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PRIVATE UNIVERSITY PRODUCTS AND NEWS

GREEN CONSTRUCTION, WINDOWS, & DOORS —SPRING 2018
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# SUSTAINABLE DESIGN

STUDENTS DRAWN TO GREENER CAMPUSES

TESTING FOR DOORS

THE ORIGINAL "GREEN" BUILDING MATERIAL: BRICK

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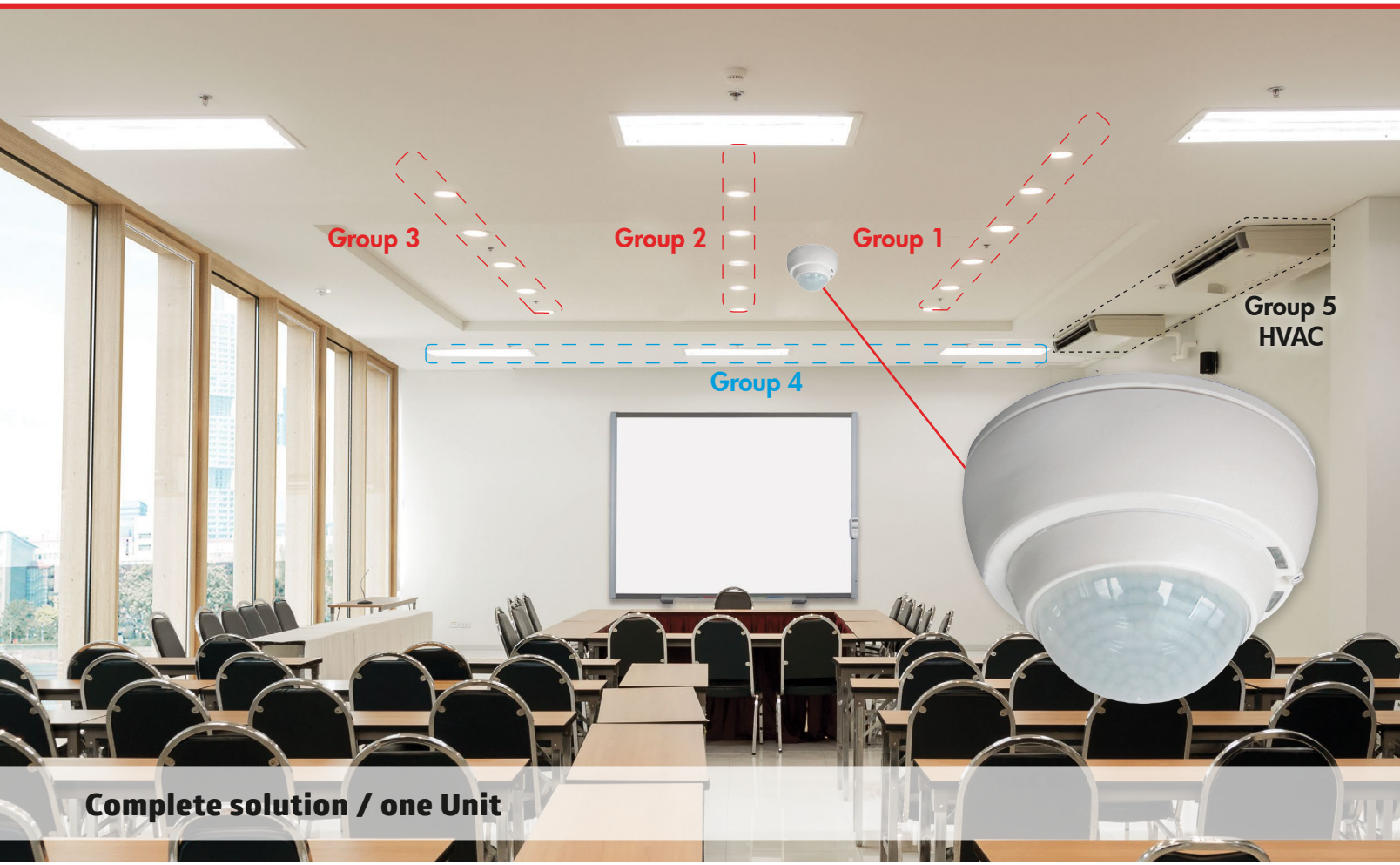


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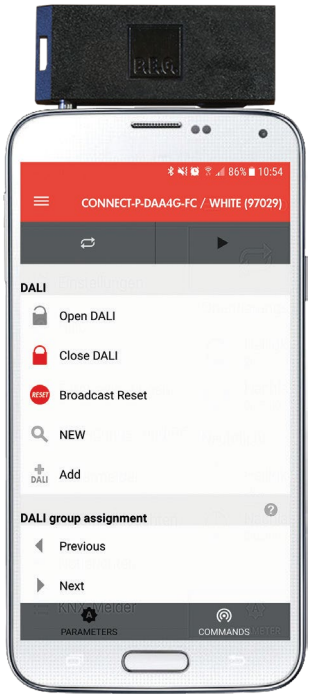


- **Groups 1-4** Each group can dim or switch at a different rate in response to daylight or manually via any style momentary switch.
- **Group 5:** A dedicated 16 amp relay can be used in various ways; to signal occupancy to an HVAC system, control of blinds or ceiling fans or as a "master off" for the room to completely switch off the drivers reducing energy consumption to zero.
- Additional CONNECT secondary units can be added to extend the detection range.


# Curve Appeal

Marion–Clark Halls, Worth Hills Village
Texas Christian University, Fort Worth

architect
KSQ Architects, Tulsa

general contractor
Beck Group, Dallas

masonry contractor
Wilks Masonry, Aledo, Texas

## A Strategic Update in Brick

Marion and Clark residence halls–sited to create an unmistakable first impression–are key to TCU's transformation into a fully residential campus. Their Acme modular brick is a TCU mainstay for well over a century. Dependable Acme Brick hugs the curve on maintenance, design, and life-cycle value. In the race for college students, let Acme arm you with materials for efficient, timely, enduring human spaces.

*"We used brick creatively to meet budget, with single-color stacked-bond details, and patterning on one long wall of the dining hall to provide visual relief. We are happy with the results on this first gateway building for Worth Hills, with additional housing planned."*
*– Lindsay Reeds, LEED AP, Associate, KSQ Architects*

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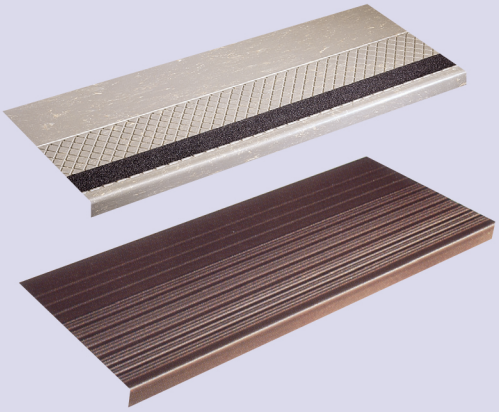

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## STUDENTS DRAWN TO GREENER CAMPUSES:
### Principles of Green Construction & Sustainable Design

by Sheila Wagner

Many students at private colleges and universities are extremely invested in the environment and interested in knowing what campuses are doing to reduce their carbon footprint and contribute to sustainability goals. When these eco-conscious young people are shopping for the right college for them, the institutions that go to the greatest lengths to make their campuses "green" will be the ones they prefer.

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## TESTING MATTERS: DOOR PERFORMANCE

by Ben Dorsey

In the world of building products, performance testing is common. For product manufacturers, it can be a time-consuming and costly process. Why would they choose to undertake it? More importantly, what is the value in such testing to you? Before we explore these, and related questions, specifically for doors, we need to understand a little more about the testing of building products.

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by Art Young

One of the hottest topics in the construction industry today is "green buildings." These buildings require less energy to heat and cool and save their owners thousands of dollars over the life of the building. They can withstand the ravages of elements for generations, and they are most likely constructed of materials that come from the earth. These include the oldest manufacturing building material of all: brick.

# Students Drawn to Greener Campuses

## PRINCIPLES OF GREEN CONSTRUCTION & SUSTAINABLE DESIGN

by Sheila Wagner

Many students at private colleges and universities are extremely invested in the environment and interested in knowing what campuses are doing to reduce their carbon footprint and contribute to sustainability goals. When these eco-conscious young people are shopping for the right college for them, the institutions that go to the greatest lengths to make their campuses "green" will be the ones they prefer.

Administrators of private universities and colleges may find that, aside from addressing the environmental topics their students are passionate about—such as climate change and recycling—stricter building codes and long-term costs of ownership will inevitably lead them to consider the benefits of green and sustainable materials in their construction projects.

## Sustainable Design

What "building green" means is that consideration is given to design and construction of buildings and landscapes to reduce or even eliminate negative impacts on the environment and the people involved. Another term for that, of course, is "Sustainable Design."

There are several fundamental principles of sustainable building design, including proper site selection, energy use, conserving water, indoor environmental quality, and maintenance practices such as using materials that do not require toxic chemicals and cleaners.

The U.S. Green Building Council is an organization that is committed to measuring and understanding that, and they are identifying tactics to transform campuses to become sustainable communities that will make their students and professors proud. Their site shares a recent article that outlines several ways to show leadership in green building and operations, some of which are outlined here.

## Rating Systems for Maintenance & Future Projects

They are not only dedicated to reducing the environmental impact on the buildings and grounds, but also want to have a positive effect on students to prepare them to be citizens who will lead in the green building movement. They now have several rating systems that can be used for ongoing maintenance as well as future building projects. USGBC (offers campus assessments when a university is planning new construction or renovating older buildings to make sure they meet their sustainability goals)

These certifications cover nearly every facet of a sustainable build environment:

**LEED** (Leadership in Energy and Environmental Design)

**PEER** (Performance Excellence in Electricity Renewal)

**SITES** (System to distinguish sustainable landscapes)

**TRUE** (Zero waste rating system)

**Parksmart** (Recognizes high-performing sustainable garages)

**WELL** (System for certifying features on buildings that impact health and well-being)

Administrators of private universities and colleges may find that, aside from addressing the environmental topics their students are passionate about—such as climate change and recycling—stricter building codes and long-term costs of ownership will inevitably lead them to consider the benefits of green and sustainable materials in their construction projects.

## A Passion for Building Green

Doug Yancey, an executive with Varco Pruden Buildings in Memphis, Tennessee, has been in the construction industry for 18 years. He is a passionate proponent for green building for initial construction as well as renovation of standing structures. Yancey considers the long term cost of ownership to be the most important component of green construction for private universities.

He added that the two best ways for private colleges and universities to improve their energy efficiency and gain more energy savings with their construction choices to be insulation and daylighting with sensor controlled electric lighting.

While the cost to "build green" will be more, many administrators and facility managers are surprised to learn that the cost to design and build a structure is insignificant compared to the cost of owning and operating the building over its useful life. According to the Building Owners and Managers Association, only two percent of the total cost of building, owning, and operating a typical office building over a 30-year period is for design fees and construction costs.

## The Cost of Building Green

Yancey stated that while the cost to "build green" will be more, many administrators and facility managers are surprised to learn that the cost to design and build a structure is insignificant compared to the cost of owning and operating the building over its useful life. According to the Building Owners and Managers Association, only two percent of the total cost of building, owning, and operating a typical office building over a 30-year period is for design fees and construction costs.

Operations, maintenance, finance and employee costs account for the remaining 98 percent of the total costs. Adding energy savings may add material and installation costs, but ultimately will reduce the day-to-day operating expense.

## The Mindset of Meeting the Minimum

For economic reasons, some colleges and universities may have the mindset of "what's the least I have to do to meet code now?" What they are failing to consider is the fact that ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) standards have risen almost every year. By 2020, the building completed this year will be obsolete in terms of meeting construction code for the future. For new construction, it is imperative to use the best insulation material possible, because the expense of adding insulation later will be substantially more.

Yancey provided a list of benefits that any private college or university can expect from a green building:

**• REDUCED OPERATING COSTS**

It is possible to reduce building energy consumption by 20 to 30 percent within the constraints of most building budgets. This increased energy efficiency can reduce energy costs over the life of a building.

**• REDUCED WASTE COSTS**

Green buildings that are designed with flexible open space can significantly reduce construction waste in facilities that undergo frequent remodeling.

**• ENHANCED OCCUPANT PRODUCTIVITY**

Several case studies of completed green buildings have shown significant improvements in productivity because occupants (students,

staff, etc.) had a connection to the outdoors and worked in spaces with natural daylight. Skylights might work well in athletic facilities, student centers, and libraries.

**• STREAMLINED REGULATORY APPROVALS**
Sustainable site design strategies can often build public trust and streamline regulatory approvals.

## The Key to Reaping Economic Benefits of Building Green

Overall, Yancey believes the key to realizing the economic benefits of green building is to work with design and construction professionals who have experience with this approach to construction.

Since no two building projects are alike, these professionals can work with clients to develop focused green building strategies that are cost effective and respond to the unique needs of a university's building goals. He reiterated, "Numerous studies have shown that a nominal investment now can pay for itself sooner than you think."

**ABOUT THE AUTHOR:** Sheila Wagner has spent the last several years working as a professional editor and recently became the staff writer for *Private University Products and News*. Wagner can be reached at sheila@pupnmag.com.


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# TESTING MATTERS

by Ben Dorsey


In the world of building products, performance testing is common.
For product manufacturers, it can be a time-consuming and costly process.
Why would they choose to undertake it? More importantly,
what is the value in such testing to you?

Before we explore these, and related questions, specifically for doors, we need to understand a little more about the testing of building products. It helps to consider this from the perspective of involved parties. Various organizations become involved with sometimes overlapping roles and always within an interrelated model:

- An appropriate organization creates a standard of expected performance.
- A local, regional, or international authority having jurisdiction (AHJ) accepts the standard and makes it part of their building code.
- Architectural-Engineering firms design projects, and related 3-part project specifications, while referencing both codes and standards.
- Other organizations create test specifications to ensure compliance to the standard.
- Independent testing agencies undertake actual product testing per the test specification.
- Manufacturers submit their products to the testing agency (likely after reviewing the requirements and performing internal testing to some extent).

So, the product is tested to a test specification to be considered for compliance to a given industry standard and/or related building code.

Now what does this process mean for you? You want products that meet certain criteria. For example, you might be concerned with how well the product will hold up over the test of time. In support of mandated or voluntary sustainability initiatives, you may want products that can save energy costs or contribute to credit achievement in green building rating systems. You certainly want products that provide for the safety and security of your students, faculty, staff, and visitors.

Meanwhile, the architectural-engineering community that is assisting you will attempt to translate your desired criteria into a project specification that dictates specific performance characteristics for all products that will be used in the project. They will always consider the building codes. As we have seen, these codes will reference certain standards.

Let's explore appropriate standards and associated test specifications for doors and entrance systems as they relate to some of your desired outcomes. These standards and subsequent testing primarily apply to exterior doors or entire entrance systems. Indications of quality or compliance by a given manufacturer should also give you confidence in their interior doors.

## Energy Efficiency

The definitive performance standard of energy efficiency for commercial and institutional buildings is known as ASHRAE 90.1. ASHRAE is the American Society of Heating, Refrigerating, and Air-conditioning Engineers. Their 90.1 standard has become an integral part of countless building codes. A portion of the standard deals with the expected energy performance of doors.

One measure of performance is the thermal efficiency of the door. In other words, to what extent does the door exhibit heat loss or heat

gain. High levels of heat loss or gain have a direct bearing on the heating or cooling load of the facility. These systems, as you know, are energy intensive. Therefore, a door that exhibits a lower level of heat loss or gain is more energy efficient.

Heat loss or gain is expressed as a U-factor. U-factor is the reciprocal of R-value (insulating value).

ASHRAE 90.1 calls for U-factors that don't exceed specific levels. The location of your campus matters because the standard establishes U-factors per ASHRAE climate zones. The standard also makes provision for various types of doors such as flush doors or monumental stile and rail doors. The latter would use a good deal of glass.

Finally, the standard references the approved test specification for determining U-factor. This test specification was developed by the National Fenestration Rating Council and is known as NFRC 100.

Therefore, you can look for a published U-factor for doors and verify if the manufacturer used the approved test specification. If so, the manufacturer should be able to provide copies of its test results. Even if you don't wish to deal with these matters directly, your service providers should.

## Long-term Reliability

This broad expectation can translate into more specific criteria that relate to door standards. Here, the type of door material is often a factor because various tests are specified depending on the material (hollow metal, wood, fiberglass, aluminum, or composite/hybrid assemblies).

Several organizations establish test specifications in regards to these materials. They consider such factors as the life cycle expectations or endurance, the capability of material to resist dents, the capability of the material to resist UV fading, and more.

Relevant organizations in this general category include the American National Standards Institute (ANSI), ASTM International (formerly American Society for Testing and Materials), and the National Wood Window and Door Association (NWWDA), among others.

Due to the variety of possibilities here, it is best to ask for any test results that relate to overall product reliability. I can best illustrate this point with two examples. First, ANSI A250.4 began as a standard from the Steel Door Institute. Now, as an ANSI standard, it can be applied to any door/frame assembly. The test specification measures the long-term use or endurance of the door assembly in opening/closing cycles. Various criteria describe failures that can occur along the way to a cycle count. This swing test can result in cycle counts of 250,000 (bottom threshold) to over 1,000,000. In fact, some products have achieved cycle counts of several million.

For another example, ASTM G154 and G155 are tests designed to measure the fading of materials that occur due to sunlight exposure. G155 is only designed for non-metallic materials so it is appropriate for wood, fiberglass, and FRP (fiber reinforced polymer) doors. Moisture is also introduced in the testing to fully evaluate product weathering.

## Extreme Weather Resistance

Speaking of weathering, we should note that the general term—windstorms—and more specific terms, such as hurricane-rated, describe testing scenarios that put doors through the effects of weather extremes.

Here, local building codes and local jurisdictions have created standards and test specifications for products, including doors, that are used within their jurisdictions. Because these standards are so high, a product found compliant here will certainly hold up to the rigors of weather elsewhere.

Two jurisdictions are noteworthy: (a) The Florida Building Code, established by the Florida Building Commission, demands a high level of product performance, especially in what it calls its High Velocity Hurricane Zone (Miami-Dade, Broward, and coastal Palm Beach counties); (b) The Texas Department of Insurance has also established similar standards and its own set of tests. These jurisdictions also influence other building codes.

In hurricane, and other windstorm-prone regions, three factors influence the performance of exterior doors:

- Impact resistance (due to windborne debris)
- Air pressure changes
- Water infiltration

Thus, testing of doors for these criteria becomes essential for peace of mind.

However, there is a note of caution here. Such testing considers specific sizes of doors as well as specific hardware and glazing. Therefore, no blanket statement of compliance can be made for every potential door configuration. Additionally, unless you are using the particular arrangement of door and hardware, the manufacturer cannot legally label the product as compliant to the given standard.

## Sound Control

This particular characteristic is equally applicable to exterior and interior doors but will usually be more important for interior doors. You will hear terms such as sound isolation, sound transmission, and acoustical doors used in this context. For sound that is generated on one side of a door, the general goal is to keep sound within that space as much as is reasonably possible and to attenuate it on the other side.

The primary test specification for sound control is known as ASTM E90. It describes how to measure airborne sound transmission loss of building partitions such as walls of all kinds, operable partitions, floor-ceiling assemblies, doors, windows, roofs, panels, and other space-dividing elements.

ASTM E90 is designed as a laboratory test that product manufacturers and testing agencies would use. For field evaluation, such as might be performed by a service provider, ASTM E336 is the appropriate test specification.

The unit of measure is known as Sound Transmission Class (STC). STC is an integer rating of how well the door attenuates airborne sound. The higher the number, the better the sound isolation.

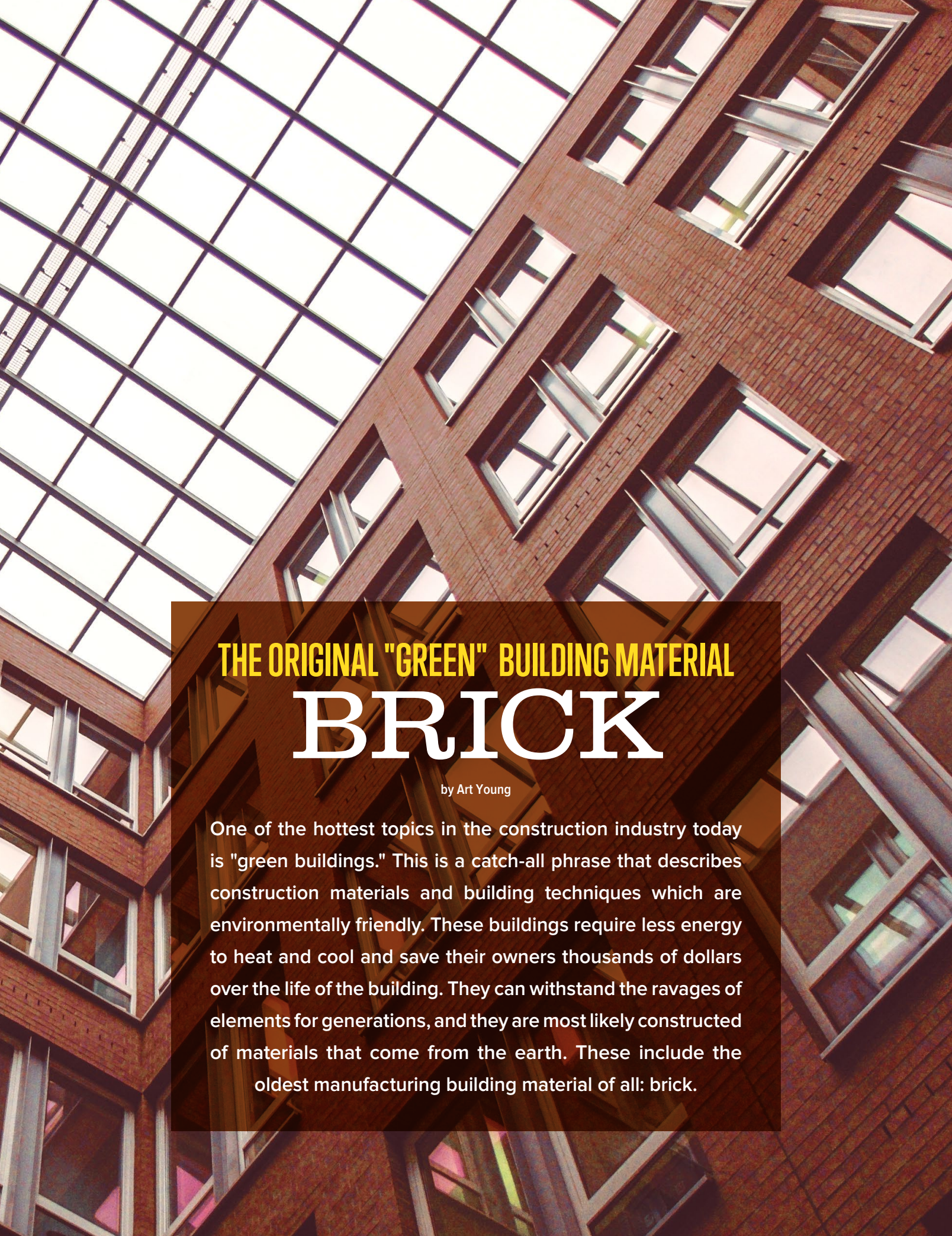
Almost all doors can offer a reasonable STC rating. A good STC rating for a standard door might be in the upper 20s or 30s. When your sound control needs are especially high, you may specify acoustic or sound control doors which are available at higher price points than standard doors. These doors can have STC ratings near 50 or higher.

## What's Next?

Hopefully, you have begun to consider some of the performance criteria that might be important for you—in doors or other building products. You will discover that there are, typically, product standards and tests that coincide with your desired criteria. Then, it is a matter of conveying your criteria to service providers and asking them to produce evidence that their proposed products have met some related standard of performance.

In Part 2 of this series, we will examine further criteria related to safety and security. You can read Part 2 of "Testing Matters" in the April issue of PUPN.

**ABOUT THE AUTHOR:** Ben is a product marketing veteran for commercial and institutional buildings. He has worked with entrance systems, building automation, fenestration products, mechanical systems, and other building products. He earned a bachelor's degree in Scientific & Technical Communication from Bowling Green State University (Ohio).



## THE ORIGINAL "GREEN" BUILDING MATERIAL

# BRICK

by Art Young

One of the hottest topics in the construction industry today is "green buildings." This is a catch-all phrase that describes construction materials and building techniques which are environmentally friendly. These buildings require less energy to heat and cool and save their owners thousands of dollars over the life of the building. They can withstand the ravages of elements for generations, and they are most likely constructed of materials that come from the earth. These include the oldest manufacturing building material of all: brick.

## Going Green

Ceramic products such as brick are derived from natural earth elements and are manufactured to span the test of time.

When used for interior walls, brick can also make significant contribution to indoor environmental quality. Being chemically inert, they emit no chemicals into the air: a claim that no paint can make. When properly selected and installed, they will often last as long as the rest of the building, with minimal maintenance and regular cleaning.

As occupants and uses change, a brick building adapts easily, and—at the end of the building's life—the brick can be reclaimed and recycled. These two factors lighten a building's environmental impact and reduce its total life-cycle cost.

Brick is today what it has always been: an authentic building material, made from the earth, for the earth. Although many have tried to duplicate some of its remarkable qualities in design and construction, no other material has equaled the unique blend of beauty and brawn in authentic fired clay brick.

## An Authentic Building Material

Brick is today what it has always been: an authentic building material, made from the earth, for the earth. Although many have tried to duplicate some of its remarkable qualities in design and construction, no other material has equaled the unique blend of beauty and brawn in authentic fired clay brick.

As a forty year veteran of the industry, Jay Cox knows a thing or two about the benefits of brick construction. As the Midwest Regional Sales Manager for Acme Brick, he has helped hundreds of customers who are interested in energy efficient, green building construction realize their dreams. "When we think about green buildings, sustainability, and the availability of raw materials to manufacture these building materials, we naturally focus on brick," Cox states. "When I go back to my early days in this company and think about jobs that I sold back then, it's very rewarding when I see those buildings now. They still have the same finish and are still very attractive.

Cox continues, "As far as 'green' is concerned, those buildings never had to be painted and they have not required any further maintenance. I would say brick is one of the original green building materials and this goes back thousands of years."

## How Does Brick Compare to Synthetic Building Materials?

Institutions and their architects have many choices for building materials, including synthetic materials. What makes brick superior from an environmental and sustainable standpoint?

"Because of its mass and the air space behind it, brick is one of the best performing walls for commercial structures," Cox notes. "Because of the mass of brick, the heat on the outside of the building during a hot summer day takes a substantial amount of time to work its way into the building. By the time this has happened, it is typically the evening and the air is cooling down. It acts as an

insulating barrier due to the nature of the product itself. When the weather turns colder, this insulation barrier of brick works the opposite way. When the sunshine hits a brick wall, the mass of the brick stores the heat from the sunlight, which helps keep the building warm."

Walls constructed of brick require almost no maintenance, whether exterior or interior. "With a synthetic wall, there is a constant need to paint and/or caulk to maintain its integrity," Cox adds. "This is not necessary with brick construction. Plus, unlike brick, where the moisture is returned outside, synthetic materials absorb that moisture, resulting in a weakening of the structure."

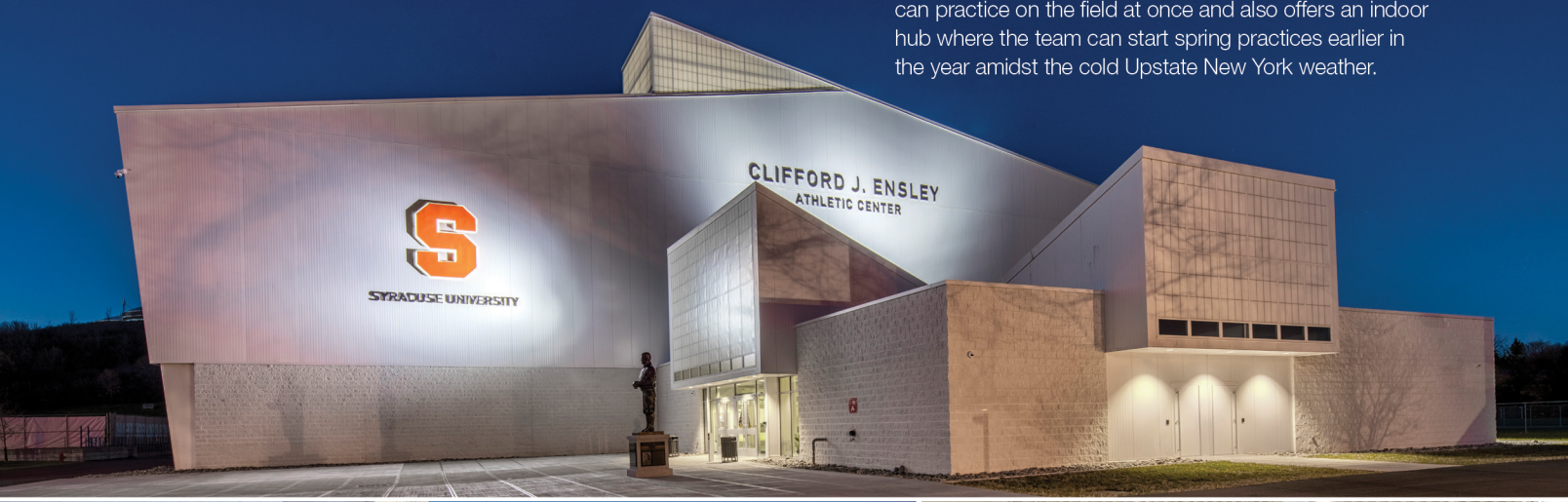
## The Other Green—The Folding Kind

The economics of brick construction account for another green advantage and this is the folding kind—money saved. Cox concludes, "If you think about the long-term aspect of a building, brick offers a much better return on investment. As we have noted, no painting will ever be required, the costs for maintenance are very low, and the energy saving aspects of brick construction are far superior to others."

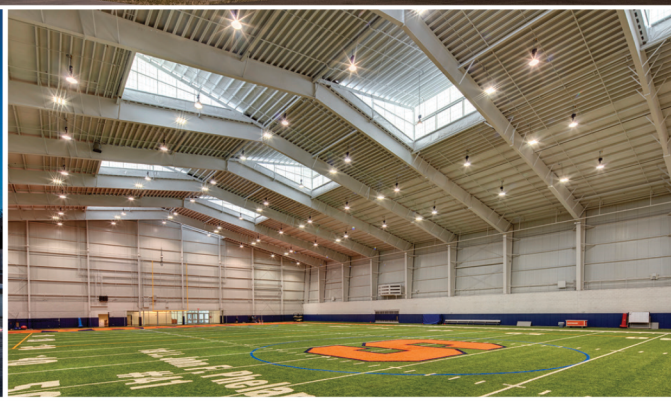
**ABOUT THE AUTHOR:** Over the past 35 years, Art Young has interviewed some of the most interesting people in the world and used these conversations to develop a diverse catalog of facts and articles. He is a writer, blogger, podcaster, broadcaster, and frequent speaker on subjects ranging from construction to technology to healthcare to music to outdoor sports and many other subjects.

# The Strength of Excellence in Athletic Facilities

Syracuse University's Ensley Athletic Center is a stand-out facility that enhances its football team's ability to practice, train and recruit new players. The 87,000-square-foot facility creates a space where both offensive and defensive units can practice on the field at once and also offers an indoor hub where the team can start spring practices earlier in the year amidst the cold Upstate New York weather.







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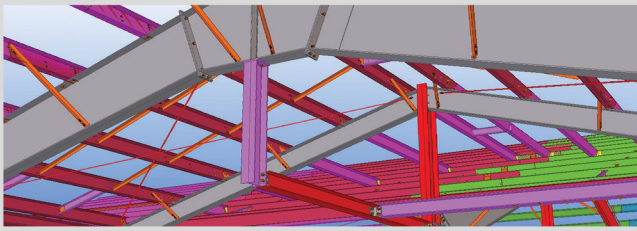

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### FOR EXTREME EMERGENCY SITUATIONS

The Nightlock Lockdown Door Barricade allows a teacher to immediately lock the door from inside the classroom, eliminating exposure during a hostile intruder situation. This device makes it virtually impossible for an intruder to break through an entry door.

- **Simply add this safety device to classroom doors**
- **Works with outward and inward swing doors**
- **No need to replace existing hardware**
- **One time solution - easy to install**
- **Lockdown in seconds**

*So affordable!*
**$59.95 ea.**

**NIGHTLOCK**
**classroomlockdown.com**
**CALL TOLL FREE 1-855-644-4856**