NOV/DEC 2013 VOL. 11 NO. 9

Commercial BUILDING PRODUCTS

SERVING ARCHITECTS, CONTRACTORS, AND OWNERS IN COMMERCIAL CONSTRUCTION

Light The Way To Savings

VRF Or Chilled Beam?

Efficient Hydronic Boilers

We are pioneers of safety.
Separately, we are a host of brands
that have secured the world for centuries.
Together, we are a new company
focused on the future;
halting dangers before they threaten
and keeping the vulnerable from harm.
We are many.
We are one.

We are Allegion.

ALLEGION™

PIONEERING SAFETY™

CISA ■ interflex ■ LCN ■ SCHLAGE ■ VON DUPRIN

Learn more about all of our brands at allegion.com. © 2013 Allegion

For free information, circle 200

contents INSIDE

LED fixtures help sell product.
see page 8

50

54

nov/dec 2013 vol. 11 no. 9

FEATURES

PROJECTS

DEPARTMENTS

PRODUCTS

About The Cover

Open space, plenty of daylight, and an environment that helps people relax are key elements in effective healthcare-facility design. This is particularly true when children are involved, such as at the Arkansas Children's Hospital in Little Rock. Learn more about this project and the role gypsum board played in the design by turning to p. 42.

RE:think™

Lower **lifecycle** costs. Reduced maintenance. Industry-leading performance and reliability. Our advanced VRF zoning solutions focus on more than just energy usage to totally *redefine efficiency*. Rethink your HVAC at **www.mitsubishipro.com/rethink.**

: MeHVAC

: @MitsubishiHVAC

You Tube : MitsubishiHVAC

RE:defined™

MITSUBISHI ELECTRIC

COOLING & HEATING *Live Better*

AMERICA'S #1 SELLING BRAND OF VRF TECHNOLOGY

For free information, circle 201

CBP*digital* EXTRAS

To learn more about the products mentioned in the features in this issue, visit our digital magazine at http://www.cbpmagazine.com/digital/novdec2013. Turn to the article that interests you and click on the icon to download a spec sheet or watch a video. Below is a summary of this issue's Digital Extras.

Lighting The Way To Bottom-Line Savings, p. 8:
Click on the Digital Extra icon for this feature, you'll be taken to the Cree website page for their LED luminaires.

Metal Is Not Just For Warehouses, p. 12:
This Digital Extra download is a 32-page catalog that details MBCI's line of metal roofing and siding products.

VRF Or Chilled Beam?, p. 16:
Click on the icon in the digital magazine and you'll have an opportunity to download the Taco LoFlo injection-plumbing product catalog.

Operate An Efficient Hydronic Boiler, p. 22:
The icon will provide you with the Cleaver-Brooks ClearFire-LC product brochure.

Passive Fire Protection Safeguards Buildings, p. 28:
Click on the Digital Extra icon in the digital magazine and receive the Clark-Dietrich Blaze Frame product catalog.

Lighting Brightens Long-Term Care, p. 31:
The Digital Extra link for this article will allow you to watch a promotional video from Kenall Lighting.

Busy Laundry Facility Gets Upgraded, p. 32:
Click on the Digital Extra icon at the end of this story to watch a video that helps you better understand the Aquatherm line of piping.

Windows Deliver Healthy Light To Critically Ill Kids, p. 34:
Click on the Digital Extra icon in the digital magazine to visit the Prism window area of the Simonton website.

Biotech Incubator Features Lightweight Panels, p. 38:
The Digital Extra link for this article produces the product brochure for the Slenderwall line of exterior cladding.

LEDs Shine In Vegas, p. 41:
Clicking on the Digital Extra icon will allow you to enjoy a tour of the Venetian/Palazzo facilities to see the results of the LED lighting upgrade.

Curved To Promote Healing, p. 42:
The Digital Extra link for this article will provide you with product catalogs for CertainTeed's M2Tech gypsum board and GlasRoc exterior sheathing.

Foam Cools Fruit Harvest, p. 44:
Click on the Digital Extra link to visit the ACH Foam website page and download their product literature.

CBP COMMERCIAL CONVERSATION

As part of our variety of online editorial products, *Commercial Building Products* presents Commercial Conversation at http://www.commercialconversation.com. Commercial Conversation is a series of semi-monthly podcasts in which the editors speak with commercial-construction industry experts about issues that affect specifier decisions. Podcasts are supported by a resource page and are available for download from the website.

Breaking New Ground With Geothermal: Jay Egg

Jay Egg, founder of Egg Geothermal, Kissimmee, FL, is a consultant and designer of geothermal HVAC systems, in addition to being author of two books and several articles on the subject. In this podcast he offers his insights into geothermal technology and the role it can play in commercial facilities by providing improved indoor air quality and energy savings on several fronts.

Glass For Interior Spaces: Diane Turnwall

Diane Turnwall, market segment director for interiors at Guardian Industries Inc., Auburn Hills, MI, offers insight into the growing trend of using glass for interior walls and to define inner work spaces. In the podcast we talk about sound, privacy, lighting, safety, wayfinding, and other glass-related factors.

Fenestration Spec Factors For Buildings: Mike Turner

Mike Turner, vice president of marketing at YKK AP America Inc., Austell, GA, and board member of the American Architectural Manufacturers Association, Schaumburg, IL, returns to discuss factors to consider when specifying fenestration for various building types. This podcast accompanies his article on p. 13 in which he discusses regional factors that affect fenestration specifications.

Sustainability And Its Future: Gale Tedhams

Gale Tedhams, director of product and supply chain sustainability, Owens Corning, Columbus, OH, shares her views of current trends and the future of sustainable construction, along with the roles the LEED, IgCC, and BioPreferred programs are playing in the process.

www.cbpmagazine.com
offers many online products meriting investigation.
Just click on the icons on the website.

VIDEOS

CBP*digital*

E-*news*

BLOG*items*

Recent blog topics:

- **ACSA/AISC student design awards**
- **ASTM building standards subscriptions available**
- **ABI surges, design firms cite increased productivity**
- **Adaptive reuse project wins award**

TEXAS A&M UNIVERSITY
LIBERAL ARTS & HUMANITIES BUILDING
COLLEGE STATION, TX

DUPONT
Tyvek®
FLUID APPLIED WB

APPROVED & APPLIED FOR TEXAS A&M.

Only the most effective air and water barrier could pass the test to be used on the new Liberal Arts & Humanities Building at Texas A&M. The DuPont™ Tyvek® Fluid Applied System scored high for performance and ease of application to earn high marks from the installers, builders and architects.

Learn more at: **www.fluidapplied.tyvek.com/casestudies**

For free information, circle 202

NOV/DEC 2013 VOLUME 11, NO. 9

Commercial BUILDING PRODUCTS

SERVING ARCHITECTS, CONTRACTORS, AND OWNERS IN COMMERCIAL CONSTRUCTION

1300 S. Grove Ave, Suite 105
Barrington, IL 60010
847.382.8100 fax: 847.304.8603
www.cbpmagazine.com

EDITORIAL

Gary L. Parr — 847.382.8100, ext. 101
Editorial Director — gparr@cbpmagazine.com

Kenneth W. Betz — 847.382.8100, ext. 105
Senior Editor — kbetz@cbpmagazine.com

Marga Parr — 847.382.8100, ext. 115
Assistant Editor — mparr@cbpmagazine.com

Elisa Kendal-Ward — ekendalward@cbpmagazine.com
Art Director

Ellen Sandkam — 847.382.8100, ext. 110
List Rental Services — esandkam@atplists.com

ADVERTISING SALES

1300 S. Grove Ave.
Barrington, IL 60010
847.382.8100 Fax: 847.304.8603
www.cbpmagazine.com

SUBSCRIPTIONS

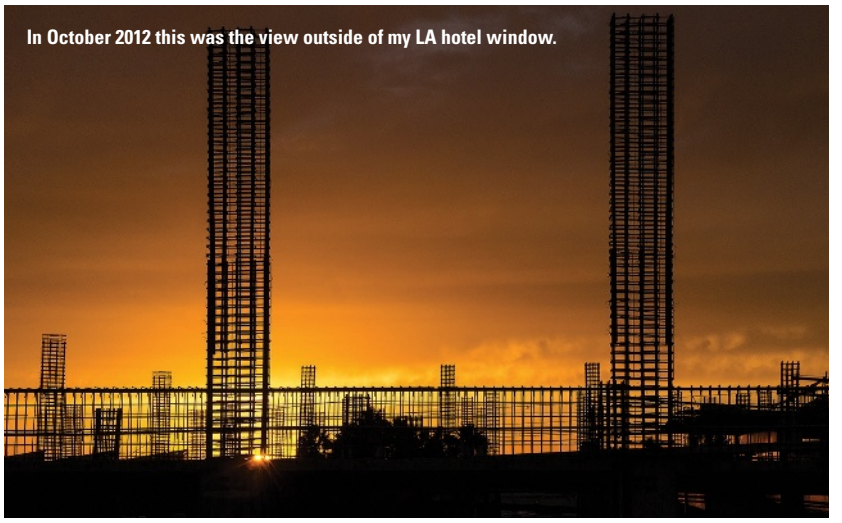
For subscription inquiries or change of address, go to www.cbpmagazine.com, or contact
Jeffrey Heine, Circulation Director
Phone: 630.739.0900 ext. 204
Fax: 630.739.7967
E-mail: jheine@cds1976.com

WEBSITE

www.cbpmagazine.com
Developed and maintained by
Web Publishing Group
www.webpublishinggroup.com

BPA WORLDWIDE

Commercial Building Products
ConSource LLC
1300 S. Grove Avenue, Suite 105, Barrington, IL 60010
847.382.8100

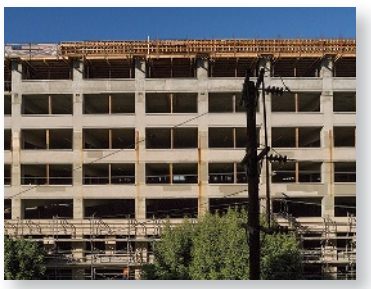


In October 2012 this was the view outside of my LA hotel window.

Making Progress

When I travel to Los Angeles for business, I always stay in the same hotel. In October 2012 I was on the west side of my favorite LA hotel. Photographically, the view from my window made for a semi-interesting sunset image. From a commercial-construction perspective it was a depressing sight because it was clearly an abandoned construction site, and I wondered if it would ever be completed. It spoke volumes to me about how commercial construction has struggled in recent years and made me hope/pray we would see things improve in 2013.

When I made a similar trip in early November 2013, I'd completely forgotten about that abandoned construction site. As fate would have it, I ended up on the west side of the hotel again and was surprised/pleased/annoyed to have a very different view outside my window. I was surprised because I had no expectations that the structure would ever be finished. I was pleased because it was another indication of what I've been seeing all over the country—commercial construction gaining momentum. I was annoyed for two reasons. First, I could not make any sunset images of the structure, and the only image I could make was one of a standard parking structure. Even more annoying is that construction workers make a lot of noise at 6:30 in the morning. Silver lining: I didn't need to set an alarm.

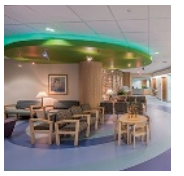


My hotel-room view changed dramatically in November 2013.

Seeing active commercial-construction sites and cranes above city skylines lifts my spirits. Even more uplifting is the October AIA Architecture Billings Index that is at 54.3. Anything higher than 50 indicates growth.

As this year comes to an end, I'm taking the view outside my Los Angeles hotel room, cranes I've seen topping city skylines, and the AIA number as clear indicators that we've made progress in 2013. Those indicators also say to me that we have a legitimate shot at commercial construction shifting to a higher gear in 2014. cbp

Gary L. Parr
Editorial Director



COMMERCIAL BUILDING PRODUCTS (USPS 23077) is published nine times/year in January, March, April, May, June, July, September, October, and November, by ConSource LLC, 1300 S. Grove Ave., Suite 105, Barrington, IL 60010 (Phone: 847-382-8100). Periodicals postage paid at Barrington, IL, and additional offices. SUBSCRIPTION: COMMERCIAL BUILDING PRODUCTS is mailed free to major users of commercial building products across several industries. Non-qualified subscriptions in the United States are $24 for one year. POSTMASTER: Please send address changes to: COMMERCIAL BUILDING PRODUCTS, Creative Data, 440 Quadrangle Dr., Suite E, Bolingbrook, IL 60440-9719. For other circulation information, call 630-739-0900.

Look Beyond Traditional Strategies

In-slab radiant heating and cooling systems can cut energy costs by 17% to 53% and reduce demand on forced-air systems.

Devin A. Abellon, PE, Uponor Inc.

Sustainable and responsible strategies for building energy use have become widely accepted and expected by building owners and designers in recent years. The energy savings and payback are, of course, justification, and public perception and comfort shouldn't be discounted either.

In the case of HVAC, design engineers are looking beyond traditional solutions to maximize energy efficiency while maintaining occupant comfort and safety. As evidence of this quest, a number of innovative systems have been incorporated in high-profile LEED-certification projects in recent years. One such system is in-slab radiant cooling, which has enjoyed popularity in the U.S. and abroad for many years.

These systems are used for space heating and cooling. For the former, warm water circulates through a series of crosslinked-polyethylene (PEX) piping loops embedded in a concrete floor. Water flow rate and temperature are controlled to regulate the temperature of the concrete thermal mass. The warmed surface radiates heat to the objects and occupants in the space, creating a comfortable environment.

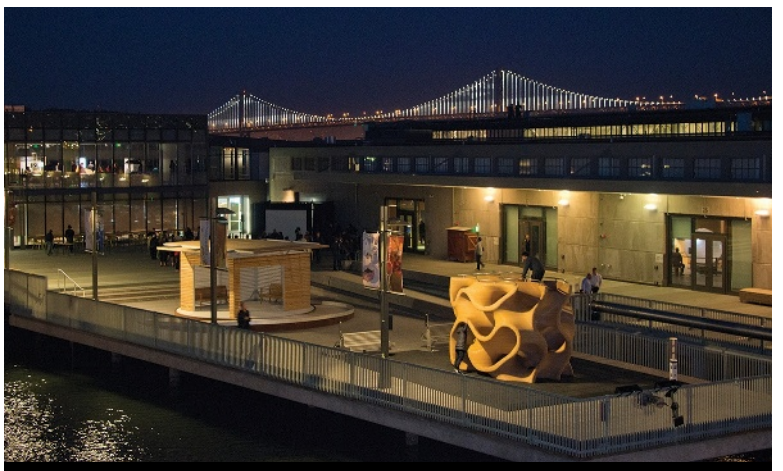
This same principle is used in radiant cooling. In fact, in most cases, the same series of piping loops can also be used for cooling. The difference is in the temperature of the water being circulated. By controlling the slab temperature, a radiant-cooling system can effectively manage all or at least a portion of the building's sensible load, thereby reducing the total demand placed on a forced-air system and saving energy.

Over the past decade, the number of radiant-cooling systems designed, installed, and commissioned in North America has increased dramatically. Such systems are gaining exposure and popularity for a variety of reasons. They can provide significant architectural freedom, superior comfort, and effective ventilation control. But the main driver behind the increase in radiant-cooling systems design and specifications, however, is the potential for improved energy efficiency.

How energy is saved

Radiant-cooling systems can reduce overall building energy usage in several different ways:

- First, because the heat-transfer capacity of water is much higher than that of air, a radiant system that uses a circulator to move water (in lieu of a fan to move air) can achieve the same heat transfer using significantly less energy.
- Second, because of the way the human body exchanges heat with its surrounding environment, a radiant system can achieve comparable levels of comfort at higher room temperatures (78 F) than are normally maintained.
- Third, the use of high water temperatures for cooling may allow more optimum operation of the system's chilled-water plant. Other sources for chilled water, such as geothermal systems, may also be used.



The Exploratorium interactive children's science museum features an in-slab radiant cooling system that uses San Francisco Bay as a heat sink and source for chilled water. ***Photo by Amy Snyder, courtesy Exploratorium.***

Therefore, a radiant-cooling system that manages the bulk of a building's sensible loads, coupled with a smaller forced-air system (for ventilation, latent loads, and supplemental sensible loads), can significantly reduce a building's total energy usage. Studies have shown total energy savings for typical office buildings on the order of 17% to 53%.

Project: The Exploratorium

A notable example of the use of radiant cooling to dramatically reduce overall energy usage is the recently completed, 330,000-sq.-ft., Pier 15 project in San Francisco. An existing, unused pier building was gut-renovated to serve as the new home for the Exploratorium, an interactive children's science museum.

Radiant cooling was used throughout a majority of the exhibit spaces and the multipurpose event space. Because radiant-cooling systems require only moderate temperatures, the design engineers were able to use the San Francisco Bay as a heat sink and source for chilled water. Bay water, piped through heat exchangers, can provide cooling water for a significant part of the year.

Not only does this innovative use of bay water reduce the overall energy consumption, it also significantly reduces the building's water demand by eliminating the need for cooling towers. The use of bay water to serve the radiant-cooling system, along with a number of other energy-conservation measures, helped cut the building's electrical-energy usage for cooling by a staggering 94%.

In addition to the potential for dramatic energy savings, radiant cooling can be seen as a sustainable strategy for a number of other reasons:

- The embedded tubing requires no maintenance.
- The radiant cooling system, including the chilled-water source and distribution, requires no greater maintenance than typical fluid-based systems. By reducing the size of the airside system, radiant cooling can reduce the need for disposable filters and belts.
- PEX waste tubing can be readily processed and re-purposed into a variety of consumer goods, such as landscape timbers, asphalt filler, concrete filler, and even other pipe products as a filler.

As building owners and jurisdictions continue to demand high-performance buildings, system designers are looking for sustainable solutions to reduce energy usage, while maintaining function. By taking advantage of a building's thermal mass, an embedded-tube radiant-cooling system can be an effective and energy-efficient alternative to a conventional forced-air-only system. cbp

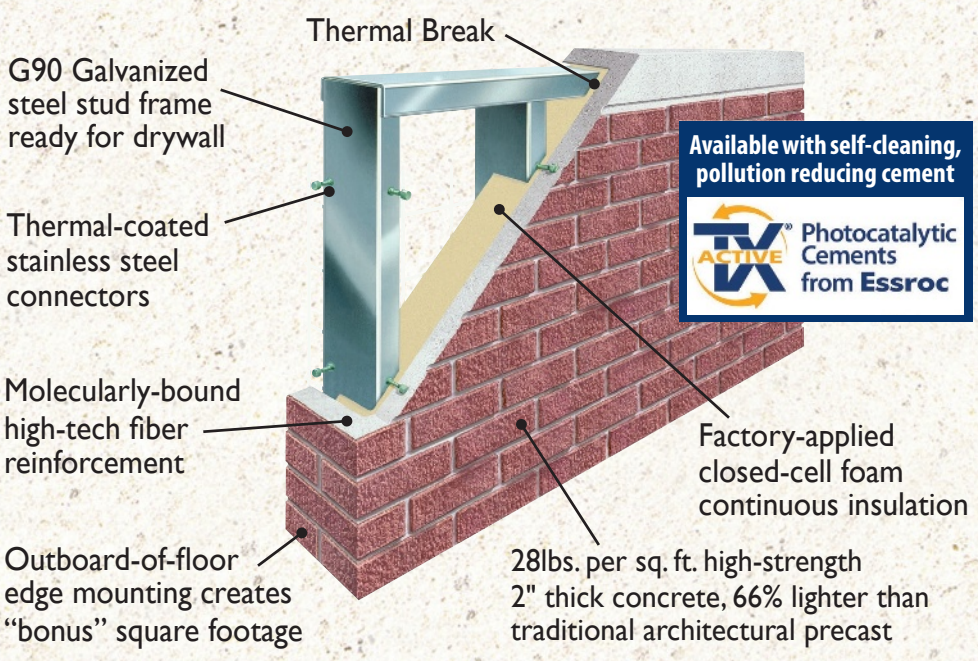
Devin A. Abellon, PE, is the business-development manager for engineering services at Uponor Inc., Apple Valley, MN. He is an active member of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and the American Society of Plumbing Engineers (ASPE).

NEW! ULTRA HI-PERFORMANCE
SLENDERWALL®

Lightweight Architectural Precast Concrete/Steel Stud Envelope Panels

- ***226 MPH Wind-Load Tested, 130 PSF***
- ***H_2Out - Pressure Equalized Sealant Joint Rainscreen & Leak Detection System***
- ***Factory-Applied Closed-Cell Foam Insulation***
- ***Factory-Installed Windows***

BioInnovation Center
New Orleans, LA
Architects:
Eskew+Dumez+Ripple, NBBJ
Precaster: **Jackson Precast**



Additional SlenderWall Benefits:

- *One-Call Building Envelope Responsibility*
- *No Moisture Intrusion Guarantee*
- *Energy Code Compliant*
- *Lower Structural Costs • Bonus Square Footage*
- *Faster Installation • Fewer On-Site Trades*

www.SlenderWall.com • 1.800.547.4045

EASI SET® WORLDWIDE

SLENDERWALL® is a product of Easi-Set® Worldwide, a licensor of precast products, with 68 licensed producers in 41 states and 10 countries. A subsidiary of publicly traded Smith-Midland, Delaware [SMID] ©2013 CBP1113

For free information, circle 203

Convenience store and gas station chain Sheetz installed LED interior and exterior lighting at more than 130 of its locations across six states, realizing a 45% energy savings on interior lighting and as much as 55% on exterior lighting.

Lighting The Way To Bottom-Line Savings

Retailers enhance shopping experience with efficient LED technology.

Allison Romick, Cree Inc.

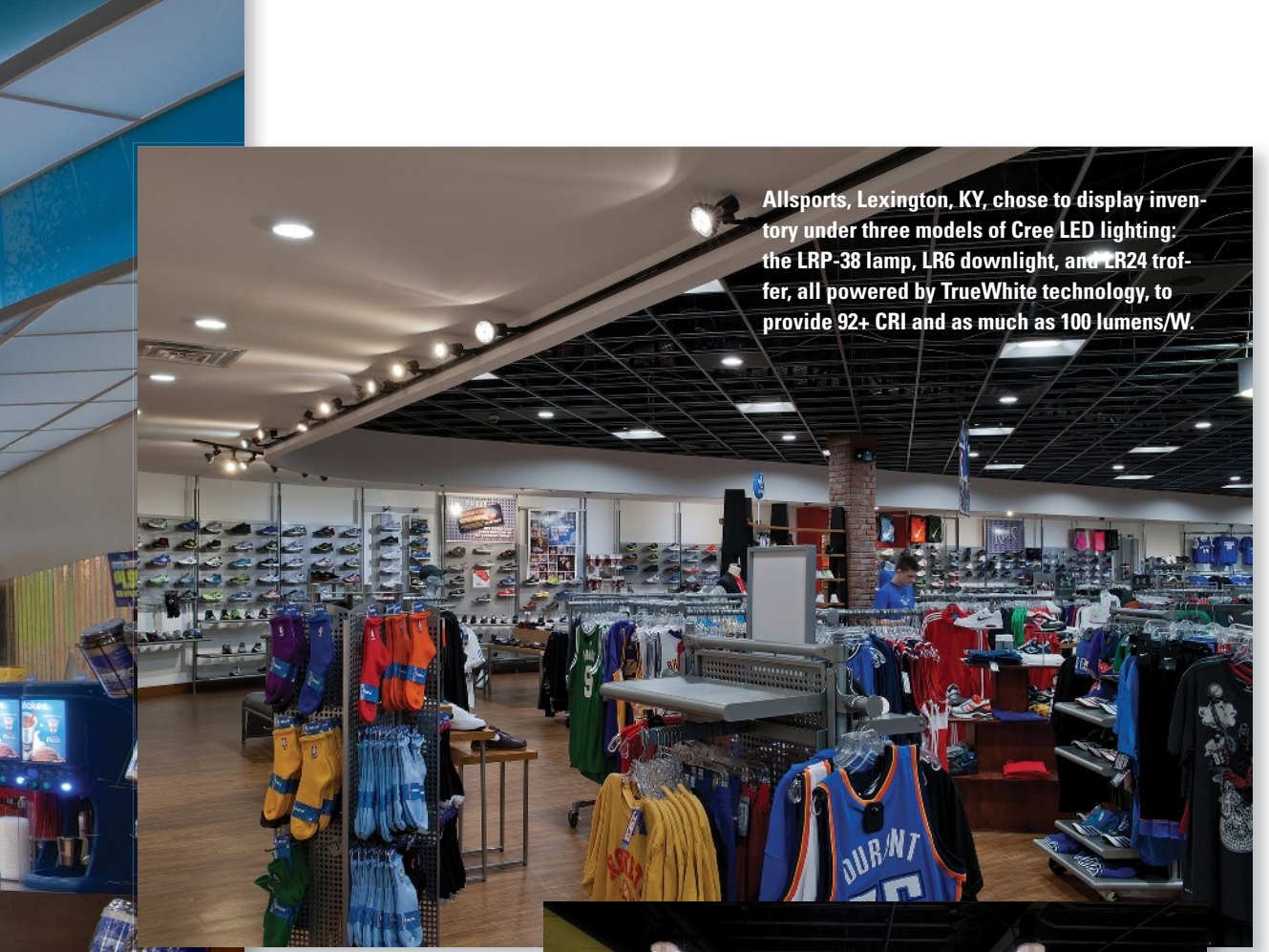
It wasn't long ago that LED lighting was mostly a curiosity with limited applications, but today it's more than ready for mass-market application in retail settings.

Retailers have plenty of incentives to look for alternate lighting solutions, not the least of which is that in 2012, U.S. Department of Energy (DOE), Washington, product energy regulations went into effect, restricting availability of many inefficient R, PAR, BR, ER, and BPAR lamps and prompting retailers, owners, and distributors to evaluate their lighting choices and seek energy-efficient alternatives. Compared with traditional halogen or incandescent sources, LED alternatives are about 75% more energy efficient, on average; last as much as 25 times longer; provide color consistency; have higher vertical light distribution; and produce almost zero UV and IR emissions. For retailers, LED technology also delivers high-impact lighting with exceptional color rendering, enhancing store aesthetics and directly improving the customer shopping experience.

According to the U.S. Environmental Protection Agency (EPA), Washington, Energy Star program, there are approximately 657,000 retail buildings in the U.S., together consuming approximately $21 billion worth of energy annually. Installing energy-efficient LED lighting offers lifetime financial benefits in the form of reduced energy bills and maintenance costs, allowing owners to reinvest the savings into the business or increasing efficiency in other ways, such as upgrading refrigeration systems. Many of the nation's leading retailers have already made the switch to LED and are experiencing dramatic benefits to the bottom line. Convenience store and gas station chain, Sheetz, for example, installed LED interior and exterior lighting at more than 130 of its locations across six states, realizing a 45% energy savings on interior lighting and as much as 55% on exterior lighting that illuminates gas pumps.

Continued breakthroughs have improved the economics of LED installations. U.S. lighting manufacturers have made it possible to replace an outdated linear-fluorescent fixture with an LED upgrade kit in about 10 minutes, providing a significant savings on energy and maintenance costs for years. Recent innovations in LED technology allow:

- Higher lumen packages
- Evolving form factors, delivering lighting in new directions, and creating the desired aesthetic
- Simple upgrades to incumbent linear-fluores-



Allsports, Lexington, KY, chose to display inventory under three models of Cree LED lighting: the LRP-38 lamp, LR6 downlight, and LR24 troffer, all powered by TrueWhite technology, to provide 92+ CRI and as much as 100 lumens/W.

Tops Markets installed LED lighting to light the aisles, specialty departments, and pharmacy at its new location in Geneva, NY, and was able to take advantage of utility rebates for an expected payback of about 2 1/2 years.

Lighting Data

For more information about lighting technology, visit the following sources.

1. U.S. Department of Energy, Energy Efficiency & Renewable Energy: http://www1.eere.energy.gov/buildings/appliance_standards/product.aspx/productid/70

2. U.S. EPA EnergyStar (Retail): http://www.energystar.gov/buildings/sites/default/uploads/tools/EPA_BUM_CH13_Retail.pdf

3. Pacific Gas & Electric and the California Lighting Technology Center: http://cltc.ucdavis.edu/publication/consumer-preference-survey-directional-led-replacement-lamps-retail-applications

4. U.S. EPA EnergyStar (Supermarkets): http://www.energystar.gov/ia/business/challenge/learn_more/Supermarket.pdf

cent fixtures, maintaining store aesthetics

- Efficient high-bay or low-bay solutions to replace high-intensity-discharge (HID) lighting
- Interoperability with traditional dimming technologies, increasing energy savings.

In addition to long-term financial benefits, the performance, style, and high-quality light prove that LED lighting is ready for mass-market retail adoption. It's no longer a question of why, but how.

Finding the right fit

A survey of retailers conducted by Pacific Gas & Electric and the California Lighting Technology Center (CLTC) reveals that 75% of respondents are considering upgrading to LED technologies due to large incentives/rebates that make LED implementation more affordable up front. Lacking the relevant education on LED lighting's maintenance savings, significant energy reductions, and superior color quality, they are making product decisions primarily based on initial cost and payback. While attractive economics make a compelling reason for retailers to switch to LED lighting when specifying products, it's important for retailers, building owners and operators, and contractors to consider long-term light quality as well as total cost of ownership for new construction or upgraded lighting solutions. This is particularly important in retail settings because the ability to showcase products in their true colors with consistent light distribution directly impacts the customer experience.

As companies seek LED lighting to take advantage of the technology's long lifetime, it's imperative that retailers carefully select a manufacturer that offers quality lighting solutions with a proven record of performance. Manufacturers that offer a comprehensive line of LED luminaires that can enhance the entire retail operation—from a safe and inviting parking area to an appealing sales floor and well-lit warehouse—streamline the process for the specifier and end-user. Additionally, selecting manufacturers who offer third-party testing and fixtures backed by strong warranties can help retailers be confident that the luminaires will stand up to their performance claims.

Once retailers understand the energy efficiency and maintenance advantages of LED lighting over incumbent technologies, finding the LED luminaire that conforms to the aesthetics customers expect from a retailer is key, as lighting is a defining characteristic of a retail application. When customers enter a retail setting, they expect a certain aesthetic, and lighting plays an instrumental role in this experience. In an automotive dealership, for example, customers may expect high-bay, bright lighting that showcases merchandise in its truest colors, whereas in a restaurant or an upscale boutique, lower light levels and warm lighting can help create a feeling of comfort. In contrast, poor-quality, flickering lighting may trigger a perception of low quality, which may negatively affect the customer experience and purchasing decision. Retailers should not have to compromise aesthetics for energy efficiency, and LED lighting looks and lights like the incumbent light sources, for a true no-compromise solution.

Selling merchandise is about more than just stocking products for customers. For patrons, it's a highly visual and sometimes emotional experience. According to Benjamin Moore, Staunton, VA, store co-owner Lesley Merritt, although paint is what customers leave with, color is what they buy. Since the illumination source can affect the perception of color, it's critical for a paint store to have a lighting solution that renders colors in their truest form. Regardless of retailer, LED lighting solutions are attractive

Petty's Garage, Randleman, NC, installed more than 700 Cree CR series LED troffers and CS series linear luminaires, reducing the facility's fixture count by 10% and labor time in the installation process.

because they can offer superior color quality, low cost of ownership, and better optical control than traditional light sources, particularly in key retail applications such as track, accent, display, and downlighting. With LED lighting, specifiers can prescribe solutions that provide exactly what retailers want in terms of appearance, creating a comforting environment to clients.

Improve customer experience

Customers are unlikely to buy what they can't see. With high-lumen light, high color rendering, and energy savings of as much as 85% over traditional sources, interior LED lighting puts the focus on products to help customers reach a buying decision.

Innovations in LED have allowed luminaires to be very effective, producing tremendous amounts of vertical light—meaning retailers need less power to illuminate every level of their shelving. On the sales floor, choose high quality fixtures that are directional for consistent illumination across the displays.

LED suspended ambient lighting should deliver high levels of vertical illumination, coupled with high CRI (color-rendering index) and a variety of color temperatures. For interior lighting, look for precision control and direct uniform illumination with multiple mounting options. A new installation at Allsports in Lexington, KY, chose to display inventory under three models of LED lighting from Cree Inc., Durham, NC: the LRP-38 lamp, LR6 downlight, and LR24 troffer, all powered by TrueWhite technology, to provide 92+ CRI and 100 lumens/W.

Specialty counter lighting not only makes these areas stand out, but acts as landmarks to help patrons more easily navigate retail spaces. Focus on efficient, dimmable LED troffers and downlights with high CRI and color consistency to showcase counters. Cree TrueWhite technology, for example, allows indoor LED fixtures to deliver an exclusive combination of efficacy, 90+ CRI, and consistent warm or cool color temperatures.

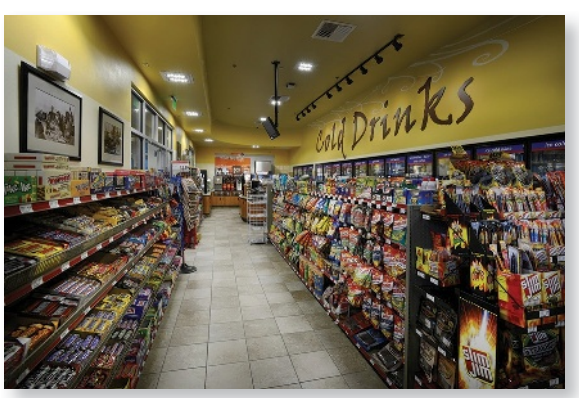
Appetizing produce

According to the EPA Energy Star program, U.S. supermarkets use about 50 kilowatt-hours (kWh) of electricity every year with average annual energy costs of $4/sq. ft. This equates to more than $200,000 annually in energy costs for an average-sized (50,000 sq. ft.) store. In addition to energy savings and light quality, LED luminaires deliver added advantages for grocery retail settings where color quality can help the merchandise appear in its truest, most appetizing colors. Look for high CRI LED lighting that provides beautiful light that approaches natural sunlight and is a more efficient solution than halogen lamps. Additionally, unlike fluorescent lighting, LED lamps have almost zero UV and IR emissions, helping produce stay fresher longer.

A well-lit space with high vertical yet low-glare illumination for areas such as a pharmacy, office, storage area, and other workspaces in retail settings offers greater visibility for the employees who are critical to running these areas safely and efficiently. In a pharmacy, for example, high-detail, color-critical work requires greater visual acuity. High vertical LED illumination in these areas also helps employees identify and locate inventory faster—even on the bottom shelves—helping the operation run more efficiently.

Adding green to the bottom line

Saving energy, maintaining retail aesthetics, and helping drive sales and productivity are important benefits to consider when selecting a lighting solution, but adhering to building codes is a necessity for any retailer, too. Upholding some of the highest standards for building efficiency, the California Title 24 Energy Code outlines stringent guidelines for W/sq. ft., often requiring commercial buildings to incorporate controls into their lighting. In general, dimming and controls can increase energy savings by an additional 25%. Retailers should select luminaires that are interoperable with building energy-management systems and can be easily retrofitted with standard dimming technologies such as TRIAC or used in new installations with 0 to 10 V or digital addressable lighting interface (DALI) dimming technologies. Raley's Family of Fine Stores, for example, illuminates its new petroleum station, car wash, and convenience store in South Lake Tahoe, CA, with LED technology, paired with an integrated dimming system for payback in less than a year. Luminaries in the car wash operate at 20% power until the occupancy sensor brings them to full power and then dims them when not in use. With an optional integrated sensor, the LED luminaires also help Raley's meet California's daylight-control requirement.



Raley's Family of Fine Stores illuminates its new petroleum station, car wash, and convenience store in South Lake Tahoe, CA, with LED technology paired with an integrated dimming system for payback in less than one year.

Retailers in marketplaces with progressive utilities may also be able to take advantage of rebates associated with demand-side management, further reducing upfront costs. Tops Markets installed Cree CS18 luminaires and CR24 troffers to light the aisles, specialty departments, and pharmacy at its new location in Geneva, NY, and was able to take advantage of utility rebates for an expected payback of about 2 1/2 years.

Innovative technologies have revolutionized the lighting industry by making high-quality, sustainable LED lighting affordable and available. The possibilities are endless, but the end result is clear: with LED lighting, retailers can turn savings into tangible bottom-line benefits. Whether starting with one store, one area, or one fixture—get started today on improving operations and energy savings with high-quality LED lighting. CBD

Allison Romick is product marketing manager at Cree Inc., Durham, NC.

for free information, **CIRCLE 4**

and visit our digital magazine at www.cbpmagazine.com/digital/novdec2013 and click on the icon.

The Visitors Center in the Audubon National Wildlife Refuge, Coleharbor, ND, is an example of how choosing the right color for a standing-seam metal roof can enhance aesthetics in a natural setting. This roof-panel profile manufactured by MBCI, Houston, is called BattenLok.

Metal Is Not Just For Warehouses

Use color and profiles to reinvent metal construction and break away from that barn look.

Robert A. Zabcik, NCI Group

Ask neuroscientists and psychologists what separates traditional thought from creative thought, and the fundamental answer is simple, yet surprising: As we get older, our tendency to be creative is overridden by our experiences. As vital as experience may be in life, it creates prejudice in that we tend to first try the things that have worked in the past to solve a problem before we apply creative thought. This is why children, who have relatively little life experience, are generally the most creative demographic.

What does this have to do with construction? Ask most people what they think of when they think of metal construction, and they will answer with things such as barns, warehouses, shops, and factories. While those are certainly the anchors of the metal-construction business, there are far more types of buildings that metal can enhance and extend than you might think. As an engineer with 20 years of industry experience, I believe the only reason metal cladding is not used more often is because most people have a negative impression of what it looks like. “I don’t want my house to look like a barn” might be their reaction, and if so, that’s completely understandable. I challenge you to free yourself of what you typically think of metal on a building and open your mind to the possibilities. If you do, you might be pleasantly surprised.

A metal-roof color can be easily and dependably recreated to achieve a consistent look not just across a campus of buildings but across multiple campuses.

Color can be powerful

One of the advantages of metal is that it can be coated with a variety of materials that greatly change its look. The most obvious example is paint, and paint technology has brought some tremendously durable finishes in an unlimited variety of colors to the metal-cladding marketplace. The Visitors Center in the Audubon National Wildlife Refuge, Coleharbor, ND, is an example of how choosing the right color for a standing-seam metal roof can enhance aesthetics in a natural setting.

Natural settings aren’t the only place where color can have great impact. In urban environments, a splash of color can catch the eye of passersby, helping to bring in business from the street. This is commonly done on auto dealerships where a color such as Ford Blue can be easily and dependably recreated over and over to create a consistent look not just across a campus of buildings but also across multiple campuses in an entire country. This is because metal cladding is typically painted in a factory environment under tightly controlled conditions using paints mixed by a national supplier.

In suburban environments, architects often strive to connect the rural and urban aesthetics in a meaningful way, and color can be a key component in this approach. This can be seen on the roof on the Helena Municipal Building in Helena, AL. This building combines classic colonial brick and architecture with a green roof. Metallic finishes add another dimension to this variety. The subtle sparkle and deep undertones of the copper metallic roof on the Cairo Construction office in San Diego come out when the legendary Southern California sun strikes the roof of the building.

This impressive visual flexibility, combined with the traditional benefits of metal roofing

such as excellent hail and load resistance, high recycled content, long service life, and low maintenance costs, make metal the ideal roofing material. You've probably heard a lot about cool roofs lately, and a white metal roof is among the most reflective roofs available. But here is another surprising fact: Paint technology now incorporates highly reflective infrared pigments. This allows even darker colors to reflect more energy back into the atmosphere due to the fact that about 40% of solar energy at ground level resides in the infrared spectrum. Even more importantly, the non-porous surfaces of these paints and the metal substrate provide longevity in these reflective properties due to their resistance to soiling and microbial growth. Lawrence Berkeley National Laboratories, Berkeley, CA, and Oak Ridge National Laboratory, Oak Ridge, TN, actively researched this subject and have found that metal performs well in both aspects. Furthermore, these paint pigments don't generally cost more money to use, so there is no need to worry about payback.

It's also easy to forget that metal roofing is ideally suited to curved architecture. Because steel can be rolled very thin, it can go over curved surfaces without special forming or stressing. The Caven-Williams Sports Complex at Boise State University, Boise, ID, is an example of curved-metal roofing, and its shape blends well with the mountainous terrain behind it. Furthermore, curved roofing can be used right alongside traditional metal roofing also with great effect.

The Caven-Williams Sports Complex at Boise State University, Boise, ID, demonstrates how curved metal roofing and its shape blends well with the mountainous terrain. MBCI's BattenLok standing-seam roof panel, with its classic pan profile and pencil ribs, installs easily on a curve.

Benefits of metal roofing include excellent hail and load resistance, high recycled content, long service life, and low maintenance costs.

Metal, like any roofing material, has its idiosyncrasies. Reputable manufacturers train and certify installers to use the product in a way that will not only provide beautiful aesthetics but also give the building owner a sense of comfort as they live and work in their buildings. When considering metal roofing, a great way to start is to visit with a certified installer in your area. Metal roofing offers some of the strongest warranties in the business so the value and security of a metal roof can be experienced for years to come after installation. It is also important to use a manufacturer with third-party quality-control accreditation to cement this value. The industry standard is the International Accreditation Service's Accreditation Criteria 472, Part B, commonly called IAS-AC472.

Walls of color

All of the benefits of using metal on roofs apply to wall applications as well. Perhaps more so than roofs, the profiling and color on a metal wall panel can set off each other with dazzling effects. Architects are finding more and more

that profiled metal mixed with other cladding materials such as stone and brick can create gorgeous and complex visuals. Although architects tend to favor strong horizontal lines, vertical installations can break horizontal lines into accent areas on a façade.

Insulation is important

With the increased focus on building energy efficiency, insulation uses more volume in a wall than ever before. This has created the need to use materials that provide high R-value for every inch of application to maximize interior space. The metal-construction industry has responded with development of a versatile line of products called insulated metal panels, or IMPs. These products use a foamed-in-place polyurethane core placed between two metal skins. Not only does the core provide excellent insulation of about R-7/inch of thickness, but it acts to tie the skins together structurally, creating a very strong composite panel. IMPs can span larger distances than their single-skin counterparts on roofs and walls.

The side joints of most concealed-fastener IMPs have dual tongue-and-groove joints. This configuration is ideal for application of sealants, which can be done in the field or even at the factory for most of these panels. The separate metal skins do not physically touch each other, avoiding thermal short circuits. Moreover, this joint configuration excels at resistance to water and air infiltration, making it even more energy efficient beyond its insulation properties.

The metal skins of IMPs are available in the same colors as single-skin panels, so all of the possibilities mentioned here are still in play. IMPs come in roof- and wall-panel options in either exposed- or concealed-fastener forms. Concealed-fastener roof panels are similar in implementation to standing-seam roofs and typically come in widths from 36 to 42 inches. Concealed-fastener wall panels come in a variety of vertical and horizontal flavors with various outer-skin profiles. One panel, Insulated R, has exposed fasteners and can be used as either a roof or wall panel. It has the outer skin of a traditional metal R-panel and should look familiar to everyone. The popular 7.2 panel is mimicked in an insulated form called Insulated 7.2, but the IMP version has concealed fasteners. One of the inherent advantages of an IMP is that the bonded foam core provides continuous support to the metal skin, allowing the panel to use flat skins while keeping its erector-friendly 42-inch width. Narrower panels are available. Besides paint, IMPs can be coated with exotic finishes, creating stucco-like looks or even natural-stone finishes.

Metal roofing is ideally suited to curved roofing. Because steel can be rolled very thin, it can go over curved surfaces without special forming or stressing.

If fire resistance is a requirement, most insulated-metal-panel manufacturers offer a fire-resistant panel. Instead of a foam-plastic core, this panel uses mineral wool. Although it only has about half of the insulation value as foam plastic, it offers the benefit of superior fire resistance and can be used in assemblies that provide a 3-hour rating. Furthermore, all of the color options of IMPs are still available.

Remember what we've learned from the neuroscientists and psychologists: Don't limit yourself to what you see around you; somebody else has already thought of that. Instead, use what you observe to create new possibilities. The examples given here are not meant to be constraints but instead open pathways into new applications for metal construction. Start down the path, but don't be afraid to venture off of it. CBP

Robert A. Zabcik, PE, LEED AP BD+C, is director, research and development, for NCI Group Inc., Houston. He has more than 20 years of building-design experience.

for free information, **CIRCLE 6**

and visit our digital magazine at www.cbpmagazine.com/digital/novdec2013 and click on the icon.

THE SMART CHOICE FOR YOUR BUILDING IS LG

LG
Life's Good

NEW MULTI V™ IV VRF SYSTEMS
offer exceptional advantages:

- Design flexibility
- Simultaneous heating and cooling
- Superior efficiency
- Low Total Cost of Ownership

LG air conditioning products are the smart choice you can feel good about today and far into the future.
With LG, it's all possible.

AHRI CERTIFIED
Packaged Terminal HP
AHRI Standard 310/380

U.S. GREEN BUILDING COUNCIL MEMBER

Find out what LG has for your clients at lg-vrf.com

For free information, circle 207

VRF Or Chilled Beam?

Refrigerant- and water-based hydronic systems are very popular solutions for new and retrofit construction. Both systems offer notable benefits.

John Vastyan, Common Ground

In Chicago, 635 active chilled beams were installed at 250 S. Wacker Drive, a 15-story, multi-tenant office tower with retail space on the first floor. The chilled beams consume only 30% of the fan and pump power of a fan-powered VAV system.

One of the challenges faced when constructing or renovating a commercial facility is choosing how to heat and cool the interior spaces. After all, energy rates play an increasingly important role in determining the cost of building ownership. Also, if the building is to be leased, the HVAC solution must pass muster in terms of comfort and cost of operation.

Two of the most efficient methods of heating and cooling commercial facilities compete frequently: VRF (variable refrigerant flow) and hydronic (water-based) systems that include chilled beams. Each of the methods has its strengths and weaknesses.

With VRF technology, heat is transferred directly to and from interior spaces by circulating refrigerant between a remote condensing unit and interior evaporators. Wall-mounted ductless or fan-coil ducted units are located in or near occupied spaces. Multiple evaporators (wall-mounted or fan-coil) can be connected to the system, allowing optimal temperature control and zoning.

VRF suited for many applications

VRF systems can serve a wide range of applications including multi-family units, hotels, nursing homes, restaurants, office buildings, condominiums, and schools where temperature-control zoning is needed. Depending on the manufacturer, capacities range from 2 to more than 30 tons of cooling/system, with the ability to connect as many as 48 indoor evaporators.

Space-temperature control in VRF systems is achieved by modulating the flow of refrigerant to each evaporator. Indoor-unit fan speed is determined by the difference between set point and control point (actual space temperature), according to Tim Young, PE, West Coast HVAC engineer for Fujitsu General America, Fairfield, NJ.

The heart of the system is a variable-speed compressor. The speed of the compressor—and thus the amount of refrigerant circulated—is varied to match the cooling loads of the indoor units. As zones are satisfied, compressor speed is reduced, thus saving energy and reducing noise. Also, compared with the operation and cycling of conventional, single-speed compressors, temperature control is vastly improved. Multiple thermistors in the indoor and outdoor units provide data to adjust and optimize compressor speed.

VRF systems, which can be coupled to dedicated outdoor air systems (DOAS), may be used to ensure air quality in conditioned spaces, according to Brendan Casey, commercial product manager for Fujitsu. High-performance filters, such as Apple-Catechin, ion deodorization, or MERV-13 help achieve high levels of IAQ.

"Most VRF indoor units can accept up to 10% fresh outside air directly to the indoor unit. Outside air is delivered by a booster fan that can be integrated with a CO_2 sensor and the indoor unit," he added. "By providing the precise amount of outside air required in each zone, VRF systems can contribute toward ensuring proper air quality in every zone." *(continued on p. 19)*

Introducing the Full Monty of Polyiso.

Hunter goes fully exposed with our new Xci 286 “ci” product.

Don’t look now, but Hunter Panel’s new Xci 286 is a thing of beauty. Designed for a wide range of exposed interior wall or ceiling applications, our new product is energy-efficient Polyiso manufactured to glass fiber reinforced foil facers. One side is reflective, the other not so much. This lets you choose which side to leave facing out. And because new Hunter Xci 286 has passed rigorous NFPA 286 fire testing, it can be left exposed on the interior of buildings without an additional thermal barrier. In other words, it’s sexy and we know it.

XCI
HUNTER
CONTINUOUS INSULATION

ENERGY SMART POLYISO

HUNTER PANELS • WWW.HUNTERXCI.COM • 888-746-1114

For free information, circle 208

2014

AHR EXPO®

NEW YORK CITY

THE WORLD'S LARGEST
HVACR MARKETPLACE

CO-SPONSORS ASHRAE AHRI

HONORARY SPONSOR HRAI

JANUARY 21-23
JAVITS CONVENTION CENTER
AHREXPO.COM/ATTEND15

For free information, circle 209

Chilled beams with injection-mixing technology were installed at the Penn Foundation mental health facility near Allentown, PA. Btus are removed from or delivered to enclosed spaces through the chilled beams, which have a capacity approaching 400 Btuh/sq. ft.

Different water temperatures are readily available for a variety of terminal units throughout the Penn Foundation facility from a single-pipe system because injection-mixing blocks blend supply and return water temperatures.

A technician inspects a Taco LOFlo mixing block installation at the Emergency Operations Center (EOC) on Joint Base Elmendorf-Richardson Air Force Base near Anchorage.
(Inset) The mixing block installation, which consists of a variable-speed injection circulator and constant-speed zone circulator, results in pump energy savings for the chilled-beam system.

Ductless indoor units eliminate risks associated with the build up of dust, mold, and allergens inside long duct runs. With VRF technology, even ducted units, which can be hidden in mechanical spaces or above suspended ceiling tiles, use significantly less duct than a standard central system, allowing easy cleaning and maintenance while preserving IAQ.

According to Barbara McCrary, PE, LEED AP BD+C, an associate with HHB Engineers based in Prattville, AL, VRF's ease of zoning also plays into another strength: the systems offer a wide variety of options for indoor air handling, such as ceiling cassettes, wall units, floor-mounted air handlers, and ducted units—all playing into an interior designer's ability to match equipment to space aesthetics.

Not in the sweet spot

On the other hand, experts agree VRF systems aren't well suited for surgical suite, lab, or clean-room applications where 100% outside air may be required, or those that may have high filtration requirements.

Process-cooling use or large gymnasiums and sports arenas would not be in the VRF sweet spot, either, because of the technology's lack of compatibility for use with high latent loads (humidity).

Detractors also point to refrigerant management concerns. As it is with all larger refrigerant-based systems, there's the need to be vigilant about containing toxic refrigerants. Refrigerants such as R-410a are hermetically sealed within a VRF system's compressor, refrigerant lines, and

Chilly in Chicago

In Chicago, 635 active chilled beams were installed at 250 S. Wacker Drive, a 15-story, multi-tenant office tower with retail space on the first floor. The first and top floors had dedicated HVAC systems, separate from systems serving the 2nd through 14th floors. The intermediate floors had a floor-mounted induction perimeter system and a constant-volume/variable-temperature interior system. Each of the floors has about 14,300 sq. ft. of rentable floor area (215,000 sq. ft. total).

A major renovation of the building included removal of the building's exterior walls and glass and gutting the structure to bare concrete. Building owners concluded that the existing induction units would have to be replaced.

The building's three-year renovation involved a change to 100%, low-e exterior glass, which significantly reduced the building's heating and cooling loads. Heat losses along the perimeter were reduced to less than 200 Btu/lineal foot, which made it possible to provide comfort conditioning of interior spaces with active chilled beams.

According to Jim Wilson, Windy City Representatives, Oak Brook, IL, manufacturers' representative for commercial HVAC products, there were many advantages, beginning with unobstructed visibility through the floor-to-ceiling windows along exterior walls. Also, there are no down drafts, floor space is gained, and the cost of custom enclosures for floor-mount units was avoided. Also, fan energy and noise levels were greatly reduced.

The developer approved installation of 635 active chilled beams, which now consume only 30% of the fan and pump power of a fan-powered VAV system (assuming that the average cooling loads are 70% of the full design cooling load).

The building's chilled beams have proven successful in operation. Many visits to the site by professionals keenly interested in studying system function have been conducted. One trip to the building took place when ambient temperatures were at –12 F, yet visitors were comfortable sitting next to exterior windows with no hint of down draft.

A Good Mix In Pennsylvania

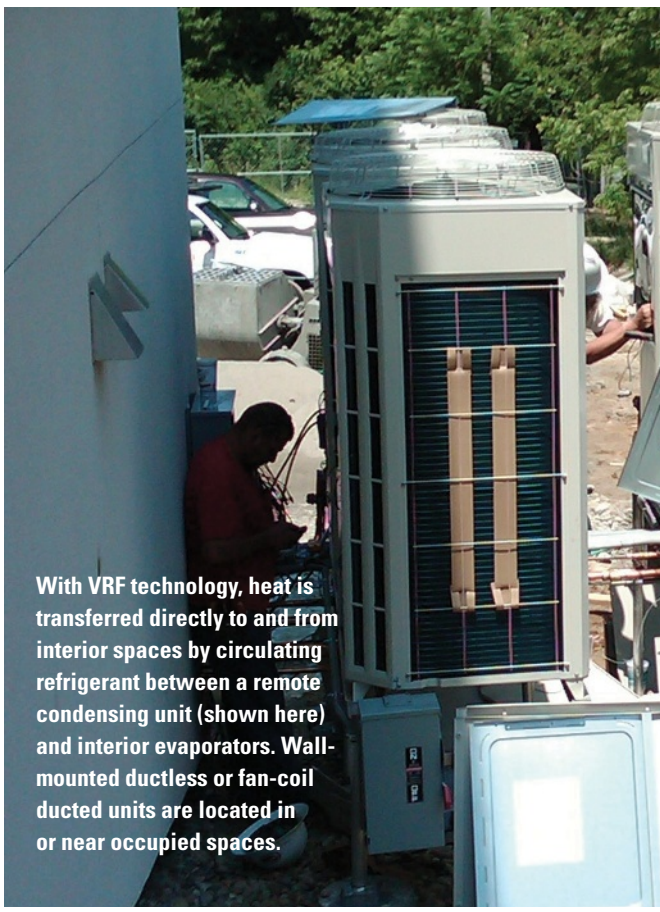
Chilled beams with Taco Inc.'s, Cranston, RI, LOFlo injection-mixing technology were installed at the Penn Foundation mental health facility near Allentown, PA. "I don't know that you'll find a smarter, more efficient mechanical system than the one installed at the new Penn Foundation building," said Glenn Snyder, PE, vice president, Lederach Associates, Lederach, PA.

The facility is a 36,000-sq.-ft., two-story addition to the foundation's mental-health facility. The building uses a total of 98 mixing blocks, 88 of which are coupled to chilled beams in the 1,000- to 6,000-Btu size range.

"Geothermal systems were installed," added Snyder. "But the real uniqueness of this job is the way Btus are removed from or delivered to enclosed spaces through chilled beams, technology with a capacity approaching 400 Btuh/sq. ft.

"Different water temperatures are readily available for a variety of terminal units throughout the facility from a single-pipe system because we're using the injection-mixing blocks that blend supply and return water temperatures," he said.

According to Lederach engineers, Penn Foundation will see a return on additional investment of the geothermal and chilled-beam system—compared with operation of conventional heat pumps—within 16 months.



With VRF technology, heat is transferred directly to and from interior spaces by circulating refrigerant between a remote condensing unit (shown here) and interior evaporators. Wall-mounted ductless or fan-coil ducted units are located in or near occupied spaces.

within the condensing unit and indoor units. Great care is taken to test for leaks during installation and routine maintenance check-ups.

McCrary also points to a final VRF design consideration. "VRF isn't well suited for facilities that will require modification to the system in the future," she said. "If a tenant plans to do interior remodeling, or if they anticipate growth that could lead to modifications of interior spaces, then VRF may not be the best option. Because of the way refrigerant lines are installed, the systems serve their purpose best when designed specifically to meet a building's existing needs.

Beam me up

An alternative to VRF systems is hydronic chilled-beam technology. First devised in Europe as a cooling retrofit for older, non-ducted structures, chilled beams achieve high energy efficiencies and superior comfort levels by combining forced convection with radiation. The systems are sure to grow in popularity now that ideally matched use of 100% dedicated outdoor air systems (DOAS) is better understood.

The use of chilled beams with injection pumping, using a single-pipe system, makes hydronics more competitive, from a first-cost basis, due to the reduced piping. Such a system is also self-balancing because its primary/secondary piping arrangement efficiently distributes Btus.

"With a chilled-water system it's easier and less costly to provide multiple zones of temperature control, particularly in larger buildings because multiple terminal units [chilled beams, heat pumps, fan coils] are linked to one set of central generation equipment with one piping distribution system," explained Greg Cunniff, PE, application engineering manager for Taco Inc., Cranston, RI.

A perennial challenge with HVAC systems is how to deal with humidity. Hydronic and refrigerant coils (such as with VRF systems) handle dehumidification differently. The biggest challenge with dehumidification is to remove moisture continuously for optimal comfort and also to reduce the risk of condensate formation where it's not wanted, such as in ceilings or behind walls where mold might grow.

Humidity problems can be mitigated by smart selection and positioning of cooling coils (best when facing airflow velocity). This can be difficult in DX or VRF systems where refrigerant-coil configuration and sizes are limited. This is not the case for hydronic coils employed for passive or direct dehumidification.

Chilled beams separate the functions of ventilation and dehumidification. The business end of chilled-beam systems is made of copper tubing bonded to aluminum fins. The "beam" is housed in a sheet-metal enclosure that's typically placed at ceiling level.

Little space required

"What makes this technology so interesting is its broad applicability for commercial structures and extreme energy and thermal efficiency," said Cunniff. "A key advantage is that a chilled-beam system requires very little ceiling space and height."

Another advantage is that water, the main transporter of thermal energy in a chilled-beam system, permits very high energy carrying capacity through pipes—a big advantage over larger, less efficient, forced-air conveyance. A forced-air system is, by its very nature, less efficient because of the inherent low density of air and the requirement of large ducts to transport Btus.

Because chilled beams are ceiling-mounted and do not use drain pans, chilled-water supply temperatures must be above ambient dewpoint. As a result, dehumidification, or latent cooling, is handled by a separate, 100% DOAS supplying dry, conditioned air to the space.

"The amount of outside air required to operate a typical chilled-beam system is much less than that needed for a forced-air system," added Cunniff. "A chilled-beam system typically needs only one air change per hour, using outside air to pressurize the space to prevent the infiltration of outside air. With a forced-air system, that need grows to eight to ten air changes of recirculated (and fresh) air to cool a space."

According to Cunniff, any system using air as its means of delivering sensible cooling in a space will create evaporative cooling from the increased air volumes and velocities in the space. With chilled-beam technology, however, reduced air flow means greater comfort since evaporative cooling is virtually eliminated.

Also reduced is the ceiling space typically required for ductwork. The amount of air circulated by the central system is also dramatically reduced, often 80% to 90% less than with conventional, all-air systems. The net result is lower energy consumption and operating costs.

Injection-mixing systems

Although radiant cooling and chilled beams reduce fan electrical-energy demand and con-

sumption as much as 10 times, when compared with traditional forced-air systems, pump energy demand doubles.

To address this, Taco designers devised an injection-mixing system to reduce pump energy. Coupled with chilled beams, significant energy savings are achieved by the company's LOFlo system. Low-temperature chilled water (40 to 45 F) is "mixed-up" to that required by a chilled ceiling panel or beam (55 to 60 F) for cooling.

"With the mixing system, circulation to and from chilled beams—instead of double that of conventional chilled-water systems—requires only one-quarter of the flow," explained Cunniff.

Compared with an all-air system, a chilled-beam/injection-mixing system reduces electrical-energy demand by 35% or more, thus reducing the transport energy to only 20% of the total HVAC system.

Depending on the application, VRF and chilled-beam technologies offer a variety of solutions to enhance energy efficiency and occupant comfort. Carefully weighing the options will ensure optimum results. CBP

John Vastyan is president of Common Ground, a trade communications firm based in Manheim, PA, that specializes in the hydronics, radiant-heat, plumbing and mechanical, geothermal, and HVAC industries.

VRF, Chilled Beam: Pros And Cons

VRF Pros

- Versatile: They heat and cool simultaneously.
- As zones are satisfied, compressor speed is reduced, saving energy and making these a green technology.
- Precise temperature control.
- Excellent results for buildings with multiple temperature-control zones.
- Well suited for retrofit applications where ductwork isn't feasible.
- Separate indoor air handling units help reduce the transfer of bacteria and germs within health-care facilities.
- Easy, inexpensive cleaning and maintenance.
- Wide variety of indoor units: wall mount, cassette, compact duct, floor/ceiling mounted, and high-static-pressure duct.
- Very high efficiency during shoulder season, part-load operation.
- Single-source supplier for condensing unit, air handlers, and integral DDC control.
- Quiet operation.
- Small footprint.

VRF Cons

- Not for surgical suite, lab, or clean-room applications where 100% outside air is required.
- Not best for buildings with high filtration requirements or for process cooling.
- Large gymnasiums and sports arenas aren't a good fit for VRF because of high latent loads (humidity).
- Refrigerants are toxic. System designers must take into account limitations set by ASHRAE Standard 15.
- Smaller zones limit the maximum size of condensing units.
- Not well suited for buildings that will require later modification.
- Higher initial cost compared with traditional HVAC (but lower cost of ownership).

Chilled Beam Pros

- Versatile: They heat, and cool simultaneously.
- Superb energy efficiency (especially with injection mixing). Water, the main transporter of thermal energy, permits very high energy-carrying capacity.
- High-efficiency, variable-speed chillers and geothermal heat pumps can be easily combined with chilled beams.
- Hydronic systems can take advantage of lower-cost gas heat in middle to northern latitudes of the U.S.
- Single-pipe systems with injection mixing make them competitive from a first-cost basis.
- With primary/secondary piping, systems are essentially self-balancing. Additional zones can be added easily in the future without having to rebalance the entire system.
- Ideally suited for multiple zones of temperature control, particularly in larger buildings.
- Superior temperature control. Hydronic chilled-beam systems take advantage of the thermal inertia of water vs. other systems that require air as the final Btu delivery medium.
- Systems require very little ceiling space and height.
- No down drafts. Extremely comfortable because chilled beams circulate less air and do not create drafts or evaporative cooling on occupants' skin.
- Super-quiet, essentially no sound.
- Lower maintenance. Older components can always be replaced with newer, more efficient units from multiple vendors.
- Very reliable. Highly skilled, certified technicians are not required.

Chilled Beam Cons

- The risk of condensate moisture must be dealt with continuously and definitively.
- Interconnected hydronic systems tend to be more complex and involved.
- Higher initial cost when compared to traditional HVAC (but lower cost of ownership).

Maintaining a hydronic boiler system is often easier than maintaining a steam boiler. With steam, daily boiler blowdown and water sampling are necessary to maintain safe and reliable operation.

With a hybrid system consisting of condensing and non-condensing boilers and an intelligent control system, the appropriate boilers come online as needed and are controlled to operate at optimum performance points, thereby maximizing efficiency and significantly reducing first cost and operating costs.

Operate An Efficient Hydronic Boiler

To achieve substantial energy savings with a hydronic system, carefully choose and configure the components.

Sean Lobdell, Cleaver-Brooks Inc.

Many facilities are replacing steam boilers with hydronic units to increase efficiency and decrease system operating costs. Before condensing-boiler technology was introduced, boilers operated at a maximum of 80% to 85% efficiency. Today, condensing hydronic boilers can operate at efficiencies in the mid to high 90s. Hydronic boilers can be used to either build heat or process hot-water applications.

Some facilities that convert from a steam boiler to a condensing one reduce their energy bill as much as 50%. A condensing boiler is more efficient than a steam boiler because it extracts latent heat and sensible heat from combustion exhaust.

Steam systems are prone to heat loss for several reasons. First, many systems use a steam-to-water heat exchanger, while others have direct steam-heating equipment. Energy is lost in these systems through steam traps and steam leaks, as well as radiant losses through the piping because steam systems run at a high temperature. Some facilities address the problem by adding more insulation around the piping. That minimizes heat loss, but it does not eliminate it.

To achieve a substantial energy savings with a hydronic system, a facility must take three steps:

- Initiate an outdoor reset schedule
- Implement a night/weekend setback scheme
- Operate the system at a greater system temperature differential than conventional systems, with lower return-water temperatures.

With outdoor reset, a facility manager enters the outside-air temperature into the control or building-management system, and the system adjusts to meet the need. When it's 0 F outside, 180 F supply water typically is required to maintain building comfort; however, when it's 60 F outside, only 120 F supply water may be needed to heat the building. So, the supply-water temperature can be scaled back, maintaining the same comfort level and saving energy.

The night/weekend setback scheme is easy to understand. If there are only a few people in the facility overnight or on weekends, a facility manager decreases the header temperature 10 to 20 degrees less than it would normally be. The manager sets the temperature to warm up the building an hour before people arrive.

While the night/weekend setback scheme is logical, setting a larger system temperature differential is not for most engineers. A 20-degree differential is commonly accepted as the industry norm. The heating coils and air handler are sized to meet a supply temperature of 180 F out, returning at 160 F. However, if the supply temperature stays at 180 F, but the returning temperature is decreased to 140 F, the building temperature stays the same, but the system only requires half of the water flow because heat load is directly proportional to the differential temperature and flow rate. If the heat load is the same, and the differential temperature is doubled, the flow rate is cut in half.

There are several benefits to this system. First, with less flow, a smaller pump or a variable-speed pump can be used, which increases electrical-energy savings. Also, if the supply temperature goes out at 180 F and comes back at 160 F, there is no condensing, and peak efficiency is limited to less than 90%. But, if

Connect with a higher level of confidence.

The commercial plumbing industry is discovering what residential builders have relied upon since 1972 — Uponor quality PEX-a pipe and reliable ProPEX® expansion fittings. With more than 15 billion feet of pipe and over 500 million fittings in service, Uponor has more than proven its powerful properties.

Uponor Advantages

- Most tested, trusted, listed and code-approved PEX-a for commercial
- Cost-effective solution providing faster installs and stable material costs
- Comprehensive offering of pipe, fittings and accessories
- Plenum rated, approved for fire-resistive construction
- Full-service design and technical support
- Uponorengineering.com — resource portal for CAD, Specs, Submittals, BIM, LEED®

COMMERCIAL PLUMBING APPROVED DISTRIBUTION PIPING

In fact, the only connection tighter than our ProPEX fitting is the one between Uponor and our partners. Uponor provides the expertise, products and partnership to help you differentiate and build your business.

www.uponorconvention.com
Connect with us in Vegas!
Uponor Convention
April 23-25, 2014

uponor

PEX-a PLUMBING

FIRE SAFETY SYSTEMS

RADIANT
HEATING & COOLING

PRE-INSULATED PIPE

For free information, circle 210

the system supply goes out at 160 F, on a reset schedule, and comes back at 120 F, the system will condense sooner with the larger delta-T. If the supply temperature goes out at 120 F and comes back at 80 F, the system is capable of condensing all of the time. A larger differential temperature with a condensing boiler can drive the system into condensing mode sooner, thereby reducing fuel consumption, in addition to saving electrical energy due to the smaller pump or reduced pump speed.

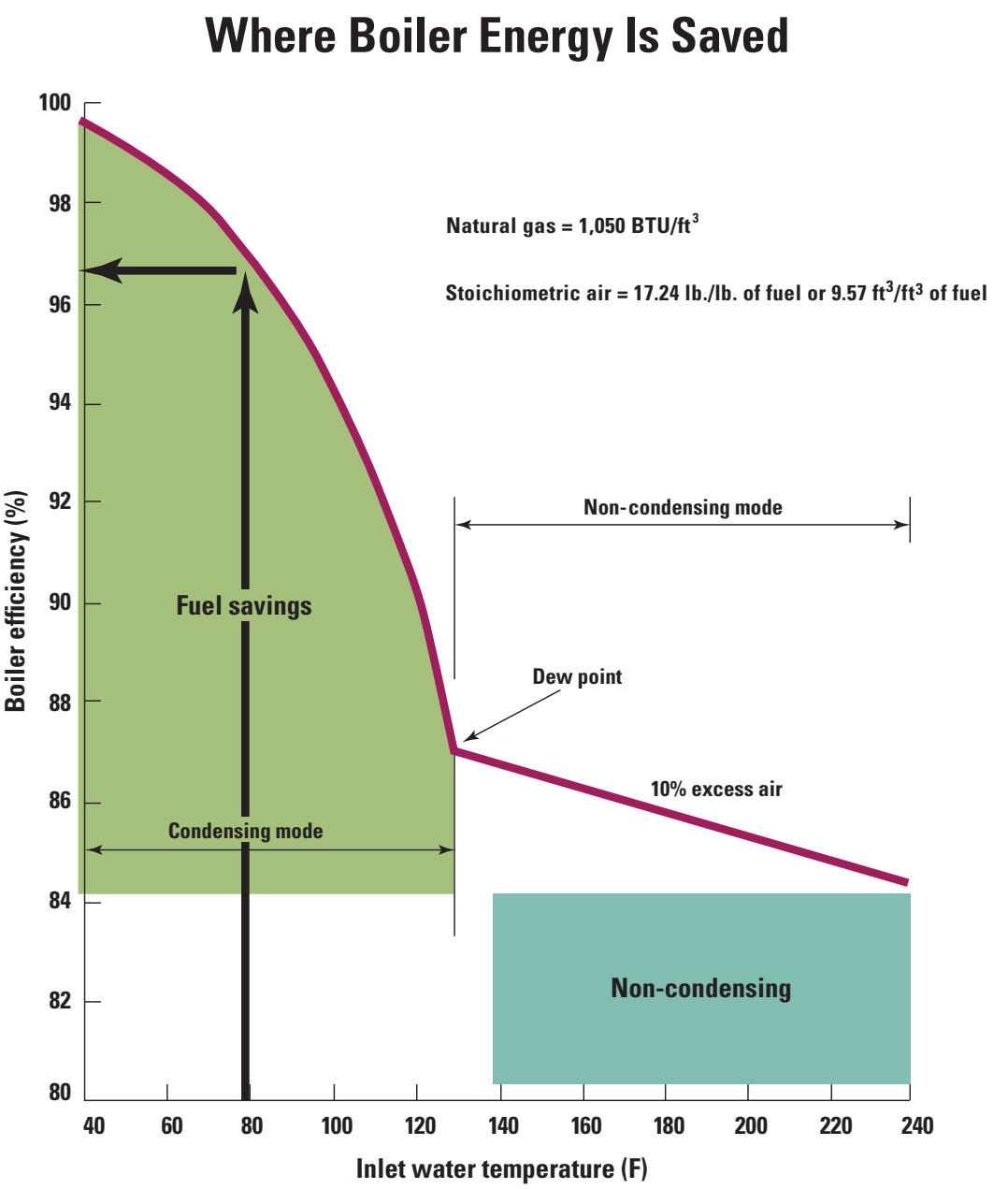
It is important to note that, under similar conditions, a non-condensing boiler cannot get much below 160 F with a 140 F return, because below 140 F, condensing will begin in the non-condensing boiler and eventually destroy it. Traditional hydronic systems were originally designed to protect the equipment, not provide maximum system efficiency.

In existing buildings, changing the temperature differential can be hard to do, but in new buildings it is easy, particularly with certain hydronic boiler controls. With select controls, pumps can be set to maintain a constant differential temperature. For example, if the system is set for a 40-degree differential temperature, and it drops to 36 degrees because the heat load decreases, not as much heat is extracted from the water, so the pump slows down. The water volume decreases when the pump slows down, which draws out more heat, returning to the desired 40-degree delta-T. In addition, slowing down the pump speed increases boiler efficiency, and thus reduces energy usage.

It is important to note that if a facility installs condensing boilers and operates them at a supply water temperature of 180 F out and 160 F back all of the time, the boiler never kicks into condensing mode, and the benefits of a condensing boiler are never fully realized. In fact, systems can become less efficient since many condensing boilers have a small water volume and will tend to have more cycling and purge losses. This scenario is all too common. Implementing the boiler control and piping system correctly is critical to achieving the maximum efficiency benefit with condensing boilers.

It is often advantageous to use multiple boilers in condensing applications. Multiple boiler systems are designed to provide proper system turndown to meet the peak load and minimum design load conditions, as well as provide sufficient redundancy. By installing multiple condensing boilers, a facility manager can stage the boilers depending upon heating load, which helps save fuel, compared with one larger boiler.

Along with multiple boilers comes the challenge of controlling them to operate at their peak efficiency. In contrast to traditional steam and non-condensing hydronic boilers, condensing boilers have an inverse efficiency-curve characteristic. This means that condensing boilers operate most efficiently at lower firing rates. A good control strategy will modulate multiple condensing boilers at lower firing rates to keep the system operating at peak efficiency.



As the system return water temperature decreases, the potential for fuel savings increases with condensing boilers.

Differences in condensing boilers

There are many different condensing hydronic boiler designs, and some are better than others. Published efficiency ratings do not tell the whole story. Heat-exchanger design, materials of construction, and effective heating surface area are important factors that should be evaluated when selecting a condensing boiler.

Many boilers are designed to meet dimensional and material constraints first, with operational performance and efficiency a distant second. While a small footprint and low cost are important considerations, operational efficiency and reliability are often compromised. In evaluating the design and selection of equipment for a new or upgraded hydronic system, the lifetime operating cost, or total cost of ownership, should be considered.

The most effective heat exchangers are counter-flow, or counter-current, arrangements and deliver the maximum amount of condensing possible. Cold return water is introduced at the end of the heat exchanger with the coldest exhaust gases while the hot supply water is alongside the hottest combustion gases. Some boilers will only condense at reduced firing rates due to limited effective heating surface (according to Btu input) and compromised heat exchanger design.

Certain boiler designs will also limit system piping options and, correspondingly, potential efficiency gains. Non-condensing designs, such as copper-finned water-tube or cast-iron sectional boilers, may be packaged with a secondary heat exchanger, typically made of stainless steel, to obtain condensing performance. These boilers cost less to manufacture, have very little water volume, and must be piped with a dedicated circulating pump and temperature control to ensure adequate water flow and temperature to protect

the heat exchanger. Operational efficiency and long-term reliability are compromised with these designs.

Condensing stainless-steel firetube boilers deliver more effective heating surface in a larger water-volume design. Besides delivering higher operational efficiencies, these provide the customer and engineer with more flexibility in system piping and variable-flow opportunities. Large-water-volume firetubes can be implemented in either primary pumping or primary-secondary arrangements. The firetube heat exchanger is conducive to counter-flow arrangement and maximizing the effective flue-side heating surface available. The large water volume inherent in firetube designs deliver low-flow tolerance, making them ideal for a variable-flow primary pumping system.

Hybrid system offers flexibility

Facilities such as hospitals, universities, and large commercial buildings often use a hybrid system that comprises condensing and non-condensing boilers. The greatest benefit of a hybrid system is its flexibility. With an intelligent hybrid system control, the appropriate boilers come online as needed and are controlled to operate at optimum performance points, thereby maximizing efficiency and significantly reducing first cost and operating costs, as well as providing the best total- lifecycle cost of ownership.

Hybrid systems are especially advantageous for facilities that operate in colder climates. From mid-December to mid-February, when the temperature is 0 F or below, it may be best for a building to run a non-condensing boiler. Given 180 F supply and 160 F return water temperatures in these conditions, there is little difference in the efficiency of a condensing boiler versus a non-condensing boiler.

Minimal maintenance

Maintaining a hydronic boiler system is often easier than maintaining a steam one. A boiler operator must closely manage the chemical treatment in a steam boiler. As the system evaporates water into steam, the chemicals and minerals stay inside the boiler and can become highly concentrated. As a result, the pH level can spike. Daily boiler blowdown and water sampling are necessary to maintain safe and reliable steam boiler operation.

A hydronic boiler is incorporated in a closed-loop system, so the chemicals that are added are significantly reduced. Unlike a steam system, very little make-up water is required. In a closed-loop hydronic system, there is less opportunity for undesirable constituents to enter the system, such as hardness, oxygen, and carbon dioxide. Typically, operators only have to evaluate the chemistry in a closed-loop system once a month and make necessary adjustments. A water meter on the make-up line is recommended to help determine if a leak is present and if adjustments to the chemicals are required.

Replacing steam boilers with condensing hydronic units can yield an attractive payback because of the latter's efficiency. The payback on a hydronic system is typically two to four years; however, it can be less, depending on how inefficient the existing boiler operation is. The payback on a hybrid system is often shorter in the case where a facility buys condensing boilers and a hybrid control system to supplement its existing non-condensing boiler. The energy savings for this type of retrofit typically is between 25% and 30%. Increases in efficiency directly correlate to effective control management that maximizes the run time of the condensing boilers while delivering the heat required to meet load demands.

Sean Lobdell is product manager, Cleaver-Brooks Inc., Milwaukee.

for free information, **CIRCLE 5**

and visit our digital magazine at
www.cbpmagazine.com/digital/novdec2013
and click on the icon.

Passive Fire Protection Safeguards Buildings

Less obvious than extinguishers and sprinklers, passive fire-protection systems contain fire and smoke.

Gregg Stahl,
Clark-Dietrich Building Systems

There isn't a universal product that will work for every firestop application, so it is important to select products that have been tested to meet safety standards for each specific situation.

When protecting commercial structures, where occupant rates can range into the hundreds and cost millions to rebuild, fire protection is uppermost on the list of concerns of builders, owners, and facility managers. It is crucial to look beyond active fire protection, such as extinguishers, fire detectors, and sprinklers, and pay equal attention to the less-visible, passive, fire-protection systems that work to contain fire and smoke at its point of origin. These components serve as barriers to confine and compartmentalize the spread of fire, smoke, and toxic gases.

Compartmentalization involves erecting barriers to divide a building into smaller units that will confine a fire. This step helps reduce risk and avoid reliance on any one element in a fire-safety plan. Compartmentalization is critical because it limits where the fire can spread. It also complements automatic sprinkler systems and reduces risks to occupants and property.

Fire-rated walls are an area of passive fire-protection design that helps minimize the spread of fire damage and increase occupant safety. Typically framed using light-gauge steel studs and tracks, these partitions, when properly installed with firestops, can provide the necessary protection.

Fire-rated-wall requirements

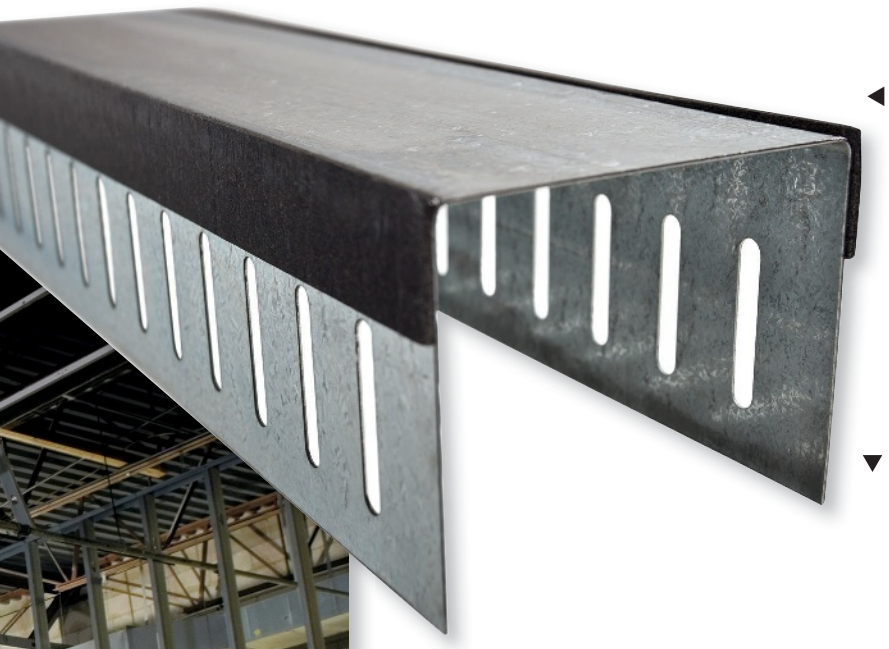
Walls (load bearing or not), floors, and ceilings can serve as fire barriers so long as they have a fire rating. Fire barriers are tested to the requirements of American Society of Testing and Materials (ASTM), West Conshohocken, PA, E119 (ANSI/UL263) and rated to resist the spread of fire for a designated amount of time, usually in hours.

There are several important things to remember about fire-rated wall assemblies and the role of steel studs in these systems. A fire-rated partition must adhere to the way the actual tested assembly was constructed, without any variation. Many of today's commonly used fire-rated assemblies were tested decades ago, and there is no requirement for retesting once an assembly passes the fire test. However, fire-rated assemblies using equivalent-gauge (EQ) steel studs are more likely to have current fire-testing reports, since the EQ studs are newer products and most of the fire testing has been performed in the past five years.

EQ studs have been fire tested or have gone through an extensive engineering evaluation to be listed in a UL fire-rated assembly. However, it's important to examine wall-assembly schedules and research the listed assembly's components to determine if the EQ studs meet the project's framing requirements.

It's a good idea to verify that product samples submitted for the project comply with the requirements of the fire-rated assemblies shown on the partition schedule. In addition, field verify that studs of proper thickness and profile are being installed according to the fire-rated assembly requirements. Steel studs are required to be labeled, making this a relatively easy visual inspection.

There are numerous laboratories, including Underwriter Laboratories (UL), Northbrook, IL; Intertek USA Inc., Houston; and Southwest Research Institute, San Antonio, that perform fire testing for a variety of building-assembly materials, including wall assemblies. This testing is



◀ **BlazeFrame from ClarkDietrich Building Systems incorporates a factory-applied intumescent strip that expands as much as 35 times its size, allowing contractors to simultaneously frame, seal against fire and smoke, and reduce airborne sound transmission to dynamic and static joints.**

▼ **Fire-rated assemblies using equivalent-gauge (EQ) steel studs are more likely to have current fire-testing reports, since the EQ studs are newer products and most of the fire testing has been performed in the past five years.**

designed to determine how quickly fire can raise the temperature to unacceptable levels and how building materials react in this situation. The results are fire-resistance ratings, which gauge the ability of a construction assembly to confine and isolate fire within a zone composed of fire-resistance-rated walls, ceilings, and floor assemblies. Fire-rated assemblies are tested in their entirety.

Passive fire stopping

Critical components of any fire-rated wall assembly are the specified fire-stopping materials used to seal openings and joints. When installed properly, these products combine with the other assembly components to prevent the spread of fire through interior wall systems.

Traditional materials used in passive firestop systems include sealants, sprays, mechanical devices, intumescent materials, and foam blocks or pillows. Total fire protection cannot be achieved with the use of a single product. Therefore, a system approach must be used when designing and specifying materials for fire-rated wall assemblies. It is not uncommon for general contractors to take responsibility for installing the firestop with their team of subcontractors.

There are four primary types of openings, or joints, associated with fire- and smoke-resistive rated assemblies to which tested firestopping systems may be applied:

- Joints—joints between fire-rated construction components (wall to wall, wall to floor, wall to ceiling)
- Floor perimeters—slab edge/exterior wall cavity (curtain wall)
- Penetrations—openings containing mechanical, electrical, structural, security, piping, or wiring
- Electrical boxes—where combined openings exceed 100 sq. in. in 100 sq. ft. of wall.

It is recommended that contractors only use products with fire-resistance properties and that are performance verified by an accredited third-party testing agency.

Let's take a closer look at three important components of passive-firestop systems—sealants, intumescent materials, and integrated firestop systems.

Sealants. Simple mastics, or sealants, are

Product Standards And Testing

ASTM E119: Fire test method, "Fire Tests of Building Construction and Materials," is conducted to evaluate the ability of a fire-resistive floor or wall assembly to perform its barrier function, resisting the passage of heat, flames, hot gases, and smoke in a fire situation.

ASTM E814: "Fire Tests of Through Penetration Firestops" is the complementary test to ASTM E119 that evaluates penetrations through a tested, fire-resistive (ASTM E119 tested) wall or floor assembly. The test involves a standard time-temperature curve, a hose stream test, and assigns ratings based on T (temperature rise) and F (flame occurrence through the firestop/penetration). The objective of specifying this type of system is to return the floor or wall to the compartment's original fire rating. An L (air leakage) rating can also be assigned. Air leakage simulates smoke movement through a penetration, measured in cubic feet/minute.

Firestop Resources

These websites offer insight into firestop technologies, processes, installation, and technical advice:

- **The International FireStop Council (IFC)**, Westford, MA, is a not-for-profit association of manufacturers, distributors, and installers of passive fire-protection materials and systems in North America. IFC's mission is to promote the technology of fire and smoke containment in modern building construction through research, education, and development of safety standards and code provisions. Learn more at www.firestop.org.
- **The Firestop Contractors International Association (FCIA)**, Wheaton, IL, strives for member organizations to be recognized throughout the construction industry as preferred quality contractors of life-safety firestop systems. Technical information, member lists, and more are available at www.fcia.org.

Understanding UL Firestop Terminology

- **Through-penetration firestop systems:** The first character defines the assembly being penetrated. The second set of characters further defines the type of assembly. The first number defines the penetrant type. The final three numbers complete the system number and are assigned sequentially as the listings are generated.

CA-J-1079, for example, means the listing is applicable for a metallic pipe penetrating through a concrete floor or wall. The actual listed system must be referenced for specific requirements.

- **Fire-resistive joint systems:** The first two characters define the type of construction joint. The second designation defines the movement capability of the system (S=static, D=dynamic). The four-digit number defines the joint width into various categories. Consult the UL directory for the specific listings.

HW-D-0034 means the listing is applicable for a head-of-wall joint that is dynamic in nature and is less than or equal to 2 inches. The actual listed system must be referenced for specific requirements.

commonly used to seal penetrations and construction joints. These products are available in various forms and chemical formulations, but the one thing they all have in common is that their performance is solely dependent on the system in which they are tested.

Firestop sealants in caulk, self-leveling, and spray grades are readily available in silicone, latex, and solvent-based products. They often require the addition of a backing material for support. Sealants are the most recognized group of firestop products due to their versatility.

BlazeFrame's factory-applied intumescent material eliminates elastomeric fire-proofing caulks and sprays. The cured intumescent tape eliminates VOCs and off gases associated with caulked spray fire proofing and over and under application associated with caulks and sprays.

Intumescent materials. Intumescent materials are firestop products that expand in volume when exposed to heat or flames that exceed a specified temperature. They are one of the primary groups of products used in applications where one of the assembly components will deteriorate or burn away during fire exposure or where surfaces are uneven and a tight fit is not possible. When the material expands, it closes the void that is created when the adjacent component melts or burns away, thus maintaining the integrity of the fire-rated assembly. Intumescent firestop materials come in many forms, from caulks to metallic collars with intumescent strip linings. Each product is designed for a specific purpose.

Integrated systems. One recent steel-framing-related innovation is the integration of intumescent firestop materials into framing members. For commercial and institutional projects, architects and specifiers are now using steel tracks manufactured with a factory-metered dosage of intumescent material applied to the track flanges in a controlled environment.

These products help building and design professionals specify product and assembly solutions for hidden and exposed aesthetic conditions where fire, smoke, and sound-resistance ratings are required. This makes it possible for contractors to provide single-source construction of wall assemblies and installation of joint protection while eliminating any trade overlap issues, common when installing traditional firestop materials. The integrated intumescent material can provide as much as 3 inches of movement and 3 hours of fire-rated protection.

A recent advancement in the area of integrated firestop systems is BlazeFrame from ClarkDietrich Building Systems, West Chester, OH. Designs using integrated systems such as BlazeFrame eliminate the need for caulks, sprays, drywall rips, and contour drywall "castle" cuts throughout the joint systems. The factory-applied intumescent strip expands as much as 35 times its size, allowing contractors to simultaneously frame, seal against fire and smoke, and reduce airborne sound transmission to dynamic and static joints.

These integrated firestop products are easier for contractors to install than traditional firestop materials. Contractors simply have to install the track member, which includes the intumescent tape, at the top of the wall. It eliminates the need to return and install intumescent caulking at a later time, thus eliminating multiple labor and material operations.

Selecting the right materials

Understanding that there isn't a universal product that will work for every firestop application is the first step to selecting the right materials. It is also important to select products that have been tested to meet applicable safety standards.

Selection of fire-protection materials and methods is an important decision that should be carefully considered early in the design stage. While passive fire protection can successfully prevent the spread of fire, redundancy is key for total fire protection. New technologies, such as integrated firestop systems, save contractors time and money and help ensure the confinement of smoke and fire throughout commercial buildings. When combined with active fire-protection systems, such as sprinklers, alarms, detection systems, and occupant education, these materials offer a safe, more balanced approach to protecting a building and its occupants. CBP

Gregg Stahl is the product-development director for ClarkDietrich Building Systems, West Chester, OH, a manufacturer of steel construction products and services across the United States and abroad.

Improved lighting provides comfortable living and general illumination at the Elim Rehab and Care Center. Over-bed fixtures have a reading-light feature and an LED nightlight.

Lighting Brightens Long-Term Care

An upgraded lighting design creates a welcoming facility for older adults.

As a faith-based ministry, administrators and staff of Elim Rehab and Care Center, Fargo, ND, recognize the health implications of an individual's spiritual growth and care. To complement these tenets, a $4 million, 18,500-sq.-ft. renovation and expansion was recently completed at the facility. Creating 20 private rooms and making rehabilitation services more accessible added to the center's welcoming atmosphere. St. Paul, MN-based Pope Architects provided master planning and architectural and interior design.

Transformation of the existing care center included thinking outside of the box, or in this case, the roof. The 8-foot lobby and dining-room ceilings were opened to 17 and 22 feet, respectively, to create expansive, open spaces. The new, two-story areas are flooded with natural light and enhanced with ceiling murals and wood details.

The first building phase also included converting shared rooms to private, adding a 20-bed transitional-care unit, and new dining, lounge, and therapy spaces to the campus. The design creates neighborhoods within the existing care center through decentralized dining and activity areas that build community among staff and residents. The 20 private bedrooms include kitchenettes, built-in casework, new furnishings, and windows that open. Private bathrooms were expanded, accommodating European showers with residential-style tile surfaces and light fixtures.

Using design cues interpreted from the community's Scandinavian influences and heritage, the architects ventured into design territory they had not previously incorporated in a skilled-care setting. Building on a Danish Modern design and given health-code restrictions and the desire for a home-like environment, the goal was to create a safe, unique setting to separate the Elim Center from more conventional long-term care facilities.

Renovation at the skilled-care facility centered on building community among staff and residents and included raising the dining room ceiling to take advantage of natural light.

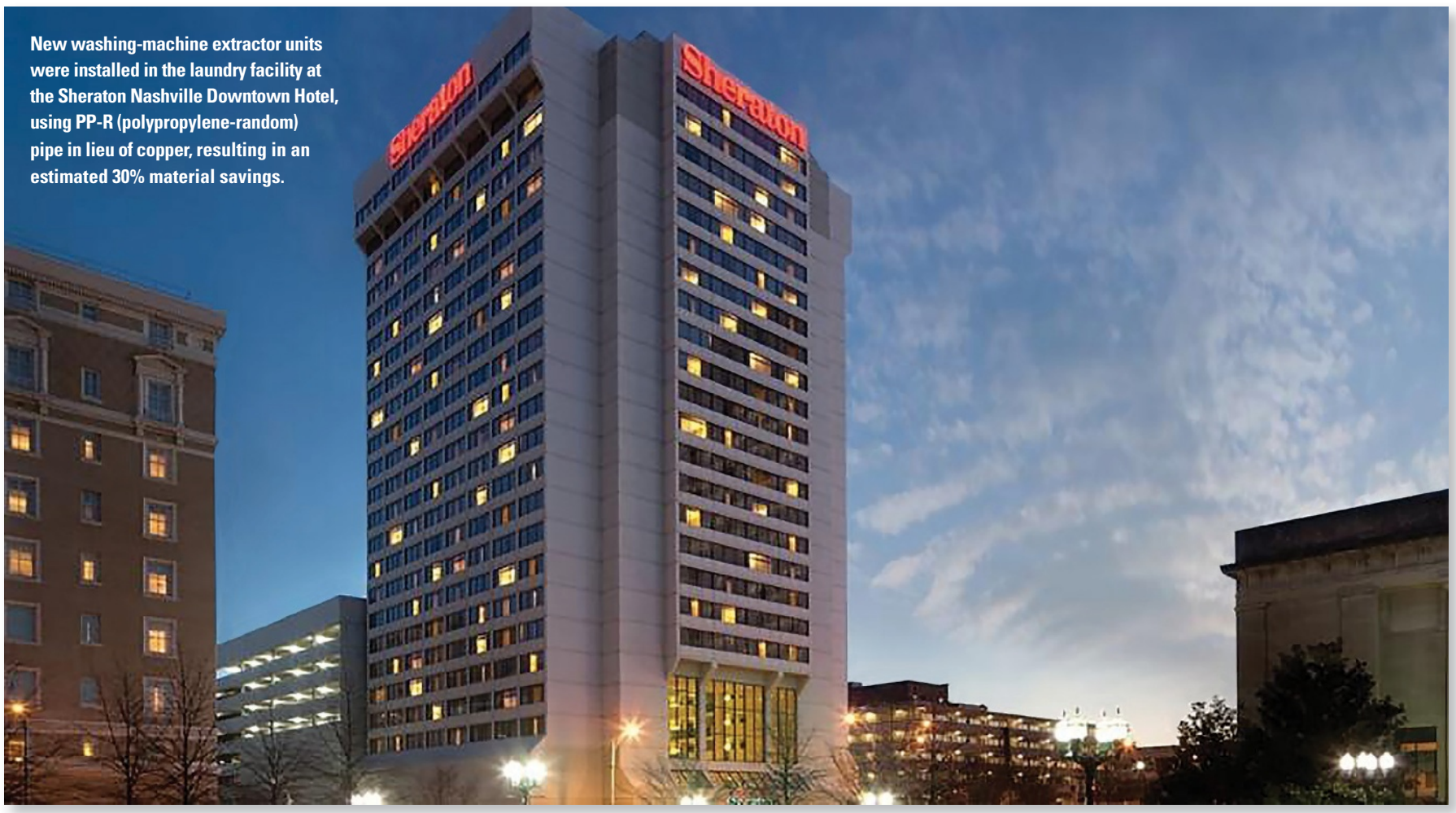
Studies show that quality and type of lighting have a significant impact on occupant health and comfort, especially those who spend long periods in artificially lit buildings. To address these issues, lighting in the newly converted private rooms was upgraded from one light source to three. The retrofit light sources include an updated, over-bed MedMaster MPWUD wall-mount ambient/reading luminaire that includes an LED nightlight on a separate control system, and a MedMaster Soft Step MSLR-H entry fixture. The luminaires, from Kenall Manufacturing, Gurnee, IL, also complement the Danish Modern style.

The improved lighting provides comfortable living and general illumination. The over-bed fixture is available in lengths of 24, 36, and 48 inches, with smooth, exterior lenses and antimicrobial finish. The LED nightlight aids staff and allows fewer interruptions in resident sleep when staff members make their nightly rounds.

The Elim Center recently won two awards for the renovation, the Environments for Aging 2012 Remodel/Renovation competition, Best in Category, Resident Rooms; and the Minnesota Chapter of the Society for the Advancement of Gerontological Environments, 2013 Design Showcase Citation of Merit. cbp

for free information, **CIRCLE 15**

and visit our digital magazine at www.cbpmagazine.com/digital/novdec2013 and click on the icon.



New washing-machine extractor units were installed in the laundry facility at the Sheraton Nashville Downtown Hotel, using PP-R (polypropylene-random) pipe in lieu of copper, resulting in an estimated 30% material savings.

Busy Laundry Facility Gets Upgraded

Music City high-rise hotel connects new washing equipment with PP-R pipe.

Nashville, also known as Music City, is home to the Grand Ole Opry, the Country Music Hall of Fame, and countless music venues where performers travel from all over the world to play, write songs, and sing tunes. With more than six million visitors to the city each year, the hotels in the area are constantly busy.

One hotel in particular attracts a lot of visitors with a rotating rooftop restaurant that offers spectacular views of the Nashville skyline. The Sheraton Nashville Downtown Hotel is the 12th tallest building in Nashville and is only blocks from the Nashville Convention Center.

For the Sheraton to accommodate a constant stream of guests, the laundry facility at the 28-story hotel must be in top shape to ensure all visitors have clean linens and towels. When the hotel's owners decided it was time to replace the existing laundry equipment to handle the facility's flow of dirty linen, they called Demand Mechanical, a Nashville-based contracting firm, to work on the project.

"We were approached by the owners of the Sheraton Nashville, who told us they were interested in buying new laundry equipment," said Jamie Hassett, chief officer with Demand Mechanical. "All the copper piping and every single joint was leaking and full of scale. We recommended that all the piping be replaced."

"The solenoid valves on the washing machines were failing and breaking the pipes. The equipment was just worn out," explained Rick Hollis, with Ferguson Enterprises Nashville, which serves as the local Aquatherm manufacturer's representative. Aquatherm's U.S. headquarters are in Lindon, UT.

30% savings over copper

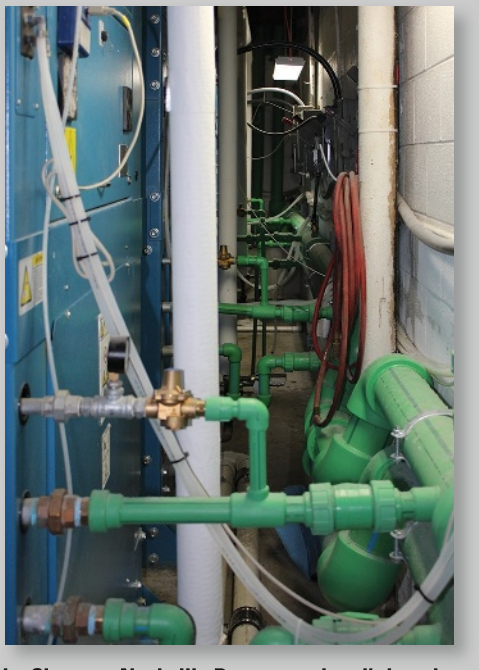
Hassett has worked with PP-R (polypropylene-random) piping for several years, and it was his first choice for the job. "We put together a proposal and ran the numbers for PP-R piping versus copper piping," Hassett said. "The material cost for PP-R piping came in at 30% less than copper."

"We do a good job of explaining the products we use to the customer," Hassett said, "and we were confident that PP-R piping was the right choice based on the application. We showed the customer a sample of the pipe, explained the history, and how long it's been in service. We spelled out the cost and speed of installation, and they were on board with it."

Going green

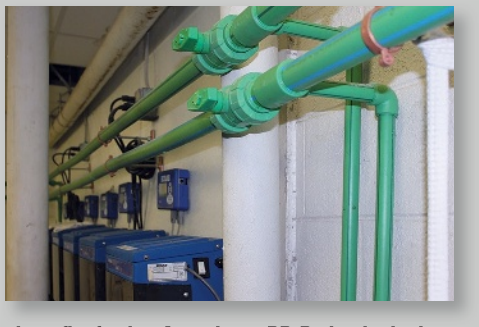
Aquatherm Green Pipe, which was specified at the Sheraton, is a pressure piping system that's designed for hot and cold potable-water applications. On this job, it helped solve problems the laundry-facility maintenance staff had been facing: It won't corrode or scale and is virtually leak proof when properly installed, according to the manufacturer.

The project took roughly a week to finish. The 1,500-sq.-ft. laundry facility, which normally operated for 12 hours a day, had to be completely shut down during that time. The Demand



In the Sheraton Nashville Downtown hotel's laundry facility, 4-inch main headers (hot and cold water) run along an exterior wall, with Aquatherm fusion outlets bored through them to feed each washer. With more than 400 valves and fittings, the PP-R pipe can typically transition to nearly any fixture.

When it was time to replace the existing washer extractor units in the laundry facility at the Sheraton Nashville, the staff decided it made sense to pipe these massive new Milnor washer extractors with a pipe designed to last 50 years.



One benefit of using Aquatherm PP-R pipe in the laundry facility is that the pipe has the ability to expand and contract more than metal pipe, so it is able to withstand the hydraulic force exerted on it by the valves in the commercial washers. Also, since the pipe has a natural R-value, even when 180-F fluid is flowing through it, it doesn't get hot to the touch.

Mechanical technicians installed 100 linear feet of 4-inch pipe with 15 connections, and 60 linear feet of 1-inch pipe.

Fusion outlets add to savings

The water mains ran from the floor through four penetrations and dropped down horizontally across the wall behind the machines. All of the branch lines were made with fusion outlets that were bored through the 4-inch main headers to feed each washer. Fusion outlets are heat-fused, saddle-type fittings that can offer significant labor savings and allow installers to simply drill into the supply pipe and then install the fusion outlet fitting into place wherever needed.

In addition, Hassett used a portable welding machine developed for stationary welding of pipe and fittings to weld and connect the 4-inch and 1-inch piping to the Milnor-brand laundry equipment. The welding machine is equipped with a hand crank to help pull the pipe and fitting together as they are heated on the iron to 400 to 500 F. For the 4-inch connections, the pipe and fitting were left on the iron for a minute, while the 1-inch connections took less than 10 seconds.

All Aquatherm pipes and fittings are made of Fusiolen PP-R, a low-friction material that is abrasion resistant and reduces pressure loss. The walls of PP-R piping systems generate less friction than other systems, eliminating the abrasion that can cause pinhole leaks and shorten the life cycle of other pipe systems, according to the manufacturer.

Problem-free operation

"The valves in commercial washers exert a lot of hydraulic force in the piping," Hassett explained. "A benefit of PP-R piping is that it has the ability to expand and contract better than the original copper. The engineer at the hotel was impressed, and the new leadership at the hotel loves it because it hasn't caused any problems."

Additionally, since the pipe has a natural R-value, even when 180-degree fluid is flowing through it, it doesn't get hot to the touch. "I like the fact that the pipe doesn't burn us if we touch it. That makes it easy to work around," added Randy Moore, director of engineering at the Sheraton. CBP

for free information, **CIRCLE 12**

and visit our digital magazine at
www.cbpmagazine.com/digital/novdec2013
and click on the icon.

Floor-to-ceiling windows grace many areas at the Elizabeth Seton Pediatric Center in Yonkers, NY, allowing children and the 650 staff members to connect with the outdoors.

Windows Deliver Healthy Light To Critically Ill Kids

The Elizabeth Seton Pediatric Center is a very special place, with extremely special residents. More than 130 children, each with a variety of serious medical conditions, live at this long-term-care facility.

After two decades of operating in Manhattan, the decision was made several years ago to construct a new, state-of-the-art facility in Yonkers, NY. After locating six wooded acres and consulting with numerous healthcare and facility design experts, ground was broken in 2010 for the premier medical center.

Opened in March of 2012, the 165,000-sq.-ft. facility was designed to enhance the lives of its residents and their visiting family members. The flow of the structure features a shamrock design of three floors of living spaces that are segmented into different "neighborhoods" to encourage a residential feeling. Each neighborhood includes a community room for activities and meals, and a family suite for overnight guests. The main level features 15 classrooms, a cafe, examination and medical rooms, plus a variety of therapeutic areas.

Adding light to life

One of the chief design challenges of the Seton Pediatric Center was to encourage light to flow into and throughout the entire structure to energize the residents and staff. Architects at Perkins Eastman, Stamford, CT, maximized the flow of light by specifying more than 770 energy-efficient Prism by Simonton windows from Simonton Windows, Columbus, OH, for the facility. Floor-to-ceiling windows grace many areas, allowing children and the 650 staff members to connect with the outdoors.

More than 700 energy-efficient windows encourage light to flow through a pediatric center to energize patients and staff.

"Windows play a critical role in the design of the structure," said Brian Harrington, senior vice president of development for the Elizabeth Seton Pediatric Center. "Our primary goal from the start was to have every one of our 137 children be able to sit in their beds and look out a window to see the outdoors. Natural sunlight is essential to setting a positive environment for these critically ill children."

Harrington believes that the Simonton windows installed in the four-story structure are a premier aspect of the building's aesthetic design and an important element of the LEED-certified building design. "We're extraordinarily pleased with the units installed throughout our facility," says Harrington. "They allow both our caregivers and residents to get a refreshed feeling on a daily basis."

According to Robert Nalaboff, project manager with Andron Construction Corp., Goldens Bridge, NY, the company that constructed the facility, the project architects created synergy within the building's systems to help achieve LEED certification. "High-performance mechanical and control systems, low-consumption electrical and plumbing fixtures, solar-reflective roof systems, and high-thermal wall and roof construction all contribute to this green building effort," said Nalaboff.

Teamwork for the children

The management team at Seton Pediatric Center feels positive about the builder and contractors who installed the windows and built their facility. "We have a special relationship with Andron Construction," said Harrington. "Those folks built this building with the greatest of care and love.

They appreciate what we do for these children, and we're proud to have worked with them on this project."

Following ground breaking, construction moved swiftly for the facility. As the Andron Construction team embarked on a progressive build, they were challenged by the facility's design.

"The complexity and scale of this structure required it be built in sections," said Nalaboff. "This meant we needed specific windows onsite at differing times. This necessitated a timely and efficient sequence of window orders and deliveries. The team at Norandex Building Products [Hudson, OH] and our Simonton sales representative worked hard with us to coordinate the multiple window types and shipments."

In total, the design plans for the structure required Simonton to produce 493 picture, 77 casement, and 202 no-hinge casement windows. Each custom-made window features ProSolar low-e glass with an argon gas fill and white-vinyl frames. The Super Spacer system and triple-glazed, 1-inch-thick insulated glass units help ensure premium energy efficiency and that every window meets Energy Star requirements.

Oversized custom windows for the facility range in size from 35 sq. ft. to 104 sq. ft., larger than found on most projects. Additionally, due to the location of the structure near the Hudson River, strong wind considerations (especially from the north elevation) had to be anticipated. Simonton StormBreaker Plus integral fin and jamb were used in the creation of most of the windows to add support to the units.

"Installation of windows this size, four stories up, requires planning," said Nalaboff. "We had to develop a site-specific installation plan which addressed production goals, safety, lift equipment, and manpower. Skilled tradesmen who understand the plan make this process work. At the height of construction on this facility, it was typical for us to have 150 union tradesmen onsite across all our divisions."

Nalaboff related that the overall height of the structure, the multiple terraces, and the contour of the building's façade presented unique challenges for this job. "The greatest challenge for this project was the project schedule," said Nalaboff. "With an overall duration for construction limited to 21 months, and with the owner having scheduled occupancy of the new facility with the children from their Manhattan location, the completion date had to be maintained.

"Several significant secondary challenges were also present. On top of traditional sophisticated mechanical and electrical systems found in medical facilities, highly specialized medical equipment and their supporting IT infrastructure were designed into this state-of-the-art facility. These systems were located in patient rooms, examination rooms, and common spaces. This design offers patient mobility throughout the facility, but required extensive medical-gas piping equipment, and IT outlets. The answer to ensuring medical and mechanical equipment functioning as designed was multi-pronged. Numerous 'mock-ups' were constructed in conjunction with traditional construction tools to achieve the goal."

According to the project manager, significant planning allowed the project team to overcome the construction challenges safely and efficiently. "The bottom line is that everyone worked smoothly together because we had the end goal in mind of creating an outstanding facility for the children," said Nalaboff.

A window on the future

Named after patron saint Elizabeth Seton, who was the first American-born saint, the non-profit Elizabeth Seton Pediatric Center now boasts impressive features that help make life just a bit easier for the long-term residents at the facility.

"Our air infiltration system turns over the air in our entire facility every 10 minutes, taking out 99.8% of the particles in the air," said Harrington. "From a medical perspective, this is of great assistance to the needs of the children. However, that's not something they see or think about every day."

The pediatric skilled-nursing and rehabilitation healthcare organization was founded and run by the Sisters of Charity. The center provides care for medically fragile children from birth to 21 years of age who have a broad range of complex conditions including orthopedic problems, spina bifida, blindness, speech and hearing impairments, brain injury, cerebral palsy, premature birth, congenital heart disease, chronic lung disease, chromosome disorders, metabolic disorders, respiratory disorders, failure to thrive, muscular and neurological diseases, and immunodeficiency syndromes.

Outdoor play areas, a therapy garden, gym, chapel, and aquatic therapy centers are all popular locations for the children and meet the needs for the challenged residents. However, since the state-of-the-art building was built with the residents' needs in mind, oftentimes what they don't actually see helps them the most.

"The sunlight pouring into their classrooms through the windows, or the views of the wooded hills from their beds, that's something that really has a major impact on their lives," said Harrington. "We are truly pleased that the windows installed in our facility allow the children and staff to feel connected with the outdoors and refreshed every day." CBP

for free information, **CIRCLE 14**

and visit our digital magazine at
www.cbpmagazine.com/digital/novdec2013
and click on the icon.

In total, the design plans for the structure required Simonton to produce 493 picture, 77 casement, and 202 no-hinge casement windows. Each custom-made window features ProSolar low-e glass with an argon gas fill and white-vinyl frames.

Oversized custom windows for the facility range in size from 35 sq. ft. to 104 sq. ft., larger than found on most projects. Additionally, due to the location of the structure near the Hudson River, strong wind considerations had to be anticipated.

The overall height of the structure, the multiple terraces, and the contour of the building's façade presented unique challenges for job, but the greatest challenge was the 21-month project schedule.

Biotech Incubator Features Lightweight Panels

Progressive, modern design of an R&D center employs precast panels with integral interior wall framing.

What do you get by combining renowned architects, a burgeoning biotechnology district, and a sustainable enclosure product?

When it's in New Orleans, the result is a memorable, graceful building that complements the city while pointing to a brave, new future: the 65,500-sq.-ft. New Orleans BioInnovation Center designed by the locally based, award-winning architecture firm, Eskew+Dumez+Ripple, in collaboration with Seattle's NBBJ. Built on a revived brownfield site with a design that garnered a LEED Gold certification, the new facility has attracted attention for its unique incubator model, strong architectural presence, and people-friendly features, including a courtyard with walkway and fountain.

The BioInnovation Center blends a large expanse of impact-resistant glass curtainwall in its southwest entry façade with the crisp lines of what looks like honed limestone. In fact, the walls are Slenderwall, from Easi-Set Industries, Midland, VA. The thin-profile precast panels are backed by steel framing that doubles as perimeter stud walls. The primary transparent façade is fitted with a slatted sunscreen to reduce solar heat gain and protect against windborne projectiles during storms. Most important, the precast panels and sunscreens combine to ensure comfortable daylighting and consistent interior temperatures for the building's occupants in laboratories, offices, and the 100-person conference center.

A beneficial enclosure choice

The choice of precast panels was an easy one for the architects, said Mark Ripple, AIA, LEED AP, principal of Eskew+Dumez+Ripple. "For the cladding we wanted a durable, hurricane-proof, and opaque system, and the precast panels chosen would allow a fine architectural surface and yet be lighter in weight than traditional, heavier precast," said the designer. "The system has a lower carbon footprint than alternatives, and the structures supporting it can be lighter,

The 65,500-sq.-ft. New Orleans BioInnovation Center, designed by local architecture firm Eskew+Dumez+Ripple, in collaboration with Seattle's NBBJ, was built on a revived brownfield site with a design that garnered a LEED Gold certification. A slatted sunscreen reduces solar heat gain and protects against windborne projectiles during storms.

photo credit: Blakely Photography

which is important in our soft soils of Southern Louisiana."

The precast-panel product was also recommended by the general contractor, according to Brian Stock, national sales manager for Easi-Set. The architects also desired certain cantilever conditions that did not lend themselves to a heavier panel, he adds.

"The architects wanted something substantial but lightweight, and they did not want to use EIFS," an exterior insulation and finish system, Stock explained. "Also, the windows were designed for a floor-to-ceiling window profile, which the panels could accommodate with specially designed attachments at the floor line."

In ways big and small, the hybrid precast and light-gauge steel cladding system befitted the architectural sensibilities, as well as the needs of the client, added J. Matt DeVoss, whose company, Jackson Precast Inc., of Jackson, MS, produced the system. "It provides a high-end, very architectural finish that can't be as easily achieved and controlled with many other materials, such as GFRC," said DeVoss. He added that the product also stands up to cost analysis for many budgets and project schedules.

"We practice unabashedly modern architecture in a city known for its historicism and architectural scenography," said Ripple. "So, for us, the challenge is simple but the resolution is hard: Do buildings that are both of their place and their time." That means using time-tested means for dealing with the hot, humid climate with powerful storms and wind-driven rains, while also creating a building that reflects the social character of the city.

In broad terms, that meant wrapping an L-shaped layout of labs, offices, and public facilities around a landscaped interior courtyard—a classic New Orleans conceit—that passersby can glimpse through the main façade. The courtyard is one of several amenities for the building's laboratory researchers and biotech executives, who tend to work long hours and desire social areas for breaks and spontaneous collaboration. Another exterior feature is a fully integrated rain cistern to modulate and control the significant rainwater of the area on the site, which the architects used in functional and aesthetic features such as plant watering, indoor brownwater, and exterior fountains.

Developing the façade design

The four-story building was conceived as a very public, glazed main façade with a covered public entry meant to suggest a classic New Orleans balcony condition. An aluminum sunscreen above the entry elegantly curbs the sunlight entering the building. The secondary exterior walls are more private and controlled, for research spaces, with punched windows.

To evaluate the building performance and LEED points, the project design team—which included the Atlanta-based MEP engineers Newcomb & Boyd and an enclosure consultant—used envelope modeling to study solar heat gain and bulk moisture drive into the building. The studies showed excellent performance for the precast portions, and that even with 68% glazing, the main entry façade was only the equivalent of 18% glass, thanks to incorporation of the sunscreen and the highly insulated precast.

The precast panels helped ensure a consistent and controlled building envelope, added Easi-Set's Stock. "The sections were delivered from the plant and site-applied with closed-cell foam insulation that also acts as a vapor barrier, which contributes to the air- and water-tightness of the structure," he explained. That means the panels simultaneously deliver cladding and 3 1/2 inches of closed-cell foam insulation (R-21),

For the cladding the architects wanted a durable, hurricane-proof, and opaque system. The Slenderwall precast panels chosen allow a fine architectural surface and are lighter in weight than traditional, heavier precast, allowing the supporting structures to be lighter as well.

with a shop-applied, continuous air barrier and moisture protection behind a perimeter stud-frame wall.

The precast panels offer other benefits as well. First, said DeVoss, was matching the architectural precast used on the first floor with the 110 panels above. "Trying to match architectural precast with another material like GFRC almost never works. But with this manufacturing process, we use the same mix to pour the face out," he said.

Then, on the jobsite, precast panels were ideal for the tight project site on the main transportation artery of Canal Street in the city's downtown core, which limited crane access. Traditional, heavy precast elements, that weigh 78 pounds/sq. ft., require a larger crane; with Slenderwall—at only 28 pounds/sq. ft.—

Precast panels were ideal for the tight project site on Canal Street in New Orleans' downtown core, which limited crane access. At only 28 pounds/ sq. ft., compared with 78 pounds for conventional precast panels, a smaller crane could be used.

a smaller crane could be used. The lighter panels took less time and space to hoist, too, and the lighter weight also saved the State of Louisiana on costs for related structural framing, moment connections, and foundations. In addition, the panels would meet the local hurricane code, which references the Miami/ Dade County standards for wind and impact resistance.

Further, the precast assemblies are cast with a steel-stud frame during manufacturing, said DeVoss, whose company won first place for the 2012 Gulf South Precast/Prestressed Concrete Association's "Top Projects" awards. That frame is mounted outboard of the floor edge. Then it is used after erection to receive drywall and other interior finishes, eliminating the cost of a traditional knee wall and opening up an additional 4 inches of available floor space around the entire perimeter.

Incubator for Bayou science

The state-funded biotech incubator project was commissioned by the state agency, Louisiana Economic Development, as one of three incubator sites in New Orleans, Baton Rouge, and Shreveport. In New Orleans, said Z Smith, director of sustainability and building performance at Eskew+Dumez+Ripple, the biotech business incubator benefits from its proximity to Louisiana State, Tulane, Delgado, Xavier and other higher-education science hubs.

"The tenants at the New Orleans BioInnovation Center are developing huge projects and valuable startups, and the idea is to provide an attractive facility at attractive rates so we can keep this intellectual capital here in the state of Louisiana," says Smith, who is also on the adjunct faculty at Tulane School of Architecture. "Inside these walls, we've designed successful generalized facilities that would work for a wide selection of start-ups and bigger companies that need 10,000 sq. ft. of cleanroom and labs—and anything in between."

The project shows the design potential and benefits of lightweight precast concrete exterior panels integrated with finish-ready stud framing. Like the biotech labs contained within the elegant building, the application and design demonstrates a high level of execution. CBD

for free information, **CIRCLE 10**

and visit our digital magazine at www.cbpmagazine.com/digital/novdec2013 and click on the icon.

For free information, circle 213

LEDs Shine In Vegas

GE energy-efficient lighting upgrades a major Las Vegas player.

Las Vegas Sands Corp., which includes The Venetian and The Palazzo hotels, underwent an extensive energy-efficient lighting upgrade.

Las Vegas Sands Corp., Las Vegas, in an effort to curb environmental impact at its resort and meeting properties, recently underwent an extensive energy-efficient lighting upgrade, part of its Sands ECO 360° Global Sustainability program. The lighting upgrade involved installing Cleveland-based GE Lighting's LED lamps and compact-fluorescent lighting in meeting spaces and guest suites at The Venetian/The Palazzo Las Vegas. As a result, the business has seen its total annual lighting bill decrease by about $2 million.


GE Lighting's LED and CFL lamps were installed in more than 7,000 guest suites.


After the lighting upgrade, savings of about $2 million a year in lighting costs are reported by the Sands Corp.

The company first invested in GE's LED and CFL lighting in 2010 at The Venetian/The Palazzo, where 7-W PAR 20 LED lamps and 10- and 15-W CFL bulbs were installed in more than 7,000 guest suites. The hotels' meeting rooms were fitted with more than 5,700 Energy Smart BR30 LED lamps. The 12-W lamps, with a rated life of 25,000 hours, require fewer change outs and use 108 fewer W/fixture than the 120-W bulbs they replaced.

Through this move, the resort's annual electricity use was cut by nearly 4.1 million kWh, saving more than $400,000 in annual lighting costs.

"The team at GE Lighting impressed us with the range of products that help us conserve even more energy without sacrificing the high aesthetic standards that our meeting and convention customers expect of a five-diamond resort and meeting center," said Norbert Riezler, senior vice president and chief procurement and sustainability officer at Las Vegas Sands. "Globally, Las Vegas Sands aims to lead the industry in environmentally sensitive meetings and business practices, and GE's innovative lighting products are helping us reduce our impact on the environment."

The resort's efforts are in line with the hospitality industry's widespread adoption of energy-efficient lighting. According to a 2012 report by global management-consulting firm McKinsey & Co., New York, the LED adoption rate is expected to surge in the hospitality sector from a 9% market share today to about 45% by 2016 and 80% in 2020. This is significant, as the U.S. Environmental Protection Agency's, Washington, Energy Star program states that U.S. hotels spend approximately $4 billion on energy each year. Energy use is the fastest growing operating cost in the industry and accounts for roughly 6% of operating costs.

The hospitality industry also has demonstrated an increasing drive toward environmental sustainability recognition. In 2008, 18 hotels earned LEED certification from the U.S. Green Building Council, Washington; by 2012, there were 198 with the designation. Energy-efficient lighting can be extremely helpful in acquiring such certifications.

Additionally, guests increasingly are paying attention to the environmental sustainability of hotel operations, according to a recent TripAdvisor.com survey. Of 700 U.S. travelers last year, 57% said they often make eco-friendly travel decisions.

The Venetian/The Palazzo, in conjunction with the Sands Expo and Convention Center, is the first property on the Las Vegas Strip to receive LEED Gold Certification for Existing Buildings. Collectively, the buildings represent one of the largest LEED-EB-certified buildings in the world.

"GE Lighting aims to lead innovation in our industry, offering our customers the highest-quality lighting solutions, while helping them advance environmental stewardship goals," said Heather Wilson Coode, hospitality-marketing manager for GE Lighting. "Las Vegas Sands Corp. has demonstrated a measurable commitment to protecting the environment with energy-saving practices, and GE's BR30 LED lamps will help the company make an even bigger impact." cbp

CertainTeed Gypsum's GlasRoc exterior sheathing provided protection against moisture and mold during construction at Arkansas Children's Hospital.

Curved To Promote Healing

Curvable gypsum board adds to the inviting, healing spaces in an evidence-based hospital design.

The 250,000-sq.-ft. South Wing of Arkansas Children's Hospital in Little Rock was designed by the city's Cromwell Architects Engineers Inc. The firm's architects and designers took an evidence-based design approach that focused on creating an intimate, visually appealing interior environment that would accommodate the needs of patients and their families while encouraging patient comfort and healing.

Design features include a mix of soothing colors, curved walls, ceiling clouds, several large murals, and ample daylighting. The design called for an atrium spanning the third and fourth floors and opening to a large rooftop garden and playground. Along with appealing to the eye, each design component contributes toward the function of creating a positive experience for patients.

"The South Wing was holistically designed around evidence-based healthcare design principles, and every design component had a purpose," said Nancy Bounds, ASID, EDAC, AAHID, senior interior designer for Cromwell Architects Engineers. "This facility wasn't just designed to look pretty."

It was important for the design team to specify high-performance building materials that would respond well to onsite fabrications and contribute to the functionality of the design after installation. Walls were particularly important. Curved walls add fluidity and playfulness. Specifications for gypsum-board products that could bend easily to accommodate the numerous curved walls, while providing necessary performance functions, such as enhanced fire and mold resistance, were paramount.

The project team specified products from CertainTeed Gypsum, Tampa, FL, for a variety of locations in the project. On the exterior, GlasRoc sheathing Type X provided protection against moisture and mold during construction. One-inch-thick GlasRoc Shaftliner Type X was selected to meet the fire-resistance requirements of the four-story building's elevator shafts, while moisture-resistant GlasRoc tile backer Type X met the tile-backing needs in the facility's restrooms. To provide mold-resistant interior walls throughout the facility, the design team specified M2Tech Type X and Type C moisture- and mold-resistant gypsum board. For enhanced impact in the emergency-room area, M2Tech Extra Abuse Type X gypsum board provides moisture and mold resistance.

"The wide variety of enhanced gypsum board products now available makes our job easier," Bounds said. "The mold resistance and fire ratings offered were especially important to us in this project. Abuse-resistant gypsum board was specified where carts might hit the walls and damage the substrate. Heavy wall coverings might address this problem; however, a weak substrate is going to crumble on impact no matter what material is covering the walls."

Once the project began, 35,000 sq. ft. of 5/8-inch exterior sheathing and 100,000 sq. ft. of glass curtain-wall panels were installed.

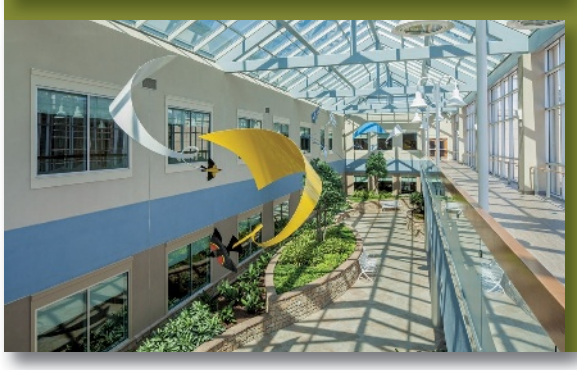
"The GlasRoc sheathing installed well, and helped shield us from any bad weather as we worked inside," said Robert Massery, owner of Suspended Systems II, Conway, AR, which installed the building's exterior skin, interior walls, and ceilings. "Our general contractor did a good job of making sure the inside was well-protected, so it wouldn't get wet at any time. However, it was good to know that the M2Tech gypsum board we were installing was mold-resistant in case moisture had gotten inside."

GlassRoc sheathing provided long-term protection from weather exposure using CertainTeed's embedded glass-reinforced gypsum technology, a combination of paperless gypsum surface and glass mats that are fully embedded into a water-resistant gypsum core.

On the inside, Massery's crew installed 53,000 sq. ft. of 1-inch-thick shaftliner in the elevator-

Curved walls add fluidity and playfulness in the children's oncology unit. The underlying gypsum board curved at the rate of the studs with no wetting.

Abuse-resistant gypsum board was used in areas where walls might take impact from carts or gurneys.



An atrium spans the third and fourth floors and opens to a large rooftop garden and playground. Each design component of the hospital contributes toward the function of creating a positive experience for patients.

shaft wall systems and 2,202 sq. ft. of 5/8-inch-thick tilebacker in the building's restrooms. Forming the interior walls called for 800,000 sq. ft. of M2Tech Type X gypsum board and 100,000 sq. ft. of 1/2-inch-thick M2Tech Type C gypsum board. The M2Tech technology gives the board moisture resistance and enhanced protection against mold growth using a water-resistive core and a moisture- and mold-resistant paper facing. The product also has a specially formulated core for fire-resistance ratings to 4 hours, making it an important component in the South Wing's fire-rated wall assemblies. The product conformed easily to the curved-wall design for the second floor.

"Usually, you'll have to wet a gypsum board a bit to get it to bend into a curve, but we didn't have to do that with the M2Tech board," said Curt Schichtl, general project superintendent for Suspended Systems II. "We just laid the board down on a stud, screwed it off as we went along, and it just bent at the rate of the studs. We did a good job with it."

Cromwell Architects Engineers won a Design Excellence Award from the American Society of Interior Designers, Washington, for its design of the South Wing's interior.

"The patients and their families love the new facility because of its look, recreational areas, and the extra accommodations we added to patient rooms, so parents or other relatives can sleep there, too," Bounds says. "It's made a huge difference to the families. What's made me the most happy is hearing about the children who pass through there and say, 'I don't want to go home. I like this place!'" CBD

for free information, **CIRCLE 11**

and visit our digital magazine at
www.cbpmagazine.com/digital/novdec2013
and click on the icon.

Foam Cools Fruit Harvest

EPS roof and wall insulation keep a storage facility for cranberries cool, costs down, and the environment safe.

Foam-Control EPS roof insulation was installed on the Badger State Fruit Processing cold-storage facility housing 200 million pounds of Wisconsin cranberries.

Foam-Control Plus+ architectural-grade perimeter and under-slab EPS insulation maintain R-value. Their permeability allows trapped moisture to escape.

The state of Wisconsin grows about 52% of the world's cranberries. Badger State Fruit Processing, Pittsville, WI, processes 200 million pounds of the fruit, about 45% of the Wisconsin crop. Butch Gardner, company owner and the state's largest independent cranberry grower, needed a new cold-storage facility to house the latest crop and still have room for growth.

Mark Konrardy, Badger State plant manager, chose Denver-based ACH Foam Technologies' EPS roof and wall insulations for the new facility. "The owner challenged me to find a way to keep our operating costs on the new cold-storage facility low while achieving demanding temperature-control requirements," he explained. "Our choice to use Foam-Control and Foam-Control Plus+ architectural-grade EPS insulation evolved out of my research into materials that would meet performance, cost, constructability, and environmental criteria. We wanted to make sure it wouldn't break down underground—it has to hold up for years of operation and not become damaged by moisture."

Almost 2-million board feet of Foam-Control flat EPS roof insulation and more than a half-million board feet of Foam-Control Plus+ architectural-grade perimeter and under-slab insulation were used in the construction of the cold-storage facility.

Compressive strength concerns were addressed by using Foam-Control Plus+ 400 (40 psi) for the freezer area and Plus+ 250 (25 psi) for the remainder of the perimeter and under-slab areas. "I also researched the performance of rigid insulations when exposed to moisture," said Konrardy, "and found that EPS has a higher permeability than XPS. That extra permeability allows trapped moisture to escape. This is a good thing, because it maintains its R-value better."

Because he was also interested in environmental considerations, Konrardy wanted to find an insulation that contained recycled content and didn't leach toxic chemicals into the ground water. "This was a great find for me: that Foam-Control insulations contain up to 15% recycled content in the code-approved labeled EPS. This is the highest percentage of recycled content of all the rigid-foam insulations on the market," he explained. "I also know that EPS is easy to recycle and doesn't contain leachates."

The tipping point was cost savings. R-value to R-value, EPS is 10% to 20% less expensive than other rigid-foam insulations. "My decision wasn't that difficult," Konrardy added. "I was able to find a material that satisfied the criteria Mr. Gardner set out for me and satisfy my desire to make our plant greener."

ACH Foam Technologies provides an interactive online calculator so contractors can compare the costs of EPS, ISO, and XPS. "All you have to do is plug in the R-value you're aiming for and the square footage of the project," explains ACH's Tom Huempfner. "The calculator instantly converts all the values and gives contractors an instant side-by-side comparison of EPS, ISO, and XPS for flat versus tapered roofing insulation." cbp

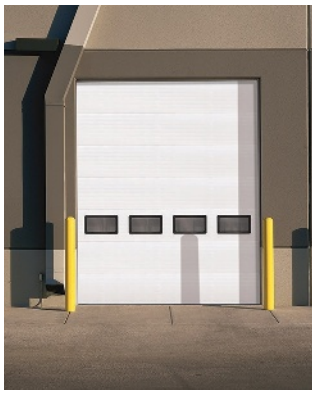
Automated exterior shades

An automated exterior-shading system is fully programmable and uses infrared and radio-frequency technology. Shades can be programmed with timed events. Said to be compatible with screened windows, options include a retractable, louvered screen for solar control and natural ventilation or a traditional shade with slats for solar control, privacy, and improved U-value. The system is integrated into a window, not an add-on, and is available in 19 colors. Self-correcting tracks provide alignment.
Marvin Windows and Doors
Warroad, MN
Free information: Circle 111

Automated exterior shades:

- **Programmable**
- **Provide solar control**
- **Integrated into windows**

Sectional overhead door



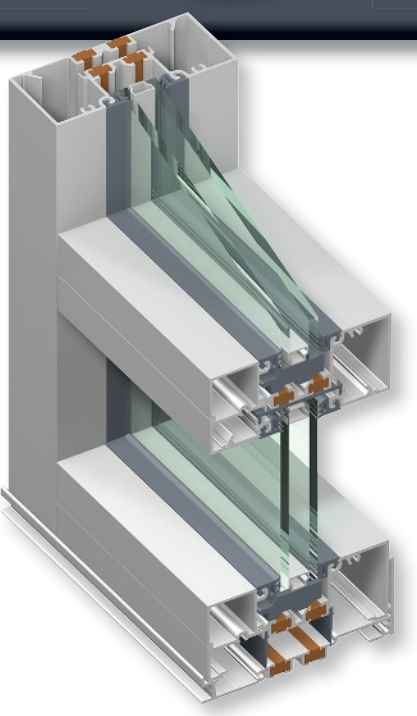
Thermacore AP 850 is a 3-inch-thick, insulated sectional door said to deliver an R-value of 26 and a U-value of 0.038. The door uses CFC and HCFC-free polyurethane insulation and a dual-barrier, tongue-and-groove-joint profile to reduce heat and cold transfer. Window options include insulated tempered glass. For applications with security needs, the door can accommodate extra locks, a sensing edge, and a cable-failure device.
Overhead Door Corp.
Lewisville, TX
Free information: Circle 112

Architectural glass

A 40-page catalog, detailing the company's line of architectural glass, includes photography of 40 building projects and descriptions and performance data for a range of products. Information is included on Solarban 67 and Sungate 600 glass. The catalog is available in print and electronic versions.
PPG Industries
Pittsburgh
Free information: Circle 113

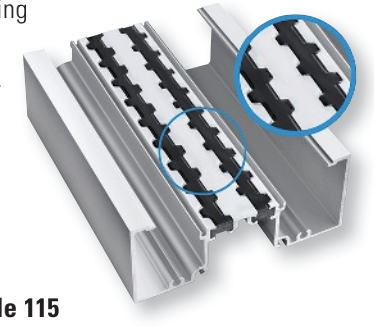
Vinyl windows, patio doors

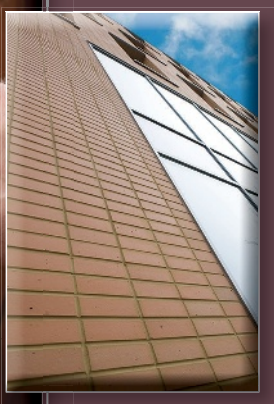
The 2500 series all-vinyl windows and patio doors includes single-hung, single-slider, casement, awning, and direct-set picture windows to provide a consistent look for a project. Made with PVC, the products use modifiers and UV stabilizers for colorfastness. Hardware is color-coordinated to the windows. A variety of colors is available.
Visions Windows & Doors
Medford, WI
Free information: Circle 114



High-performance storefront

TU24000 series high-performance storefront system features an additional pour and debridged thermal-break pocket to reportedly withstand the most demanding climates and conditions. The dual pocket is said to dramatically improve thermal performance by decreasing U-factors and increasing condensation-resistance factors. Azon's Lancer mechanical lock provides long-term resistance to shrinkage of the polyurethane barrier. Recommended for low-rise buildings and the lower floors of high rises, the glass is centered in the 4 1/2-inch-deep system for a pleasing exterior and interior reveal. Framing is compatible with the company's medium- and wide-stile Therml=Block doors.
Tubelite Inc.
Walker, MI
Free information: Circle 115





Steel-backed brick cladding system

Corium cladding system is an engineered façade that combines the natural beauty of genuine brick with fast-track installation. The system uses brick tiles with a profile that mechanically fixes to an HPS200 coated and galvanized receiver tray. Each tray interlocks to form a drainage plane, which is mounted to the engineered framing system. Brick tiles are clipped into place. The system is a fully engineered rainscreen assembly with rear ventilation that provides an open cavity, uninterrupted air/moisture barrier, meeting ASHRAE 90.1 for maximum thermal and moisture performance. The system can be mounted at any angle to achieve dramatic finishes or overhead to create soffits and ceilings.

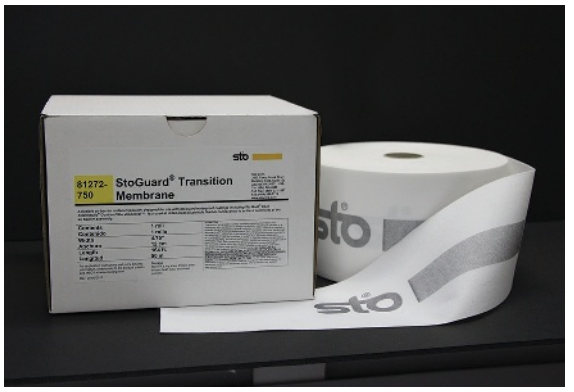
Corium is suitable for use with a range of substrates, including light-gauge steel framing, concrete, structural steel, masonry, wood frame, continuous-insulation systems, and insulated metal panels. At 14 pounds/sq. ft., the material provides lower overall wall costs. Several sizes are available.

Telling Architectural Systems
Cranston, RI
Free information: Circle 50

EDITORS' CHOICE

Corium cladding system:

- **Engineered façade combines brick and steel track**
- **Brick tiles are clipped into place**
- **Mounts at any angle with a range of substrates**



Flexible air-barrier membrane

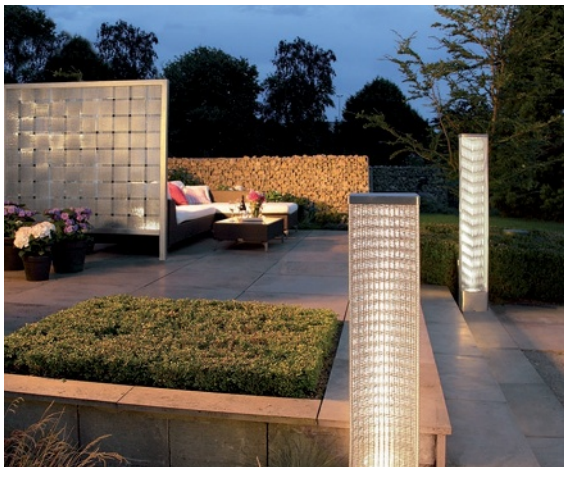
StoGuard Transition membrane is a flexible air-barrier membrane for use on vertical, above-grade wall construction over properly prepared concrete, concrete masonry, glass mat gypsum sheathing, and exterior or exposure I wood-based sheathing. Applied without special tools, the membrane is a fully adhered product and is said to not tear or lose effectiveness while in service. Applications include a wide range of static and dynamic joints. It is compatible with all StoGuard vapor-permeable or vapor-impermeable membranes.

Sto Corp.
Atlanta
Free information: Circle 51

Insulation modules

Architectural insulation modules are said to combine the aesthetics and convenience of curtainwall construction with energy savings. The thin-profile materials increase thermal resistance in space-limited situations and allow slim wall constructions with high R-values. The modules delay or eliminate the need for triple-glazed windows and have long-term insulation performance, mitigate condensation risk, and provide immediate integration in classic frame systems, such as unitized, structural glazing, and stick. Modules are available in finishes including glass, aluminum, stone, and building-integrated photovoltaics.

Dow Corning Corp.
Midland, MI
Free information: Circle 52



Woven wire mesh

A line of contemporary woven wire-mesh products includes those for furniture, wind and privacy screens, balustrades, banisters, and lighting elements. Made of stainless steel, the raguhner line includes Angulo and Curvata, three-dimensional balustrades; Lucenta Wave privacy screens; and Lumenisk light columns.

W.S. Tyler
Mentor, OH
Free information: Circle 53

Outdoor waste receptacles

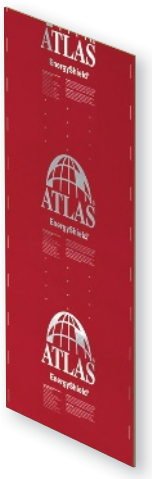
Artria outdoor waste receptacle is a large-capacity, triangular-shaped metal container that appears lighter than its volume. The line has a vandal-resistant design and can be chained and padlocked into place. The containers have a formed-concrete base.

Magnuson Group
Woodridge, IL
Free information: Circle 54

Insulated sheathing

EnergyShield polyiso insulated sheathing is part of Atlas Wall CI board for type V construction. Products include EnergyShield, Rboard, EnergyShield Pro, and EnergyShield Pro2. The Type 1, Class 1 board is laminated between two foil facers that are reflective on one side and non-reflective on the other. EnergyShield meets or exceeds ASHRAE 90.1-2010 as a component of a whole-building air-barrier system. It can also be used as a water-resistive barrier.

Atlas Roofing Corp.
Atlanta
Free information: Circle 55



Design studio

Design Studio online resource portal includes downloadable files for 3D design in AutoDesk Revit and SketchUp formats. Files include wall, floor/ceiling combinations, and shaftwall assemblies designed with the company's products.

Georgia-Pacific Gypsum
Atlanta
Free information: Circle 56

Coating system

Allura coating system is a fluoropolymer coating featuring a matte, low-gloss finish combined with a subtle, aggregate texture. Factory coil-coated, the coating is said to be highly durable and may be applied to a number of substrates, including aluminum, galvanized steel, or Galvalume coated steel.

Centria
Moon Township, PA
Free information: Circle 57

Roof retrofit system

Retro-Master roof-replacement solution is a re-roof system said to provide every element needed to install a code-compliant, sloped-metal roof over an old or failing roof. Elements include structural framing, subframing, and the company's roof panels. The system can reportedly be installed over any existing sloped or flat roof and over any existing material such as metal, asphalt, built-up, or membrane. Installed without removing the existing roof material, the system includes a warranty for weather tightness and a 45-year finish. The system is 100% steel and contains as much as 30% recycled content. Several cool-roof-compliant colors are available.

Metal Sales Mfg. Corp.
Louisville, KY
Free information: Circle 58

Mineral-wool insulation

UltraBatt mineral-wool insulation is said to provide thermal comfort, fire protection, and sound control in one. In exterior walls, it is reported to conserve energy with an R-15 in 2x4 construction and R-23 in 2x6 walls. Made with 70% pre-consumer recycled content, it is fire resistant to temperatures higher than 2,000 F. Sound insulation provides an STC rating of 30 in 2x4 walls with a single layer of gypsum board on both sides. It is available in standard wood-stud and steel-stud sizes.

Thermafiber Inc.
Wabash, IN
Free information: Circle 59

Durable paint

WeatherXL silicone-modified polyester paint is weather resistant and is said to provide flexibility to improve the application process. The product has an enhanced silicone resin system for maximum hardness. Applications include metal roofing and metal wall panels. The paint is available in a wide color palette including solar-reflective formulations to meet Energy Star and LEED qualifications.

Valspar Corp.
Minneapolis
Free information: Circle 60

EDITORS' CHOICE

High-speed hand dryer

Jet Towel high-speed hand dryer uses two jets of air to reportedly dry hands in 10 seconds. The device is quiet at 61 dB, while still featuring an increased air speed of 237 mph. The unit's drain tank collects water from users' hands. Designed to align with a sink countertop, the dryer decreases the distance users travel from a sink. At the recommended mounting height of 37 inches, the dryer conforms to all ADA regulations.
Mitsubishi Electric Cooling & Heating
Suwanee, GA
Free information: Circle 61

Jet Towel:

- **High-speed hand dryer**
- **Uses two jets of air**
- **Aligns with sink countertop**

Smart thermostat

EcoInsight thermostat has more than 125 settings. It calculates room comfort by aggregating data such as time of day, solar load, brightness, humidity, and occupancy patterns. The unit uses a ZigBee transceiver to create a wireless network that communicates with building-control devices and the EcoCentral Virtual Engineer command center. It can also be integrated with BACnet control devices and equipment.
Telkonet Inc.
Milwaukee
Free information: Circle 62

Low-profile air curtain

LoPro series air curtain mounts to the front of a walk-in freezer, automatically turns on when the door is opened, and creates a seal across the door opening until the door is closed. The curtain is available with or without NSF certification and has standard voltage selections, a variety of colors, and sizes that range from 25-inches to 12-feet wide.

Mars Air Systems
Gardena, CA
Free information: Circle 63

Dehumidification

FreeDry unit combines dehumidification with a low-temperature desiccant rotor for moisture removal. The unit uses waste heat from an ice plant. The heat pump and multiple-scroll air-conditioning compressors are said to allow the unit to maintain indoor humidity levels under extreme outdoor conditions.
Munters Corp.
Selma, TX
Free information: Circle 64

Stainless-steel boiler

Patterson-Kelley's P-K Sonic boiler has a stainless-steel heat exchanger with two segments working together to help optimize efficiency and improve reliability. The design allows the boiler to operate at 96% efficiency with ultra-low emissions. A small footprint allows replacement of existing boilers with no special rigging.
Harsco Corp., Industrial Group
Camp Hill, PA
Free information: Circle 65

Weather-sealed curb

Vibro-Curb mount for rooftop units has vibration-dampening spring isolators. A flexible, 9-inch counter flashing provides a weather seal. Vertical limit stops eliminate excessive movement from wind loads and seismic activity.
Thybar Corp.
Addison, IL
Free information: Circle 66

Sensor-operated flush valves

M·Power line of sensor-operated flush valves includes standard flow, high efficiency, dual flush, and pint flush. Valves are said to require little or no maintenance and can contribute to LEED credits. All valves have vandal-resistant stop valves, a shatterproof polycarbonate lens over the sensor eye, and meet ADA requirements.
Moen Inc., Commercial Division
North Olmsted, OH
Free information: Circle 67

Spare-parts app

An industrial refrigeration spare-parts app provides information on the company's valves to determine a kit number to secure a spare part or spare-part kit, including those for inspection, repair, or overhaul.

Danfoss
Baltimore
Free information: Circle 68

Towel dispensers

Diplomat roll-towel dispensers house and conceal other dispensers from a variety of manufacturers to maintain a washroom's design aesthetic. With a dual-curved, stainless-steel design, the line's accessories provide a sleek and elegant finish to a commercial restroom. Combination towel/waste units keep dispensers hidden.

Bradley Corp.
Menomonee Falls, WI
Free information: Circle 71

Storm louver

SCV501 Storm Class louver is a wind-driven rain louver that protects air-intake and exhaust openings in exterior walls from direct water penetration, even in extreme weather. The unit's design incorporates a drainable head member and 5-inch-deep, vertical rain-resistant blades. Made of extruded aluminum, the product is available in a wide variety of architectural finishes.

Airolite
Schofield, WI
Free information: Circle 72

Steel grille

XSV-845 8-inch steel grille is FEMA 320 or 361 rated for violent weather such as hurricanes and tornadoes. With applications in storm shelters and safe rooms, the product is AMCA certified and is said to withstand loads of 260 to 300 psf.

Pottorff
Fort Worth, TX
Free information: Circle 69

Engineered-polymer piping

ProPEX EP 45-degree elbow is available to facilitate directional changes in piping systems. Available in 1 1/2- and 2-inch sizes, the products use the company's ProPEX connection that creates a strong, durable bond. The 2-inch EP multiport tee features three 1-inch outlets to provide a solution for flush bank installations with fewer fittings and connections. A series of reducing tees and additional multiport tees also is available.

Uponor North America
Apple Valley, MN
Free information: Circle 70

Network dome camera

SNP-6200RH video-surveillance IP pan/tilt/zoom network dome camera features 20X optical zoom, full HD image capture, and built-in IR LEDs for nighttime viewing at distances to 328 feet. The camera's IR function illuminates objects by focusing the beam as the camera zooms, resulting in reportedly clear imaging in total darkness. Noise filtering and WDR technology provide an S/N ratio of 60 dB for image quality and dual H.264/Mjpeg compression algorithms ensure effective bandwidth use. The ONVIF-compliant product is weatherproof to IP66 standards and is IK10 vandal resistant. Applications include open space/perimeter locations, airports, parking garages, and retail and industrial areas.

Samsung Techwin America
Ridgefield Park, NJ
Free information: Circle 99

SNP-6200RH:

- **Video-surveillance IP P/T/Z network dome camera**
- **Built-in LEDs for nighttime viewing**
- **ONVIF compliant**

Wireless motion detector

STI-V34700 wireless, indoor motion detector sends a wireless radio signal to a four-channel voice receiver when the sensor detects movement. The receiver offers ten tones/tunes and 53 selectable words in English or Spanish. Four tones/tunes/words can be programmed to identify which area requires assistance. The unit has a range of 1,000 feet between sensor and receiver. As many as four transmitters can be used with the same voice receiver.

Safety Technology International Inc.
Waterford, MI
Free information: Circle 100

Building automation

The company's i-Vu web-based BACnet building-automation system offers full support for Comfort Network and i-Vu Open systems. Users keep their existing CCN (Carrier Comfort Network) system while expanding the control system now or in the future. Once i-Vu combines with the CCN or BACnet system, users can manage their entire Carrier control system through a single user interface.

Carrier
Farmington, CT
Free information: Circle 101

Notification appliances

TrueAlert ES intelligent notification appliances continuously send a status report to a Simplex 4100ES fire-alarm control panel. A pass-fail signal is sent to the panel when audible and visible devices are tested. Device information and test history are stored, and the panel can generate reports. The devices provide a specific warning alert when repair or maintenance is needed.

SimplexGrinnell
Westminster, MA
Free information: Circle 102

Tablet control

WebCTRL software version 6 allows users to control WebCTRL systems from iOS, Android, and Windows-based tablets. Features include a user interface with large buttons, user-friendly icons, and simplified alarm management. A multi-trend display provides historical data, along with controls, to diagnose building system performance.

Automated Logic
Kennesaw, GA
Free information: Circle 103

Wireless-switch firmware

Firmware Version 2.10 for the Smart-Sensor EnOcean Access-point (SSEA) product provides added functionality, including the ability to transmit as well as receive. Features include RPS wireless switches, including single rocker, dual rocker, and keycard variants, which can be learned; door/window sensors using the 1BS message type; and ability to repeat EnOcean wireless packets. Files are company installed and do not require any user action.

Reliable Controls
Victoria, British Columbia
Free information: Circle 104

Access control

A catalog includes information on electronic locks and smart padlocks. The company brings electronic access control and audit tracking to mechanical locks by removing the lock's cylinder and replacing it with an electronic cylinder.

CyberLock Inc.
Corvallis, OR
Free information: Circle 105

LED monitors, dome cameras

Two LED monitors and three compact outdoor dome cameras are additions to the Advantage line. The cameras use a 960H sensor to provide 650 TVL resolution. VDC-242 is an electronic day/night camera for applications where there are drastic lighting changes. VDN-244 is a true day/night camera that automatically switches from color to monochrome in low light. VDI-244 IR dome camera has 18 integrated IR LEDs that provide 65 feet of night vision. The monitors provide resolution to 1,080 pixels and precise color reproduction.

Bosch Security Systems Inc.
Fairport, NY
Free information: Circle 106

Amber-lens strobes

Amber-lens strobes are an addition to the Wheelock Exceder LED series of notification appliances. The strobes use high-efficiency optics to minimize current draw, allowing more units on the circuit. The compact LED technology also allows a smaller footprint. Field-selectable candela settings include 15, 30, 75, and 110. A variety of mounting options is available.

Cooper Notification
Long Branch, NJ
Free information: Circle 107

Uninterruptible power

The 93PM uninterruptible power system provides flexible deployment options that support integrated thermal-management solutions, a compact footprint, and reported efficiency to 99%. As an integrated UPS solution, the product can be scaled to meet the specific needs of most critical applications, including gray- or white-space deployment, co-location facilities, mission-critical data centers, and virtual and cloud data center environments. The unit has an LCD touchscreen that provides graphical energy savings and consumption data.

Eaton
Raleigh, NC
Free information: Circle 108

Electronic cabinet lock

K100 battery-operated cabinet lock, with Aperio technology, is suited for applications where audit trail and monitoring are important, including healthcare facilities, schools, and businesses. The cabinet uses a local wireless communication between the lock and an Aperio hub to connect to an access-control system. Two forms of battery-fail override include a mechanical key override and a battery jump port.

Medeco
Salem, VA
Free information: Circle 109

Building-management solution

3-Series Control System and Fusion Enterprise management software provide a complete building-management solution. Combining AV control, room scheduling, BMS, voice and data, HVAC, security, lighting, and energy management, the 3-Series integrates the systems on the same platform to work together as a single system. The software communicates with the control system and provides a dashboard to monitor, manage, and control the technology in all rooms and buildings across a campus or enterprise.

Crestron Electronics Inc.
Rockleigh, NJ
Free information: Circle 110

EDITORS' CHOICE

Premium vinyl flooring

Serenity premium vinyl flooring provides a soft, natural design said to bring a sense of calm to any space. With a non-directional pattern, the flooring has a wood texture. To complement its soothing looks, the flooring is available in 18- by 18-inch tiles with a color range of natural, soft values including Astral, Breathe, Dream, Echo, Misty, Soothe, and Twilight. Part of the Sensatia collection, applications for the flooring include healthcare facilities and spas and areas that require flooring with a soft look. All products have high-performance polyurethane fused to a heavy-duty wear layer for easy maintenance and resistance to staining and scuffing.
Parterre Flooring
Wilmington, MA
Free information: Circle 73

Serenity:

- **Premium vinyl flooring**
- **Non-directional pattern**
- **18- by 18-inch tiles; range of colors**

Green solar shades

Manual and motorized solar shades are available in Phifer SheerWeave fabrics made with Dow Ecolibrium bio-based plasticizers. Greenguard certified, the fabrics reduce their carbon footprint and meet regulatory standards. The fabrics are made from 98% renewable feedstock, contain no phthalates, can be recycled, and are said to reduce greenhouse gases by 40%, when compared with traditional plasticizers.
Springs Window Fashions
Williamsport, PA
Free information: Circle 74

Insulated curtain walls

TZ series insulated curtain walls partition large interior spaces where temperature and energy savings are essential. Constructed of fire-retardant industrial fabric, surrounding multiple layers of anti-microbial polyester batting, the walls reportedly provide 40 F or more of temperature separation. With a smaller footprint than permanent walls, the units save floor space and mount to existing ceiling structures or use custom framework.
Zoneworks
Milwaukee
Free information: Circle 75

THERE'S MORE ON OUR WEBSITE

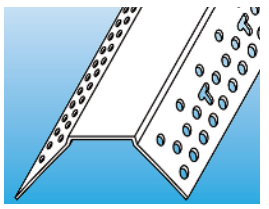
You can find more Interiors products on our website.

Go to www.cbpmagazine.com

Informal seating

Regard seating provides a range of user configurations. For applications such as libraries and student lounges, the extra-wide seating is said to provide comfort over multiple hours. Integrated power brings power off the floor for user access while removing tripping hazards. Deep/wide armrests accommodate a range of materials. The product is reconfigurable to support a range of activities and the material is stain resistant.
Steelcase Inc.
Grand Rapids, MI
Free information: Circle 76

Drywall beads



Chamfer beads match the sharp profile of 350 Chamfer. Products can be mixed and matched to achieve a clean, consistent look. Applications include drywall layering and archways.
Trim-Tex
Lincolnwood, IL
Free information: Circle 77

Eco-friendly wallcoverings

PureGraphics wallcoverings contain 31% post-consumer recycled material and are printed with UV-stable, water-based inks. With extremely low VOCs, the product meets CA-1350 indoor-air-quality specifications. Applied using low-emitting primers and adhesives with mold and mildew inhibitors, the coverings are said to be easily removable and can be returned for recycling. The coverings can contribute to LEED credits.
Signs Now Baltimore
Baltimore
Free information: Circle 78

Lounge furniture

Bodie lounge furniture is designed around the user experience. The line includes a lounge chair, full or partially upholstered, with two base options; an ottoman; and a variety of tables.

Grand Rapids Chair Co.
Grand Rapids, MI
Free information: Circle 79

PVC-free tile

Halo Free luxury vinyl tile is a PVC-free extension of the Halo line. The product has a variety of wood and stone designs, including 4-inch by 36-inch wood; an oversized, rustic 6-inch by 48-inch wood; and a combination of 18- and 24-inch stone products. It is free of halogens, plasticizers, and chlorine, and is FloorScore certified for indoor air quality.

CBC Flooring
Commack, NY
Free information: Circle 80

Linear sound absorption

MetalWorks Blades provide enhanced acoustics and upscale design. The metal panels are 1-inch-thick blades, 4 inches by 96 inches, and can be joined together for large spaces. The blades have optional end caps for design flexibility. Available in acoustical and non-acoustical versions, spacing can be varied to accommodate a variety of design and acoustical needs.

Armstrong Ceiling & Wall Systems
Lancaster, PA
Free information: Circle 81

Bleach-cleanable fabrics

Big Band, Groove, and Swing fabrics are made of 100% solution-dyed yarns and stain-repellant finishes. For applications, especially in healthcare environments, the fabrics can be cleaned with bleach.

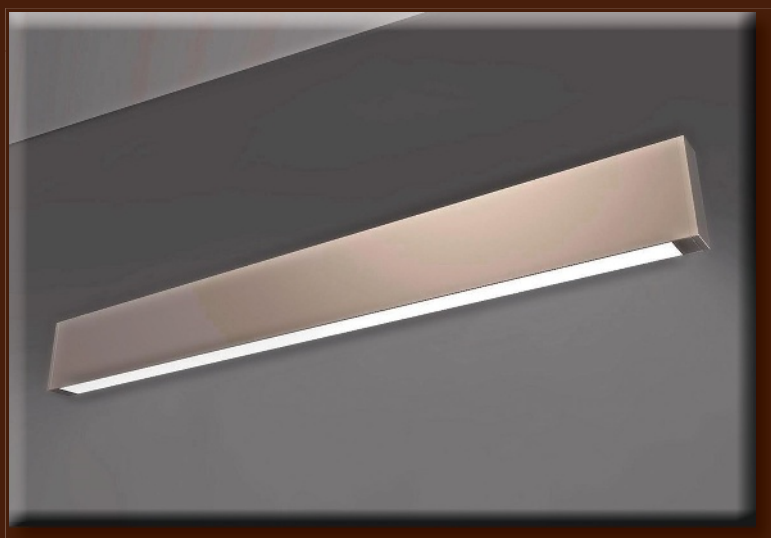
Brentano
Wheeling, IL
Free information: Circle 82

Sustainable carpet tile

Mixology collection carpet tile includes three patterns—Picture This, Seek Unique, and Coolly Noted—comprising five neutral colors mixed with randomly chosen end-of-lot yarns. Instead of downcycled, the yarns are diverted and given new life in carpet. The carpet's embedded pattern and neutral color remain consistent from tile to tile, while the accent colors change.

Mohawk Group
Dalton, GA
Free information: Circle 83

Low-scale, direct lighting



Acanthus³ linear, direct, suspended, ceiling, and wall-mount luminaires provide high-lumen output and non-glare downlight using LED or T5 fluorescent lamps. The 2-inch-wide by 5-inch-high units have a square-edged, rectangular design and can be juxtaposed at right angles, abutted to a wall or column, fully or partially span mounted, or formed into rows or patterns. Lengths include 2-, 3-, 4-, 8-, and 12-feet/unit. Optic choices include a diffuse opal-acrylic lens or a minimalistic aluminum louver. LED light options are available with low, standard, and high outputs, with a dimming module also available.

A•Light
Oceanside, CA
Free information: Circle 84

Acanthus³:

- **Non-glare downlight**
- **Rectangular, low-profile design**
- **LED or T5**

EDITORS' CHOICE

Lighting control

An interface for DLM, digital lighting management, allows third-party systems access. The interface aids specifiers and installers in combining solutions for lighting control and other requirements such as projector or audio-visual control, while presenting users with a single-control interface. With the interface, control systems send commands to energy-code-compliant DLM devices to streamline the user experience.

WattStopper
Santa Clara, CA
Free information: Circle 85

Linear-suspension fixture

Crossroads linear-suspension fixture takes its inspiration from city streets and intersections illuminated at night. Made with sheets of raw steel, protected with clear lacquer and accented by brass spot-welding, the fixture has an imperfect, rugged, and industrial design. Measuring 46-inches long, 6-inches high, and 4 1/2-inches deep, lamping options include halogen and LED. A sconce and cylindrical pendant are also available.

Tech Lighting
Skokie, IL
Free information: Circle 86

Decorative chandelier

Andromeda chandelier uses three-part symmetry. Three Vortex light elements form the points of a three-dimensional triangle with the fourth light in the center dropping 6 inches below to create a cascade of light. The fixture measures 22-inches deep by 17-inches in diameter. A variety of lighting options is available, with art-glass color selectable.

Derek Marshall Sculptural Lighting
Sandwich, NH
Free information: Circle 87

Occupancy sensor

Sensor Switch LSXR fixture-mount occupancy sensor has four interchangeable lenses and an adjustable mounting bracket. Suitable for varying mounting heights and fixture types, the sensor adapts to fit. The ability to change lenses eliminates replacing the entire sensor. The sensor is available as a stand-alone or pre-installed on many of the company's luminaires.

Acuity Brands Inc.
Atlanta
Free information: Circle 88

Architectural downlights

Q4 series 4-inch-square, low-voltage downlights provide a minimal, modernist appearance. Available reflector styles include 4-inch-square, adjustable frosted lensed; 1 1/2-inch-square adjustable pinhole; and 3-inch-square open adjustable. Trims are available in black, bronze, natural metal, and white.

Nora Lighting
Commerce, CA
Free information: Circle 89

Stairwell fixture

A stairwell light fixture provides 24/7 lighting to maintain minimum illumination standards in compliance with ASHRAE/IES 90.1-2010. A sensor reduces output to 25% of the minimum standard when no one is present. For indoor use, the fixture is for wall-mount applications.

Engineered Products Co.
Minneapolis
Free information: Circle 90

LED parking-garage luminaire

VG series parking-garage luminaire is said to deliver energy savings of 73%, compared with metal-halide fixtures. The low-glare fixture has a composite optical system combining an internal reflector and a prismatic lens for lighting uniformity.

Cree Inc.
Durham, NC
Free information: Circle 91

Over-floor raceway

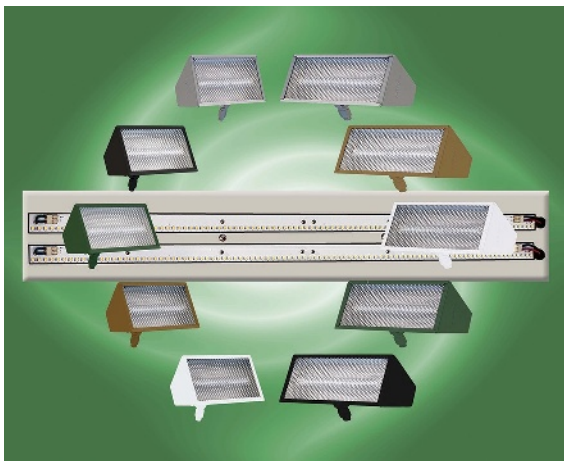
Wiremold OFR series over-floor raceway has poke-through holes and a 45-degree flat elbow fitting. The fittings allow feed to the raceway from an existing 3- or 4-inch poke-through device. The elbow enhances flexibility by making a diagonal turn. The raceway is ADA compliant.

Legrand
West Hartford, CT
Free information: Circle 92

Surge protector

FSP3-277-20K surge protector includes in-line fusing to shut down a luminaire if the capabilities of the surge protector have been exceeded. An LED indicator light shows that the device is functioning to protect a fixture. The product can be used with fixtures on electrical mains to 277 V and is rated to protect from surges to 20,000 amps.

Thomas Research Products
Huntley, IL
Free information: Circle 93



LED outdoor flood

WLED-15 and WLED-26 outdoor, surface-mount LED floodlights provide aimable coverage. Interchangeable top- or bottom-mount adjustable metal brackets have up/down and left/right aiming. The luminaires use low-glare, diamond acrylic lenses.

Magnaray International
Sarasota, FL
Free information: Circle 94

LED pendant

Wyandotte pendant has an industrial design with metal hardware. The luminaire works with a 12-V system and provides 385 lumens, 3,000 K, and 85 CRI. The shade is available in antique bronze or brushed nickel. A Quick Adjust canopy allows height variety.

WAC Lighting
Port Washington, NY
Free information: Circle 95

Linear LED tube light

LEDLT linear tube light is a 17-W, 1,250-lumen fixture for use in a wide variety of environments. With fully potted drivers and conformal, coated LED boards, the device prevents moisture intrusion and protection against shock and vibration. The slim fixture can be daisy chained.

Phoenix Products Co. Inc.
Milwaukee
Free information: Circle 96

Color tuning

Indy LED ChromaControl luminaires have tunable white, color tuning, and black body dimming technologies. The luminaires use broad-spectrum LEDs to produce high-quality white light while allowing specifiers to custom-tune the delivered light color. The technology allows changes to hue and saturation to anywhere on the chromaticity diagram to optimize the lighting design for the final space.

Juno Lighting Group
Des Plaines, IL
Free information: Circle 97

Retrofit lighting

Lite PAR Eco lamps are said to deliver traditional halogen performance with increased efficacy. Each of the nine models consumes fewer watts with no discernable difference in light quality or output, compared with higher-watt halogens. Lamps are available in PAR20, PAR30, PAR30LN, and PAR38, with five lumen options.

Litetronics
Alsip, IL
Free information: Circle 98

STATEMENT OF OWNERSHIP, MANAGEMENT, AND CIRCULATION

Publication Title: **COMMERCIAL BUILDING PRODUCTS**

Publication Number: 0230-77

Filing Date: September 23, 2013

Number of Issues Published Annually: 9

Annual Subscription Price: $24

Complete Mailing Address of Known Office of Publication:
1300 S. Grove Ave., Suite 105, Barrington, IL 60010

Contact Person: Gary L. Parr

Telephone: 847-382-8100

Complete Mailing Address of Headquarters or General Business Office of Publisher:
ConSource LLC, 1300 S. Grove Ave., Suite 105, Barrington, IL 60010

Full Names and Complete Mailing Addresses of Publisher, Editor, and Managing Editor: Gary L. Parr,
1300 S. Grove Ave., Suite 105, Barrington, IL 60010

Owner: ConSource LLC, 1300 S. Grove Ave., Suite 105, Barrington, IL 60010

Known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities: None

Issue data for circulation data below: September 2013

Extent and nature of circulation:

	Avg. no. copies each issue during preceding 12 months	No. copies of single issue published nearest filing date
Total no. copies	43,066	42,746
Paid and/or requested circulation		
(1) Paid/Requested Outside County Mail Subscriptions Stated on Form 3541	33,562	32,878
(2) Paid In-County Subscriptions Stated on Form 3541	0	0
(3) Sales Through Dealers and Carriers, Street Vendors, Counter Sales, and Other Non-USPS Paid Distribution	0	0
(4) Other Classes Mailed Through the USPS	0	0
Total paid and/or requested circulation	33,562	32,878
Free distribution by mail		
(1) Outside-County as stated on Form 3541	8,839	9,557
(2) In-County as Stated on Form 3541	0	0
(3) Other Classes Mailed Through the USPS	0	0
Free distribution outside the mail	361	0
Total free distribution	9,200	9,557
Total distribution	42,762	42,435
Copies not distributed	304	311
Total	43,066	42,746
Percent paid and/or requested circulation	78.49%	77.48%

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).
(signed) Arthur L. Rice, Owner

Free information: Circle 222

Free information: Circle 223

Free information: Circle 224

Free information: Circle 225

Free information: Circle 226

Free information: Circle 227

Free information: Circle 228

Commercial BUILDING PRODUCTS
SERVING ARCHITECTS, CONTRACTORS, AND OWNERS IN COMMERCIAL CONSTRUCTION

Gary L. Parr
Executive Vice President, ConSource LLC
847.382.8100 ext.101
gparr@cbpmagazine.com

Jack Curley
Regional Sales Manager
Northeast
201.569.5481
201.805.9529 cell
jcurley@cbpmagazine.com

Scott Cunningham
Regional Sales Manager
Southeast, Mid-South, OH, IN
770.913.0115
678.576.1487 cell
scunningham@cbpmagazine.com

Jon Heng
Patricia Heng
Regional Sales Managers
West Coast, MN, MO
626.799.3610
jheng@cbpmagazine.com
pheng@cbpmagazine.com

Tracy Ryle
Inside Sales, Regional Sales IL, MI, WI
847.382.8100 ext. 103
tryle@cbpmagazine.com

Marga Parr
Production Manager
847.382.8100 ext. 115
mparr@cbpmagazine.com

Ellen Sandkam
List Rental Services
847.382.8100 ext. 110
esandkam@atplists.com

Jill Kaletha
Foster Reprint Service
866.879.9144 ext. 168
jillk@fosterprinting.com

Arthur L. Rice
Chairman/CEO
847.382.8100 ext. 106
arice@atpnetwork.com

Commercial Building Products
ConSource LLC

1300 S. Grove Avenue, Suite 105, Barrington, IL 60010
847.382.8100 www.cbpmagazine.com

COMING in future issues

JAN/FEB 2014

Healthcare

HVAC

Roofing

MARCH

Education

Energy & Backup Systems

Security, Life Safety

PLEASE RECYCLE

supplier INDEX

A planetarium is housed in the rotunda at the new Richard S. Shineman Center for Science, Engineering and Innovation at State University of New York, Oswego. Alluding to the orbits of planets, project architect Cannon Design, Buffalo, NY, created a tower of non-concentric rings and circular skylights suggesting stars in the firmament of the atrium's metal-panel ceiling. Ceilings Plus, Los Angeles, used BIM models to engineer and fabricate curved wall panels, made from recycled aluminum laminated with FSC 100% plain-sliced anigre veneer, micro perforated for noise reduction. The Pike Company, Rochester, NY, was the project's contractor. *Photo: Bjorg Magnea, courtesy of Ceilings Plus.*

INTERNATIONAL ROOFING EXPO
hanley wood | NRCA

YOUR ULTIMATE ROOFING SOURCE

Register today to attend the preeminent roofing construction and maintenance event where roofing professionals discover the latest trends, advances in technology and best practices for business growth — the 2014 International Roofing Expo® [IRE].

- 450 companies in 1,000 booths
- Hundreds of products and services
- 44 educational sessions
- Community Service Day
- Technology & Business Services Pavilion
- Welcome Party at LIGHT Nightclub
- Product Showcase
- Metal Marketplace
- Keynote by Frank Abagnale
- Exhibitor Product Clinics
- NRCA Annual Convention
- Roofing Market Outlook

2014 INTERNATIONAL ROOFING EXPO

Exhibits & Conference: February 26-28

Mandalay Bay Convention Center | Bayside Halls C & D
Las Vegas, Nevada USA

Register at www.TheRoofingExpo.com
to receive **FREE** Expo Only admission.

During the online registration process, you will be asked, "How did you hear about the 2014 Expo?" Click on "Received a special code" and enter ADG as the code.

Toll-Free: 800.684.5761 | Outside USA: 972.536.6415

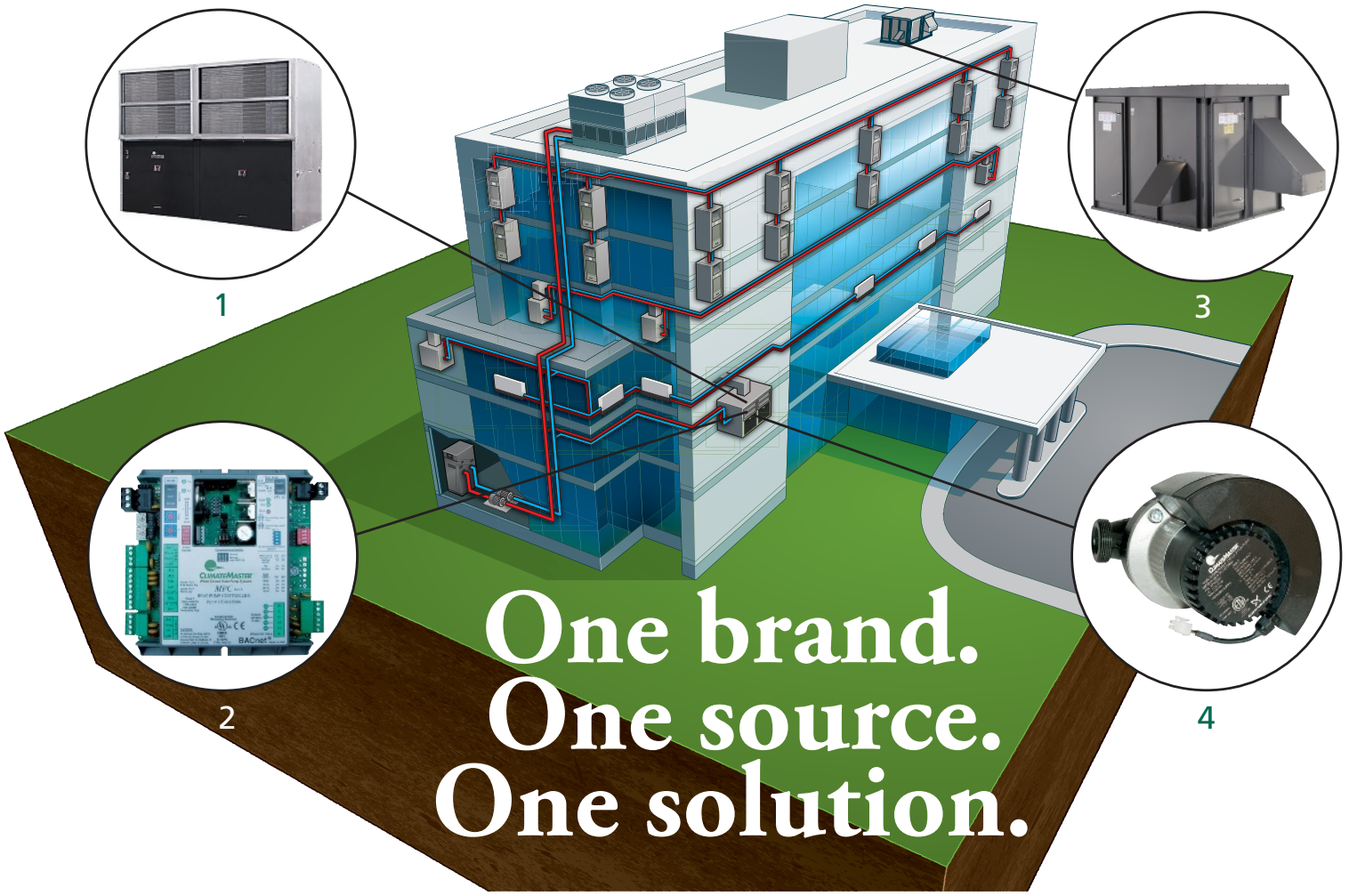
hw

Official Show Sponsor: NRCA

Official Show Publication: ROOFING CONTRACTOR

Official Digital Publication: ROOFING-AUTHORITY.com

For free information, circle 220



ClimateMaster® delivers complete water-source or geothermal heating and cooling solutions for every segment of the commercial construction market. Because we can provide all the components required for most applications, you are assured a perfectly matched, perfectly controlled, perfectly installed system.

1. All the Heating and Cooling Required.

A ClimateMaster® system will provide both heating and cooling to the building, changing modes based on the building load. Heat can even be transferred from one part of the building to another. A single control system will manage all these functions. You'll need less equipment and have a completely integrated system.

2. Multi-Protocol DDC Controls.

Factory-mounted Direct Digital Controls lower installation costs by reducing problematic on-site wiring. Implement a variety of building automation protocols through a PC, and read fault codes from any remote location.

3. Energy Recovery Ventilator.

Improved IAQ is achieved with an ERV, coupling outdoor air treatment directly to space conditioning equipment. Stand-alone and mated rooftop configurations are available to meet your design requirements.

4. vFlow™ Variable Water Flow.

vFlow™ variable water flow technology represents a major advance in system performance. vFlow™ not only builds the major water circulation components into the unit for a clean installation, it also intelligently varies the water flow to minimize energy consumption and improve system reliability.

Get the entire ClimateMaster® system story by calling 1-877-436-6263 to connect with a ClimateMaster® Commercial Representative.

CLIMATEMASTER®

Water-Source Heat Pump Systems

To learn about career opportunities with ClimateMaster®, visit climatemaster.com today.

A company of LSB Industries, Inc. - NYSE symbol LXU

ClimateMaster® is a proud supporter of the Geothermal Exchange Organization - GEO. For more information visit geoexchange.org