looked for a more optimal solution. They were familiar with HOBOS since they had successfully used older models in the past. Ultimately they chose to purchase and install Onset (Booth 1158) HOBOMX1101 data loggers in the galleries. The loggers, which leverage cutting-edge Bluetooth Low Energy (BLE) technology, continuously measure and record temperature and RH around the clock, and enable the registrars to download the readings wirelessly from up to 100 feet away with just a smartphone or tablet.

The BLE loggers provide the Hunter Museum with a number of advantages.

First, they eliminate the time and costs associated with manual data collec-



Temperature and relative humidity data loggers installed on a glass sculpture in the museum.

tion, and collect data when and where it is needed. And, they provide audible and visual alarms to notify staff of potential problems so corrective actions can be taken immediately.

"We have to keep every data record and monitor any extreme changes," said Slowikowski. "If there's a paper buckle or a ripple, we can narrow down the cause with the assistance of the HOBOMX1101." Second, the devices can be deployed in hard-to-access locations if necessary, including storage areas and inside display cases, and make access to the data very straightforward and convenient using mobile devices.

Finally, the loggers provide evidence of the environmental data submitted in the Facility Report, a document adopted by the American Alliance of Museums when applying for and receiving exhibits and loans.

"We are hosting a Monet exhibit at the museum this June, and the lenders know it will be in good hands."

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Victaulic to Exhibit Project Life-Cycle Solutions

With the help of virtual reality technology, Victaulic (Booth C4324) will showcase its innovative pipe fitting services, including the world's first grooved mechanical joint for saturated steam systems, at this year's AHR Expo.

Visitors to the booth can experience Victaulic-optimized mechanical and fire protection pump rooms via a 3D virtual reality headset. They can also view the newest additions to Victaulic's complete PHA system solution, including vibration isolation pump drops, pressure reducing valve (PRV) stations, the RG5200i intelligent roll grooving tool, and the 2016 AHR Innovation Award Winner, the Style 870 rigid coupling for saturated steam and condensate piping.

"We are excited to demonstrate these offerings and discuss how our solutions can be tailored to fit our customers' needs at the AHR Expo this year," said Rick Bucher, Victaulic's Executive Vice President of Technology and Product Development.

Victaulic provides comprehensive solutions to the HVAC industry's most pressing challenges through its extensive services and technologies. From the use of its Construction Piping Services (CPS) division to help streamline workflows and provide more accurate project estimates, to its complete offering of couplings, valves, fittings, and other accessories for hydronic and potable water piping systems, Victaulic is a trusted partner for owners, engineers and contractors throughout the project lifecycle.



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Sustainability, HVAC Energy Efficiency

Philadelphia's 98,000-square-foot, state-of-the-art 2.0 University Place is proof that office buildings featuring high efficiency HVAC systems, superior indoor air quality (IAQ) and other sustainable features reap higher lease premiums and 100 percent occupancies, and ultimately attract real estate investment buyers.

The heart of the facility's sustainability is its cutting-edge HVAC system featuring active chilled beams, dedicated outdoor air systems (DOAS) and high efficiency boilers and chillers. According to energy modeling, the combination of technology results in more than a 62 percent energy savings versus conventional building HVAC methods. Daily energy tracking reveals the building ranks in the upper 22 percentile of Energy Star Program facilities nationwide. Energy modeling has demonstrated that the building also surpasses requirements of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1 (2004) Energy Standard for Buildings, except Low-Rise Residential Buildings by 44 percent.

The result is energy savings and environmental stewardship that attracts green-minded tenants and buyers. Furthermore, occupants feel a noticeable air comfort difference mainly due to tightly controlled temperature tolerances and relative humidity (RH) levels that chilled beams and DOAS offer. Other sustainable features adding to the well-being of occupants are day lighting, LED lighting, water conserving plumbing fixtures and an accessible vegetated rooftop gathering area irrigated by recaptured rainwater. "Many of our tenants say they've never felt this type of air comfort or atmosphere in an office building," said Scott Mazo, principal, University Partnership Associates (UPA), Philadelphia, which developed the property as Philadelphia's first multiple-certified Leadership in Energy and Environmental Leadership (LEED®) Platinum buildings, one of few nationwide.

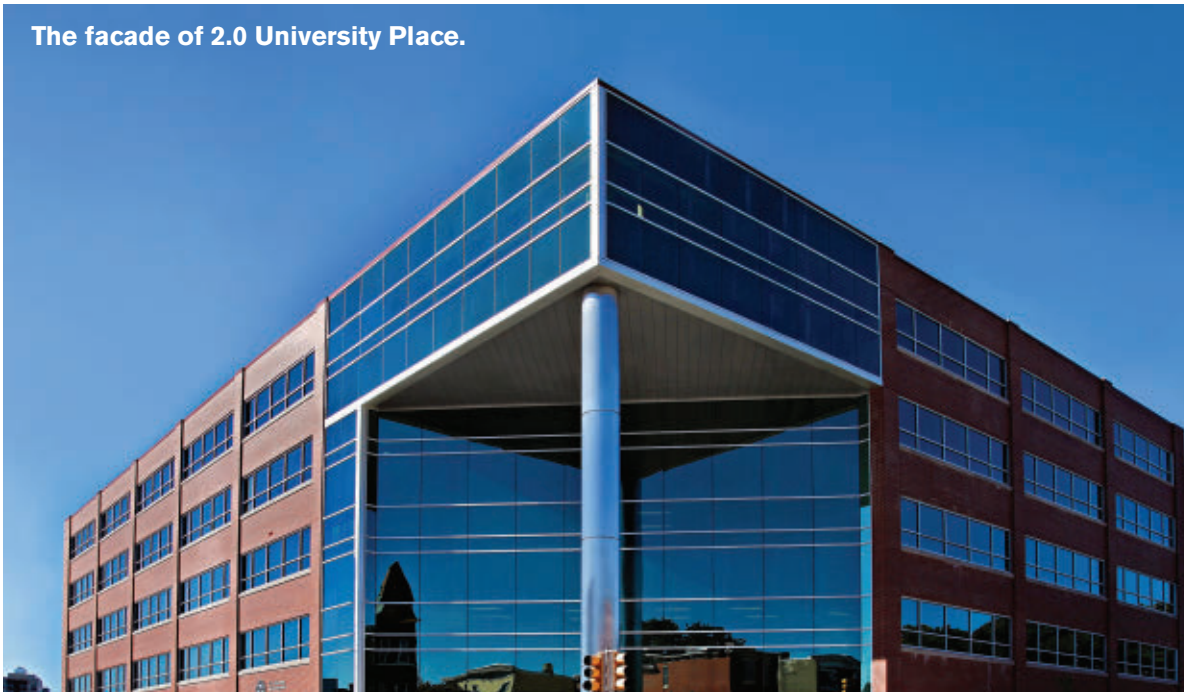
LEED Platinum doesn't stop with just the facility, however. Three tenants have already achieved and four more tenants are pursuing LEED Platinum certification under the "Commercial Interiors Rating System," which will make 2.0 University Place the world's first multi-tenant, multi-certified LEED Platinum building.

Real estate investors have also taken notice. UPA recently sold the five-story property to Swiss-based Zurich Insurance Group (ZIG) last April. "As a buyer, they recognized not just the energy efficiency and technology features, but also the commitment to sustainability, which is important to them (ZIG)," said Mazo.

Mazo led a dream team of mostly Philadelphia-based designers that included:

- Design architect—the late Shraga Berenfeld, prin-

The facade of 2.0 University Place.



cipal of the now defunct Shraga Studios Architecture;

- Architect of record—SPG3 Architects;
- Core engineering and design, McHugh Engineering Assoc., Ambler, Pa.
- Consulting engineer—Mark Ulrick Engineers Inc.;
- Additional engineering SEMCO LLC, Columbia, Mo., manufacturer of the chilled beams and DOAS;
- HVAC contractor—Accord Mechanical, Norristown, Pa.; and
- Sustainability consultant—The Sheward Partnership LLC.

Chilled Beams' Contribution To LEED and IAQ

The bulk of the HVAC system's LEED credits and air comfort were achieved with 500 active chilled beams, and their induction principle operation. Air around ceiling-mounted chilled beam water coils continually cools and falls while warmer air rises in a continual convection of air comfort benefits with no drafts, no noise and stable temperature tolerances of $\pm 1^\circ\text{F}$. Chilled beams also reduce fan energy by up to 50 percent versus the large fan horsepower required in the conventional rooftop DX, ductwork and variable air volume system the design team considered. "The chilled beam system is a major contributor to the building's sustainability story and ongoing energy efficiency," said Michael W. Pavelsky, sustainability director, AIA, LEED AP at The Sheward Partnership, which tracks and records the facility's energy performance.

Supplying the chilled beams is a four-pipe system for heating and cooling consisting of pre-insulated polypropylene (PP-R) pipe by Aquatherm (Booth C6103), Lindon, Utah, that's used in pressurized plumbing and HVAC applications. Aquatherm's highly-efficient piping helped accumulate LEED HVAC credits as well as other pipe loop components, such as a 98 percent efficient 2,000-MBH condensing boiler manufactured by Lochinvar (Booth N8306), Lebanon, Tenn; and a 200-ton air-cooled chiller manufactured by Daikin Applied (Booth C2509), Minneapolis. Four 25-hp pumps by Bell & Gossett (Booth N9509), Morton Grove, Ill. The four pipe system allows simultaneous heating and cooling options during Fall and Spring seasonal changes, and it helps offset perimeter heat loss and solar gain.

The building's envelope is very efficient with R-42 opaque wall assembly, R-30 roof assembly, and southern exterior sun shades manufactured by Tubelite, Walker, Mich., according to Chloe Bendistis, LEED AP, BD+C, The Sheward Partnership's sustainability project manager.

While some chilled beam brands use factory-set airflow nozzles that require replacement or complicated pressure balance calibrations for cfm rate changes, the IQHC model features a proprietary 12-slot nozzle that's field-adjustable with two easily-accessed hand-operated levers for providing a unilateral, disproportional or

equal air volume from each side. Accord Mechanical and its testing and air balancing (TAB) contractor, Independent Balancing Co., Philadelphia, both received factory-assisted chilled beam training. "The chilled beams in the external zones definitely needed different nozzle adjustments than internal zones," said Ulrick Joseph, P.E. principal, Mark Ulrick Engineers, which specializes in mechanical, electrical, plumbing and fire/safety building systems.

Outdoor air requirements and condensation prevention is achieved with one 20,000-cfm rooftop PVS-24 Pinnacle DOAS unit manufactured by SEMCO (Booth N12114). The DOAS uses its own DX condenser so that the chiller is dedicated to just the chilled beams. The DOAS controls its operation independent of the building's building automation system (BAS) by Delta Controls Inc. (Booth C1052), Surrey, British Columbia. Each active chilled beam's six-inch-diameter outdoor air takeoff is supplied with conditioned outdoor air to avoid condensation from the chilled water loop's 48°F discharge. Ventilation air depends on the chilled beam's size and ranges from 25 to 85-CFM, which satisfies the building's outdoor air requirements and surpasses ASHRAE 62.1 standards for commercial buildings, according to Joseph.

"Most chilled beam manufacturers don't make DOAS units," said Mazo. "A manufacturer making both the active chilled beams and the outdoor air unit to supply them dehumidified air was integral for synergy and purposes of single source responsibility."

Accord Mechanical also helped rack up LEED credits with its sheet metal fabrication and jobsite environmental compliances:

- Ductwork fabricated at its Norristown sheet metal shop was wrapped in plastic prior to shipping, which kept it cleaner for IAQ reasons, and eliminated environmentally-damaging chemicals to clean it onsite;
- Ductwork trunk lines were wrapped with an environmentally-friendly R-20 insulation, manufactured by Johns-Manville, Denver, Colo.
- Pre-insulated flexible six-inch-diameter take-offs supplied air to the chilled beams; and
- Firestop materials for sealing floor and wall pipe/duct penetrations were environmentally friendly.

Chilled beams supply all rooms except for an electrical vault and data center, each which use a five-ton ductless minisplit air conditioner by Mitsubishi Electric (Booth N9710), Suwanee, Ga.

Its quick sale to ZIG helps facilitate UPA's next sustainable project in the University City District on an adjacent lot. The pre-construction concept calls for a five to seven story, 160,000 to 200,000-square-foot commercial building, the first Platinum Pre-certified global pilot project for LEED v4. Mazo plans to anchor the HVAC system with chilled beams and DOAS, but add smart, plug-and-play controllable chilled beam pump modules (CCBPM), which promise to cut the chilled beam system's piping installation/material costs by 50 percent. Manufactured by SEMCO under the brand of NEUTON, the modules will reduce chilled beam piping by half.

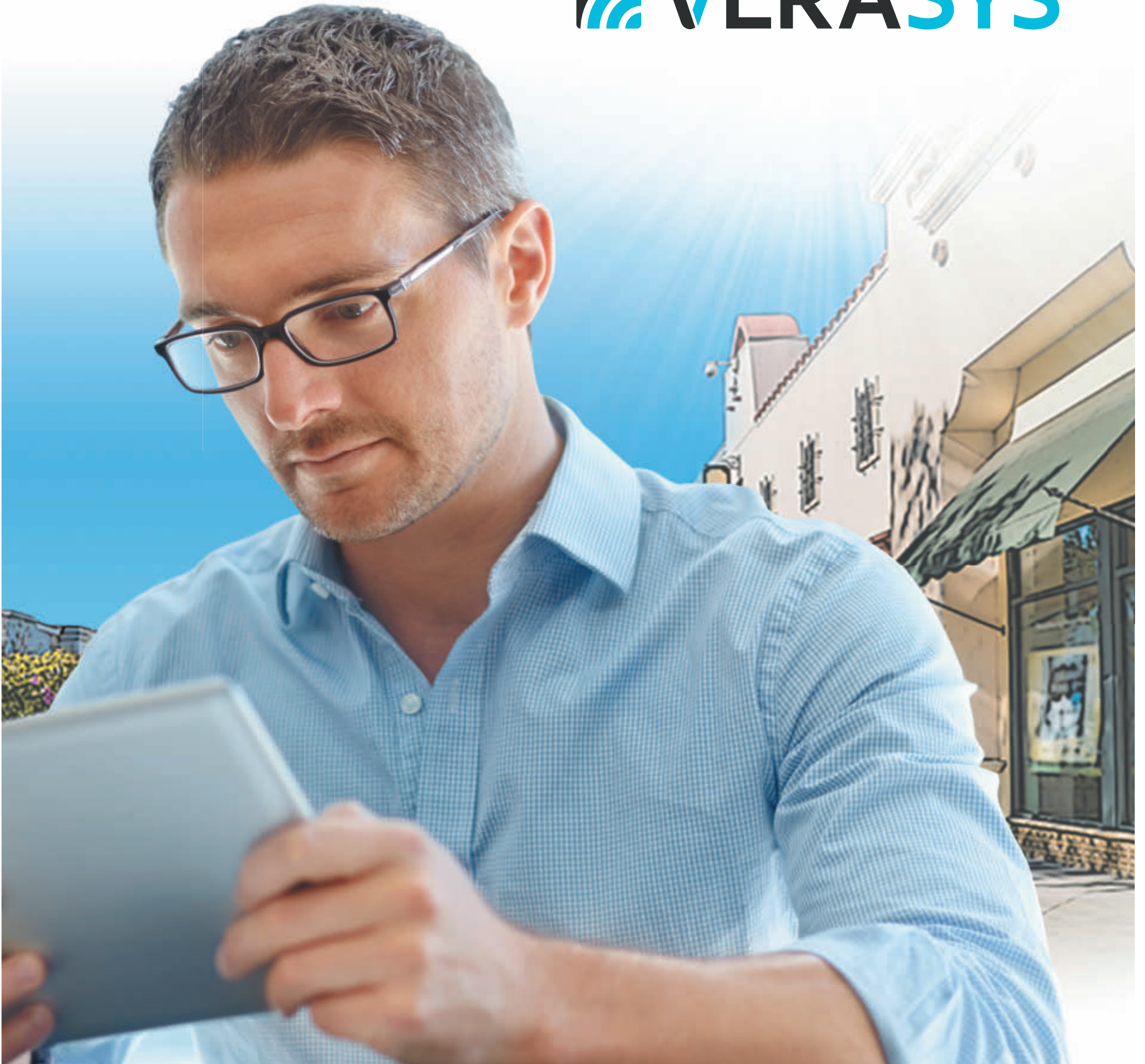


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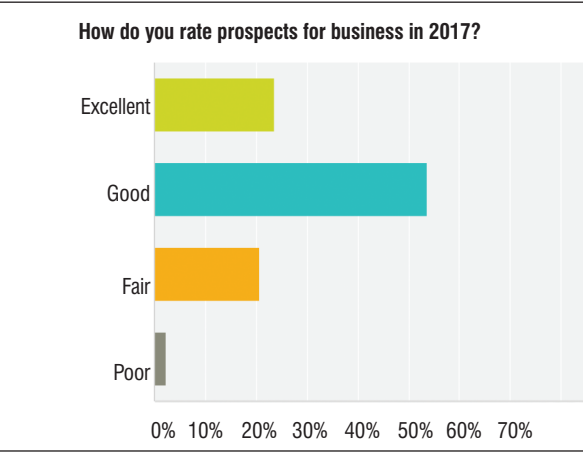
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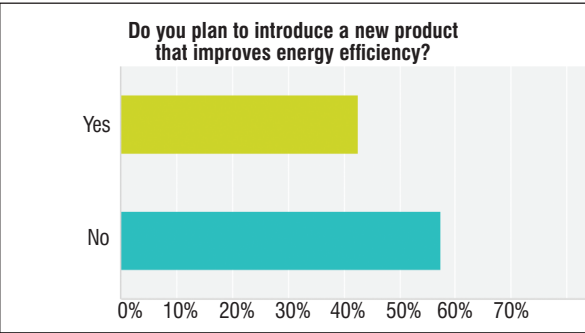
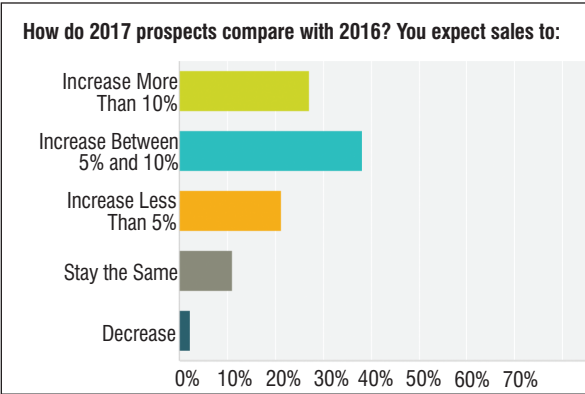
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Industry Optimistic in 2017



What do you see as the most important trend or issue in the HVAC&R industry?

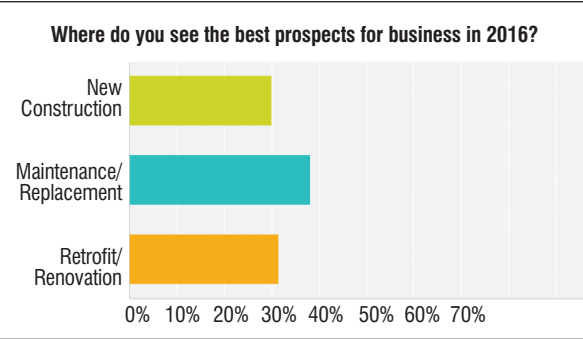
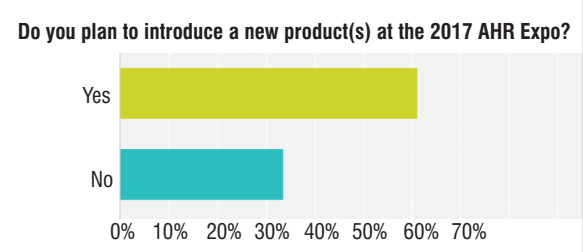
- The movement towards sustainable energy
- Energy efficiency and sustainability
- Less revamp of current products and more NEW products. Manufacturers need to start coming up with new ideas, not just changing old ideas.
- Energy efficiency and emissions reduction
- Being more Eco Friendly—working with Ammonia and Solar Panels.
- Energy efficiency
- Keeping efficient equipment/buildings running properly, so sustainable equipment and designs which the staff can perform,
- Recruiting next generation workers—HVAC service techs, installers.
- Fuel prices
- Energy
- Connectivity and regulatory
- Interconnected equipment with smart controls. Occupancy controlled HVAC
- Who wins the presidential election will have a lot to do with what will happen to all industry.
- Efficiency vs. durability
- Need a revitalized economy. Too many jobs leaving the country.
- Education
- Improving Technologies and business integration
- Energy efficiency
- BIM
- Energy efficiency in data centers and e-house type buildings



How important to your customers are the following?

	Very Important	Somewhat Important	Not Important
Energy Efficiency	63.6%	28.8%	7.6%
Indoor Air Quality	48.5%	40.9%	10.6%
Maintenance	50.4%	48.1%	1.5%
First Costs	66.7%	29.6%	3.8%
Sustainability	34.4%	54.2%	11.5%
Reliability	77.3%	21.2%	1.5%
Comfort	40.5%	46.6%	13.0%

- Efficiency, low first costs
- Internet of Things for the consumer with connected devices. Internet of Things for the industry with connected & integrated appliances
- Technician Training
- Energy efficiency
- New efficiency protocols
- Ductless
- Efficiency
- Efficiency getting the best return on dollar invested



How do you rate the outlook for these market segments in 2017?

	Excellent	Good	Fair	Poor
Residential	13.1%	40.2%	42.6%	4.1%
Light Commercial	14.6%	59.4%	24.4%	1.6%
Heavy Commercial	14.2%	55.8%	27.5%	2.5%
Schools	10.1%	47.9%	36.1%	5.9%
Non-School Institutional Buildings	8.4%	51.3%	37.0%	3.4%
Office Buildings	9.3%	43.2%	44.1%	3.4%
Lodging	10.3%	38.8%	45.7%	5.2%
Manufacturing/Industrial	9.1%	47.1%	38.0%	5.8%
Data/Telecom Centers	9.5%	52.6%	32.8%	5.2%
Hospitals/Health Care	16.8%	53.8%	25.2%	4.2%
Restaurants/Hospitality	7.0%	42.6%	43.5%	7.0%
Laboratories/Cleanrooms	7.1%	39.3%	48.2%	5.4%
International Markets	12.1%	37.9%	43.1%	6.9%

- Consolidation of the industry will eliminate many of the private individually owned companies. Smaller companies will be forced to sell out.
- Energy Efficiency
- Energy conservation
- Energy Management and cost effective will drive the business increase.
- Customer is seeking the cheaper items, but it is high quality
- Energy Efficiency
- Cost reduction
- Regulations, skills gap, connectivity
- Heat recovery
- Legislation on energy efficiency
- Continued market sustainability within a down turned economy.
- Use of VRF minisplits in new commercial construction
- VRF
- Poor communications standards across equipment when compared with more progressive industries. Why can't we all work off an internet standard, instead of BACnet, etc?
- Industry needs to stop demand for cheaper products and parts. Cheap becomes the new expensive when it fails! You do get what you pay for.
- Building HVAC system operating efficiency
- The increased awareness and usage of Push to Connect fittings
- People are trying to save money on energy more now than ever
- Reliability of the electrical grid, regulations, U.S. political leadership power struggle.



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Desert Heat and a Ducted Alternative

By Joe Martinez, Commercial Sales Manager, Ferguson HVAC

According to Greek legend, the phoenix was an unimaginably beautiful bird that, after a long life, died in a fire of its own making, only to rise again from the ashes. It's an enduring symbol of death, rebirth and the aspirations of humankind.

An early white settler, gazing at the remnants of a long-gone Native American settlement where modern-day Phoenix, AZ, lies, envisioned the rise of a great metropolis in the same location.

"A new city will spring, phoenix-like, upon the ruins of a former civilization," he said. And he was right.

Now, 150 years later, the Phoenix Valley is home to 3.2 million people and the scorching heat is as much a factor now as ever. In July, average high temperatures crest 106°F, falling briefly into the double-digits overnight.

"If you talk to an old-timer, they'll tell you that Phoenix has gotten hotter," said Aaron Sharp, founder of Sharp Air Conditioning & Heating, LLC. "Most attribute it to the quantity of pavement in the valley."

Sharp focuses on high-end residential work, and most of that takes the form of service and retrofit. Given the mild winters in the Sonoran Desert, heating here is a smaller consideration than the need for reliable AC, though still necessary.

In Phoenix, the key challenge is dealing with incessant heat and huge solar gain and – with rising electrical rates – the need for energy efficiency is very important, too. Across all six Ferguson branches in the Phoenix Valley, we've seen high-efficiency products gaining popularity with installers.

"We've recently made a push into green energy and high efficiency retrofits," continued Sharp. "For most of our clients, comfort and efficiency trump upfront cost."

This means Sharp technicians are doing a few less in-kind replacements of AC units each year. Sometimes they use a solar-ready approach, where new AC condensers are installed along with the components necessary to connect to a dedicated photovoltaic panel. Other times, they're finding ways to get creative with condensers and zoning, adding efficiency while improving comfort and controllability.

A recent AC replacement in a single-story, 4,000-square-foot home, prompted Sharp to inquire about one of our newest lines; the light-VRF J-II system made by Fujitsu (Booth N10113).

Technicians were removing a 15-year-old, 12 SEER air conditioner and gas-fired furnace. After we discussed his options, with special consideration made for the homeowners' requests, he decided to replace the existing equipment with a five-ton J-II condenser. He also planned to add three new zones.

"Once you max out the mechanical efficiency of available options, you need to find other ways to reduce power consumption," said Sharp. "By adding zones to the house, we're not only improving the controllability of the space, but increasing efficiency. It's something few people realize before we speak with them about it."

The family's two children had moved out, leaving large parts of the house unused. Because the entire ground floor was on a single zone, some rooms were greatly more comfortable than others. The full, finished basement was a second zone and suffered similar problems, though not as bad.

The owners were adamant that the new system not "blow" cool air forcefully across the room, making them feel quite cold near a supply grille, and too warm anywhere else.

Sharp's plan was use the 19-SEER J-II for its ability to support up to nine zones. This way, the unused floor-space



Sharp checks the system's refrigerant charge after installation.

could be set back from the rest of the home, and the master bedroom and common areas could be controlled individually. In addition, smaller zones meant lower static pressure in the ductwork.

To make sure his plan checked out, Sharp brought his layout to Ferguson's design team and had it checked for performance and compatibility standards in Fujitsu's Design Simulator. Because Ferguson is the exclusive Fujitsu VRF distributor in the Western Region, we're able to quickly determine if a plan needs any changes before the rubber meets the road.

After his design was given the green light, Sharp technicians put the plan to work.

"The upstairs trunk line was removed, and three smaller branches were added, each with their own fan coil," said Sharp. "This took a little more work than simply connecting the condenser to wall-hung evaporators, but it was well worth the effort."

The living room return was re-used. New return boxes were cut in for the master bedroom and the kids' rooms, and individual T-stats were added.

A new fan coil was installed for the basement zone, but supply and return

ducts were left unchanged. A 12,000 BTU ceiling cassette was installed in the theatre room, which always got too hot when occupied. With its own thermostat, the room now responds rapidly.

"The J-II provides the flexibility of a full VRF system, but doesn't require three-phase power," said Sharp. "With the four fan coils and the ceiling cassette, we have a combined 78,000 BTU maximum load connected to a 60,000 BTU condenser - or 130 percent of capacity."

VRF condensers can be undersized because it's rare that all evaporators would be required to run at the same time. And in such an instance, the EEVs (electronic expansion valves) on each of the evaporators will throttle to maintain operation of all indoor units.

Aside from the use of refrigerant headers instead of branch boxes, the J-II VRF system installs much like a multi-zone mini split. But longer line-sets and the ability to accommodate many more zones make it a far more capable solution. With sizes between three and five tons, the systems fit the bulk of Sharp's jobsites.

"There are a lot of high-SEER, conventional AC units on the market," said Sharp. "Many offer variable speed and inverter compressors; the difference is that we're zoning with refrigerant circuits here, instead of zone dampers. Closing down entire circuits when not in use provides a comfort and efficiency advantage."

The homeowners recently told Sharp that they're the most comfortable they've ever been in the home. Maybe that says something about being an empty-nester, but it probably has more to do with the retrofit.

Those complaints of being blasted with cold air? Now a thing of the past.

For Sharp AC & Heating, the new system is a growing option for light commercial applications, or when retrofitting a residential heating and cooling system.

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Don't Miss Keith's Presentation

Interested in TSI's new AirPro instruments? Keith Hofkens, Product Manager at TSI, will present Performance Beyond Measure with AirPro® Wireless Air Meters on Monday, Jan. 30 at 2:45 p.m., in Theater A.

www.tsi.com/AirPro

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The 2017 AHR Expo is expected to be the largest Show in history. It features nearly 2,000 exhibitors.



What's Hot in Products

ClimaCool introduces a modular chiller that harnesses both air and water to achieve simultaneous heating and cooling, without geothermal. The modular chiller is designed with separate electric feeds, providing redundancy so the chiller is never offline, even during maintenance. With the separate feeds, individual modules within the chiller bank can be taken offline for servicing, expansion or replacement, without impacting system performance. *Booth C1113.*

Franklin Electric Co.'s Little Giant VCC-20-P Series is designed for automatic collection and removal of condensate from air conditioning, refrigeration, and dehumidification equipment installed in air handling and plenum applications. The series delivers pumping performance of 80 gph at 1 foot and 20 feet shut off (on 115 V) and has a low profile height of 1-3/4 inches. *Booth C5120.*

The *Sensaphone* Web600 system

monitors up to six external conditions such as power failure, temperature from -109°F to 168°F (-85°C to 76°C), humidity, and water detection. Users can make programming changes, access status conditions and review data logs online. The system can log up to 100,000 records. In the event of an alarm, the system can notify as many as eight people by email, text message or SNMP trap. *Booth C1250.*

Ruskin offers pressure-independent automatic balancing dampers (ABDs). Models ABD and ABD-SEA (with grille) dampers automatically regulate damper positioning for precise and automatic airflow in both supply and exhaust applications. The result is energy-saving performance that mitigates stack effect in high-rise buildings and improves comfort for building occupants. *Booth C3334.*

Friedrich Air Conditioning Co.

launches its VRP® (Variable Refrigerant Packaged) Heat Pump system. The variable capacity matches the system's output to actual demand for increased comfort, lower energy consumption and improved humidity control. VRP also features exceptional low-ambient heat pump operations down to 15 degrees. *Booth C2127.*

Carrier announces new capabilities for the Carrier® Chillers, a mobile app that offers consulting and facilities engineers a way to select a commercial packaged chiller. The app is now automatically updated. In just three steps, users can obtain key technical data and product features for air-cooled and water-cooled chillers. *Booth C1510.*

International Environmental Corp. (IEC) introduces the Horizontal and Vertical (HDY/VDY) Direct Drive Blower Coil Series. The series ranges from 600 to 3,000 cfm, features larger blower wheels

and a broader range of performance than conventional ceiling fan coil units. These fans have acoustical benefits, eliminating the mechanical drive noises which are evident in typical belt-drive products. *Booth C1113.*

Munters' EPX heat exchanger core incorporates unique, corrosion-resistant, horizontal polymer tubes to cool makeup air in the summer through indirect evaporative cooling. In the winter, EPX operates as a dry heat exchanger for heat recovery. *Booth C4906.*

LG Outdoor Air Units (OAUs) provide conditioned outdoor air to meet code ventilation requirements for occupied spaces and can be combined with LG VRF indoor units that provide comfort cooling/heating to occupied spaces. The units can also be installed on existing refrigerant circuits, reducing costs. *Booth C1330.*

Panasonic's new low profile conceal duct models are available in 9-, 12- and 18,000 Btu/h (2638, 3517 and 5275 W). Indoor units may be installed as single or multi-heads with a mix of up to 5 indoor wall mount and slim ducts. *Booth N9526.*

The *Reliable Controls®* MACH-ProView™ is a BACnet® Building Controller (B-BC) and BACnet Operator Display (B-OD) that provides high resolution, graphical interfaces for your controlled environment. *Booth C1558.*

Uponor offers solutions for PEX hydronic heating and cooling applications that eliminate the need for additional tees and elbows to facilitate piping in two directions. *Booth C2943.*

Heating output of up to 2 MW (6.8 MMBtu/h) is now possible with *ebm-papst's* G3G315, a single compact EC blower designed for use in condensing boilers. This is enough to heat a 50-story building or a housing development with 50 family homes. *Booth C4528.*

Tjernlund Products Dryer Duct Booster meets UL 705 DEDPV and IRC-2015 requirements and saves energy. It reduces lint buildup, dust and fire hazards by maintaining proper velocity in duct runs up to 150 equivalent feet (46 m). *Booth C5706.*

MaxForm™ Shapes by *Nutec* are processed from alumina and silica blends for applications with temperatures up to 3,000°F (1650°C). Applications include

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furnace, boiler duct, and stack linings. *Booth N10928.*

Milwaukee Tool's M18™ FORCELOGIC™ Press Tool sets a new standard in press as a small, intelligent press tool and the industry's first brushless press tool. The lightweight, in-line design delivers unrivaled access in tight spaces. Featuring Auto-Cycle and pre-press battery check, the tool is accurate and reliable. *Booth C3142.*

Vapco Products introduces the 1953 coil cleaner. It is a condenser, evaporator and micro-channel cleaner, degreaser and deodorizer. It is also biodegradable, concentrated and metal safe. *Booth C2035.*

Armstrong International's Gas-Fired Humidification (GFH) is engineered to be compact while still using ionic bed technology. The GFH Series features high output capacity and precise control and accuracy. *Booth C4318.*

The TR9277-EO from *AirTest* is a wireless CO₂, temperature and RH transmitter that is powered by indoor ambient light, making it ideal for zero energy/minimal environmental impact projects or applications where zero maintenance is required. The transmitter communicates using the EnOcean® wireless protocol utilized by many leading building control companies. *Booth C1253.*

Enginia announces new aluminum back-draft dampers. Features include edge and lateral seals for low leakage, linked or non-linked blades, and snap-on flanges that can be attached to either side of the frame. *Booth C6145.*

Walraven introduces the W Series Strut Clamp family, with one piece design and no loose parts or bags. It is an alternative

to strut clamp/conduit clamps and allows one clamp to fit multiple size pipes. *Booth N10141.*

Spruce Environmental Technologies' Hangerlok automatic-locking pipe clamps hold pipe securely to a home or other building, allowing less vibration and movement. *Booth N7617.*

Toxalert's Model TOX-NET provides monitoring and control for ventilation of CO and NO₂ gas in buildings, public parking, and maintenance garage facilities. A daisy chain system allows up to an 96 sensors per controller. *Booth C1700.*

The *Ciqada* platform consists of integrated hardware modules, secure web services and mobile apps, allowing designers to add internet monitoring and control to new or existing products. Data is accessible through web and mobile apps or via API for customization. *Booth C870.*

Delta Cooling Towers introduces the new Anti-Microbial (AM) Cooling Tower. They're manufactured with antimicrobial resin, which is fully compounded into base cooling tower plastic. *Booth N7406.*

JJM Boiler Works' wastewater treatment is used for treatment of acidic condensate wastewater produced by condensing boilers, hot water heaters, furnaces and flue stack drains. *Booth N10809.*

The *Oilon 1000M/1200M Monox* series of gas and dual fuel burners are designed and manufactured with a built in air fan instead of a separate fan, which provides a higher capacity for monoblock installation. *Booth N10913.*

With a rated capacity of up to 25,000 lb (11 340 kg) and unique precision placement capabilities, *Erickson's Aircrane* offers precision aerial heavy-lift opera-

tions. Their S-64 Aircrane is the choice for a variety of heavy-lift missions, including HVAC rooftop placement and lift projects that require absolute safety and precision. *Booth N10911.*

Global Plasma Solutions' GPS-iClean is the first self-cleaning, no maintenance, cold plasma air purifier that can reduce TVOCs, kill pathogens and reduce particles. The GPS-iClean has a rated capacity of 0 to 4,800 cfm (0 to 2,265 L/s) and can accept universal voltage input from 18 VAC to 260 VAC. Weatherproof housing is included. *Booth N12112.*

Winkler Technik presents the PF PlopFix fastening nail for attaching foils and rails on insulation and fixing snap-in foils on insulation. *Booth C6719.*

Wiseman Industries' Thermoboost is an energy saving additive for radiant heating systems, suitable for use in radiators and underfloor heating. *Booth C6106.*

Introducing *Mayekawa's* new factory packaged NH₃/CO₂ Secondary Chiller with air cooled microchannel condenser and low charge NH₃ technology. High efficiencies are achieved with VFD controlled semi-hermetic compressor. Designed for supermarkets and food service applications, a water chiller version for building applications is available. *Booth C6124.*

The CB Combination (Combi) Boiler by *Noritz* uses high-efficiency condensing technology to deliver hot water to plumbing and hydronic heating applications. *Booth C5917.*

Legend's SmartClick™ Permanent Fitting System for PEX and PE-RT pipe is easy to install. Simply cut and push pipe until the audible click, then visually



The Expo gives visitors a hands-on experience with products.

inspect the red indicator showing that the spring steel clamp has engaged onto the tubing. *Booth N8341.*

Optigo Networks' Visual BACnet online software allows you to quantify the health of your BACnet system. It gives you a network health rating, run diagnostic checks to identify problems, allows you to perform audits, and compare network changes over time. *Booth C861.*

Chamberlin Rubber Company offers new push-to-connect fittings on their Chamflex hose. It is the same class A fire rated hose with a quick hook up. The hose is ideal for the chilled beam market, and no tools are required. Many other applications apply. *Booth N8620.*

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New Product & Technology Theaters Showcase Trends

Today

10:15 AM, Theater A

Marley NC Everest - The Pinnacle of Cooling is Here / **Marley / SPX Cooling Technologies, Inc.**

10:15 AM, Theater B

World's First Self-Cleaning Air Purification System / **Global Plasma Solutions**

10:15 AM, Theater C

Efficient Pressure Boosting Using Advanced Control and Permanent Magnet Motor Technology / **Grundfos**

10:45 AM, Theater A

IFM Series Integrated PM Motors for Gearless HVLS Fans / **Lafert North America**

10:45 AM, Theater B

Reaching Energy Efficient Goals With District Energy Networks / **Danfoss**

10:45 AM, Theater C

Omni for All Your Building Management Control Needs / **Innotech Controls Systems**

11:15 AM, Theater A

AMETEK Nautilair Pro Series Provides New Features and Benefits Through Aerodynamic Performance and Customization / **AMETEK Precision Motion Control**

11:15 AM, Theater B

Enhanced Belimo Energy Valve: The New Level of HVAC System Optimization / **BELIMO Americas**

11:15 AM, Theater C

Field Technology: Reduce Overhead | Maximize Profit / **Davisware, Inc.**

11:45 AM, Theater A

Lead Free Instrumentation for

Potable Water Systems / **Winters Instruments**

11:45 AM, Theater B

InVerde e+ with Solar and Battery Integration / **Tecogen Inc.**

11:45 AM, Theater C

Transforming Conventional Fume Hoods into Safer, More Energy Efficient Hoods / **Triatek**

12:15 PM, Theater A

It's Time to Do Away with the P-Trap... 200 Years is Long Enough! / **Des Champs Technologies**

12:15 PM, Theater B

BalanceStream™ Technology / **ClimateCraft**

12:15 PM, Theater C

Cold Climate Air Source Heat Pumps / **Panasonic Heating and Air Conditioning Group**



Take a break from the crowds on the Show floor at one of three New Product & Technology Theaters.

Can Your HVAC Manufacturing Partner Do This?



Profile of a tight tolerance tube sheet in stainless steel.

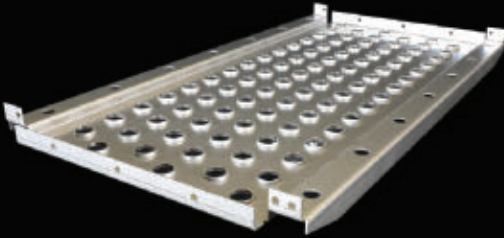
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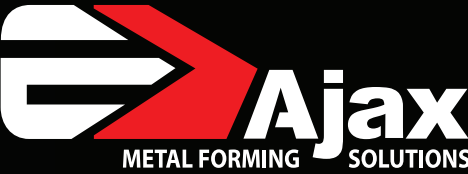
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12:45 PM, Theater A

New FieldConnect Online: Power User Features, Without the Learning Curve / **FieldConnect, Inc.**

12:45 PM, Theater B

New Way to Attach Tubing and Insulate Your Slab in One Step / **NOFP, Inc.**

12:45 PM, Theater C

Commercial Air Cooled Heat Exchangers / **Kelvion Inc., PHE**

1:15 PM, Theater A

Trends Impacting Building Design and Operation / **LG Electronics USA, Inc.**

1:15 PM, Theater B

E2V-F: The High Performance Electronic Expansion Valve Leading to Reduced CO2 Emissions / **CAREL INDUSTRIES S.p.A.**

1:15 PM, Theater C

VRV DOAS, the Next Evolution in Ventilation / **Daikin**

1:45 PM, Theater A

REFCO Condensate Pumps / **REFCO Manufacturing US Inc.**

1:45 PM, Theater B

How Evolving Building Management Solutions Meet Business Needs / **Trane**

1:45 PM, Theater C

Bosch Advances Water Heating into the Connected World / **Bosch Thermotechnology - North America**

2:15 PM, Theater A

Enhanced Technology to Improve the Accuracy of Airflow Measurement / **Ruskin**

2:15 PM, Theater B

Reducing Total Cost of Ownership with Advancements in Closed Circuit Cooling Tower Technology / **Baltimore Aircoil Company**

2:15 PM, Theater C

New Automatic Water Filter That Conserves Water / **Orival Water Filters**

2:45 PM, Theater A

Performance Beyond Measure with AirPro Wireless Air Meters / **TSI Inc.**

2:45 PM, Theater B

Caleffi Expands SEP4™ Combination Hydraulic, Air, Dirt and Magnetic Separator Line / **Caleffi Hydronic Solutions**

2:45 PM, Theater C

Unique VFD Requirements for ECPM Motors, and Resulting Efficiency Benefits / **Fuji Electric Corp. of America**

3:15 PM, Theater A

Advanced Air Replacement with Evaporative Cooling / **Essick Air Company**

3:15 PM, Theater B

Increasing Fan Wheel Efficiency with New Diffuser Technology / **punker LLC**

3:15 PM, Theater C

Novel Ultra-low GWP Refrigerant Alternative for HCFC-123 in Chillers / **Chemours**

3:45 PM, Theater A
Bluetooth Carbon Dioxide HOBO Data Logger from Onset / **Onset Computer Corp.**

3:45 PM, Theater B
How to Minimize Legionella and Other Bacteria Using Proper Filtration / **VAF Filtration systems**

3:45 PM, Theater C
Introduction of Mayekawa's New Air-cooled NH3 / **CO2 Chiller Package / Mayekawa USA - MYCOM**

4:15 PM, Theater A
Real Time Wireless Chiller Efficiency Monitoring / **AirTest Technologies Inc.**

4:15 PM, Theater B
BACnet Temperature, Humidity, and CO2 Integrated Room Controller / **ABIES Technology, Inc.**

4:15 PM, Theater C
Energy Efficient & Cost Effective Boiler Control / **Eurotherm by Schneider Electric**

4:45 PM, Theater A
Ultrasonic Flow / **Energy Surveys Best Practices / Noncontact Meters, Inc.**

4:45 PM, Theater B
Remote Monitoring of Refrigerant Pressure and Temperature / **Transducers Direct**

4:45 PM, Theater C
Benefits of Ecofit's Very High Efficiency Motorized Impeller / **Rosenberg USA, Inc.**

5:15 PM, Theater A
HVAC Solution Add-in with Autodesk Revit / **HVAC Solution, Inc.**

5:15 PM, Theater B
Mechanical Room Piping: Hydronic, Hydraulic Separation & Air/Dirt Removal / **Legend**

5:15 PM, Theater C
Maximize Business & Fleet Efficiency with the TomTom PRO 8275 Driver Terminal / **TomTom Telematics**

5:45 PM, Theater A
QwikSwap - ECM Blower Motor Replacement / **QwikProducts™/Mainstream Engineering**

5:45 PM, Theater B
Whole-Home Air Purification System Designed to Eliminate Pollutants and Allergens from Indoor Air / **Lux Products Corporation**

5:45 PM, Theater C
Lifting Variable Air Volume (VAV) Control to the Next Level / **Sensirion, Inc.**



New Product & Technology exhibitor presentations are brief 20-minute previews of new products and innovations at the exhibitor's booth. They are held in theaters located right in the Exhibit Halls and are free for all registered attendees.

SPX Showcases Latest Innovations

OVERLAND PARK, Kan.—SPX Cooling Technologies, Inc., which designs and manufactures cooling towers and other specialized heat exchangers, will highlight its innovative cooling tower offering. Featured in Booth C1726 are the new Marley NC Everest™ Cooling Tower, the Marley LW Fluid Cooler and the Recold Vector™ Adiabatic Cooling System. Also featured are Marley cooling tower control systems, new Series M Geareducers® and other aftermarket OEM components.

Geoclima's First Expo Features Chillers

RONCHI DEI LEGIONARI, Italy—Geoclima will exhibit for the first time at AHR EXPO 2017 in Booth N11514. This is going to be the very first time for the Italian company in the USA and Geoclima is going to exhibit its adiabatic chiller and an air handling unit from partner Clima Tech.

Geoclima specializes in the design and production of chillers according to the customers' specific requirements and offers customization as a standard of its production. High-quality components, low-GWP refrigerants and specifically-designed technologies are key features of the entire Geoclima's product line. Every project is designed together with the client to provide the most suitable solution and maximum energy efficiency and high performance. Moreover, one of the main focus of Geoclima is the use of low-GWP refrigerants, mainly R-290 and HFO-1234ze.

Geoclima's products includes scroll, reciprocating, and screw chillers for both very low and very high cooling capacity, but the core product is represented by Turbomiser chillers with Turbocor centrifugal compressors: Turbomiser ensures great efficiency and performance, low maintenance, and energy consumption and maximum reliability.

In addition to the production of chillers, Geoclima has developed and can provide different tools and technologies to improve customers' experience.





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Variable Speed Pumps, Modulating Boilers

On average, 15 percent of a commercial modulating/condensing boiler's runtime is spent at high-fire. The unit coasts along at medium- or low-fire for the other 85 percent of the time. This is the "sweet spot," in which the unit is condensing, providing the high efficiency for which it was designed.

Ideal condensation—which facilitates high-efficiency operation—occurs in the heat exchanger when the difference between supply and return water temperatures (Delta-*T*) is near or greater than 20°F.

To maximize the amount of time a boiler condenses, the flow rate through the heat exchanger should also modulate along with the boiler's firing rate. Currently, the industry prefers a fixed-speed circulator sized to provide the correct flow rate and desired Delta-*T* at high-fire only. This makes it impossible to provide ideal flow at lower burner inputs.

Hydronic systems can benefit from variable-speed technology 51 minutes out of every hour of firing. Simply put, we are over-pumping.

Until recently, changing the flow rate through a light commercial boiler to match the Btu input has largely been an afterthought. Only a few boiler manufacturers offered it as an option last year. The general consensus seemed to be that it simply isn't economical to pay for the upgraded variable-speed circulator. But in October 2015, an intelligent

collaboration between two hydronic manufacturers emerged to greatly expand and refine the capability.

"We lost a number of large jobs based on an electrical savings that our competitor could claim through the use of an ECM-powered, variable-speed

we began developing the technology for our own boilers out of necessity, starting with the Apex light-commercial line, which includes models from 425 to 825 MBH. At the time, nobody realized that the electric savings are just the tip of the iceberg."



Ronak Patel, engineering manager at Thermal Solutions, changes Eco-Propel settings on the boiler control. Eco-Propel circulator installed in vertical configuration for testing purposes only. For optimal longevity in the field, the circulator should be installed so that the motor shaft is in a horizontal position.

boiler pump," said Jim Schnorr, president of Thermal Solutions Products (Booth C1136), in Lancaster, Pa. "So

The Bigger Picture: Conserving Gas

Up to this point, the conversation

about using a variable-speed circulator as a boiler pump has revolved entirely around electric efficiency. Based on the inherent efficiency of ECM motors and the ability to run at much lower speeds, it's true that electric consumption falls significantly, as much as 86 percent. But in the grand scheme of things, it's only one circulator.

"The real advantage is fuel savings," explained Schnorr. "Our new variable-speed boiler pump kit, called Eco-Propel, has consistently yielded up to three percent reduction in gas consumption by increasing heat transfer at low- and mid-fire rates where over pumping limits condensing performance. The Apex condenses more, and for longer periods of time."

Three percent might not sound like much, but when you assign a dollar value to the gas that an 825 MBH boiler uses over the course of a year – or several of them for that matter – the savings stack up quickly. This is the catalyst and justification for using variable-speed technology on condensing boilers, and it seems to have gone unnoticed until now.

While testing the Eco-Propel kit, Thermal Solutions consistently found a 6°F to 10°F reduction in return water temperatures over the course of firing cycle. Each degree is critical in producing as much condensate as possible. More heat stays in the system, while less goes out the stack.

Ultimately, the result was an all-inclu-

Get Improved Performance, A Tighter Footprint... **PLUS Easier Maintenance!**

Tranter's new GT Series of plate & frame heat exchangers offers a significant boost in performance and unit integrity.

The initial range includes models GT-206, GT-210 and GT-215. Plates are available in both stainless steel and titanium alloys. Consider these design highlights:

- **HYDROFIT™ FLOW DISTRIBUTION:** highest NTU DN200 plate in the Tranter line; reduced fouling, superior thermal efficiency
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sive, plug-and-play boiler pump package that provides a 12-month payback in the Northeast, based on heating degree days and fuel prices. Payback varies in other parts of the country, but is seen, at most, around two years out.

Circulator Adaptation

It began last year, when Schnorr worked with Taco experts to select and modify an ECM circulator for the task. Meanwhile, Thermal Solutions engineers Ronak Patel and Henok Abebe began development of the Eco-Propel kit that would allow the Apex boiler's control system to interface accurately and continuously with the circulator.

"When Thermal Solutions first approached us about this project, our engineering department looked at the pump requirements and found that Taco's (Booth N7926) ECM-powered VR15 offered the correct performance curves," said Taco's OEM Business Development Manager, John White III. "The circulator's broad operating range makes it ideal for a modulating boiler that's capable of a wide variation in heat input."

The only hurdle was the pump's ability to receive a 0-10v signal. Taco has had that capability for several years, but had not yet implemented it on the 00e line of

high-efficiency circulators because the demand didn't justify it. This was the same challenge Thermal Solutions was finding with other pumps available in the same category.

At roughly the same time Thermal Solutions began discussions with Taco, engineers in Lancaster were already testing another commercial ECM circulator for adaptation. The pump's controls proved to be too cumbersome, and required commissioning upon start-up even in a typical installation.

"The VR15 is ready out-of-the-box, with no need for reconfiguration on-site," said White. "So when this project began, we wanted it to remain that way, despite the special application. Applying our 0-10v capability to the VR15 became a rush project. Thermal Solutions came to us with a need, and we made it happen."

Taco's long-standing relationship with Thermal Solutions was reason enough to put the wheels in motion quickly. While

Taco engineers modified the circulator in Cranston, RI, Engineers at Thermal Solutions were busy with the other half of the solution.

Packaged Solution

"At the very beginning of this project, we attempted to run the variable-speed pump with a set of temperature sensors on the supply and return pipes," said Ronak Patel, engineering manager at Thermal Solutions. "While these sensors work well within a distribution system, there was a slight lag time that we weren't willing to tolerate for this application, and the possibility of firing rate and pump flow fighting each other. That's when we decided that everything must be orchestrated through the Apex boiler's control."

The Concert Boiler Control, which is a combination of Thermal Solutions' main boiler control and a touchscreen display, monitors 40 different performance curves from the boiler, in addition to Delta-T across the heat exchanger in real-time.

Patel and Henok Abebe, product development engineer, began building a proprietary link between the boiler and circulator. The Concert Boiler Control handles all boiler and pump logic, and the Eco-Propel kit integrates the pump into the boiler loop and wiring.

The result is a seamless package that comes in a single box, and installs in a plug-and-play fashion. During installation, Eco-Propel requires the technician to provide only three inputs on the boiler's touchscreen: enable/disable Eco-Propel, select pump, and Delta-T. This information is entered on the boiler's touchscreen interface.

Before leaving the factory to be included as part of the Eco-Propel kit, Taco installs a jumper between two contacts as a failsafe. Should anything between the boiler and pump fail, the circulator reverts to full-speed instead of shutting off completely. This way, the boiler won't reach high-limit and shut down. It prevents a no-heat situation, and avoids damage to the heat exchanger.

Field Nimble's Better Way To Field Service

Las Vegas—Field Nimble (Booth N11531) will be formally unveiling its next generation work order management and field service software for small residential home services contractors and tradespeople. The web and app-based software provides end-to-end tools that allow owners to manage a flexible database of customer information, schedule jobs and assign them to workers, build and present proposals, invoice, and collect payment. Unlimited customization of fields for customers and their equipment, technicians, jobs, notes, and more allows companies to tailor the software to fit specific needs.

The team behind Field Nimble has been working with contractors since 2007 and has helped over 650 companies become more effective and profitable through web and mobile software tools. During that time, it became clear that the needs of the small companies, who represent 80% of all contractors, weren't being served by other products in the market.

"Field Nimble is geared toward the smaller contractor," said Field Nimble President Greg Dooley. "I saw that the other options out there require a huge investment of time and money upfront to get started. I knew there was a better way."

Field Nimble leverages new technologies, but keeps its focus on simplicity. "Too many systems have set fields and structures. My goal was to make a system that gives all the benefits of the new technologies, but stays as easy as working on paper," said Chief Technology Officer, Nick Gianadda. Field Nimble lets owners manage the entire work order process in the back office, in the field, and at home.

"We know that running a small business doesn't just happen behind a desk. Our system has been designed to let everyone in the company work wherever they need to work, when they need to work."

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Bringing In the Great Outdoors

Thanks to a recent remodeling that included several air curtains, patrons seated indoors experience the ambience of dining outdoors at O’Toole’s Irish American Grill & Bar in suburban Detroit.

The remodel included improvements to the bar area, outdoor patio restrooms, HVAC systems and more. The most critical factor: seven air curtains over the 46-feet of retractable glass walls and overhead doors. The air curtains separate the indoor environment from the outdoor elements of flying insects, heat, cold, and nearby street vehicle emissions when the glass walls and doors are opened.

The Royal Oak, Mich.-based res-

taurant’s sales jumped 25 to 30 percent after the remodeling. Restaurant owner Keith Wadle knew opening up the sidewalk frontage would increase business, but wasn’t sure how to keep outdoor elements out until he visited a Florida restaurant that protected multiple open doorways with air curtains. Wadle called the air curtain manufacturer, Berner International (Booth N8619), New Castle, Pa. Berner’s Detroit area representative, Buyline Building Products, Rochester, Mich., engineered the project.

During moderate weather in spring and fall, and nearly every day from May through September, Wadle opens up the

30 feet of retractable glass doors manufactured by Nana Wall Systems, Corte Madera, Calif., plus two 8-foot-wide glass overhead doors. The air curtains, which are mounted to the interior top of the frontage wall, discharge a “curtain” of air that meets just inside the three-foot-high exterior sill.

Air curtain selection and sizing was challenging for Buy Line Products President, Rudy Aho. Air curtains are designed for doorways and openings, but typically occupants don’t sit in or near the opening. O’Toole’s most popular seating is at the frontage and under the air curtains. Therefore, Berner’s engineering department customized the blower assemblies



Air curtains at O’Toole’s Irish American Grill & Bar.

for a lower velocity, but they still provide the necessary 1,407-feet/minute at three feet above the floor (window sill level) for performance. The customization was a factory-tested balance of protecting the opening, but also preventing napkins or paper money tips from blowing off tables.

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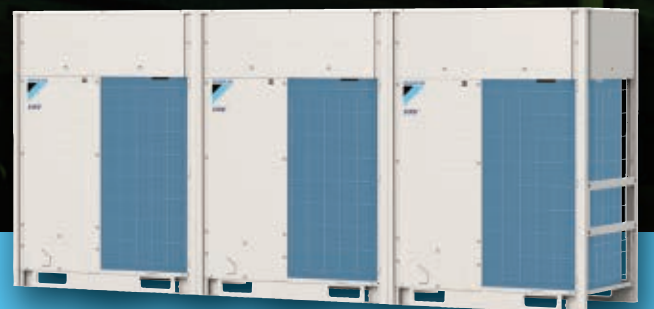


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