

Architects' Guide™ TO GLASS & METAL

Volume 24 • Issue 6

November/December 2010

Pittsburgh's Glassy Transformation

Free Subscription Form on Page 12

Also Inside:

- Thermal Performance
- The Latest Products
- And More!



Specify with confidence

Fire rated glass and framing
that can meet
every application
every time

Delivering innovative solutions for over

25 years

SuperLite

PYRAN® Platinum
by SAFTI FIRST

SAFTIfire
FRAMING

 USA MFG.



Register online for "Designing with Fire Rated Glass" and receive 1 AIA LU/HSW credit

www.safti.com

888.653.3333

Volume 24, Issue 6,
November/December
2010

Architects' Guide

TO GLASS & METAL

CONTENTS

Re-Birth: 6
Completely changing Pittsburgh's skyline, glass played a key part in the construction of the city's newest structure.

Departments and Columns

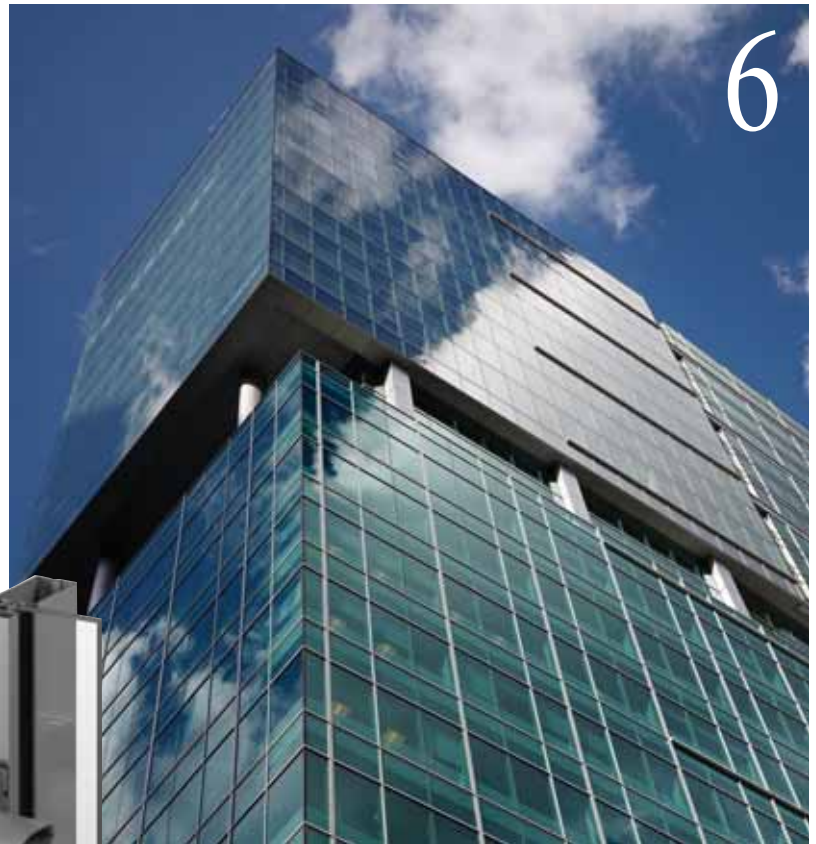
- 2 FROM THE EDITOR
- 4 METAL MATTERS
- 10 NEW PRODUCTS
- 12 AIA CONTINUING EDUCATION UPDATE



Editorial Board

The members of the *Architects' Guide to Glass & Metal* Editorial Board are:

- Michael D. Flynn**, partner, Pei Cobb Freed & Partners
- Jerri Smith**, senior associate principal, Kohn Pedersen Fox
- Jim W. Sealy**, principal, J.W. Sealy Consulting
- Christopher Barry**, manager architectural technical services, Pilkington North America
- Tony Kamber**, national architectural manager, Arch Aluminum & Glass



On the Cover

3 PNC Plaza is one of the first new buildings constructed in downtown Pittsburgh in 20 years. Designed by Gensler, glass and glazing details were critical to the building's aesthetics and performance. Turn to page 6 to read more.
Photo credit: Bruce Damonte.

From the Editor

Lighten Up

When it comes to architectural design trends (particularly those involving glass) one that we hear talk of quite often is daylighting. Daylighting is the practice of using natural light to illuminate building spaces; it brings indirect, natural light into the building and reduces the need for electric lighting, while connecting occupants to the outdoors.

However, successful daylighting design also brings with it a number of considerations; no one wants to work around excessive glare or heat, right?

So, the goal is to maximize daylight, while minimizing discomfort, and window placement is essential. South- and north-facing windows, as an example, enhance daylighting, as they offer relatively stable daylight conditions throughout the day.

Also a consideration, daylight does not typically spread its benefits across a building. For example, those near a window may receive an abundance of daylight, while those further away often go without. What to do? Skylights or light tubes can help illuminate central areas of a top floor; vertical façades can benefit from light shelves integrated into the window system or horizontal louvers that redirect daylight to the ceiling and deep into the interior.

There are also a variety of glass types that can be helpful. These can include insulating glass with thermal performance features and low-E coatings that reflect infrared thermal radiation but look clear. In addition, advanced glazing options, such as dynamic electrochromic glass, can be adjusted to either a clear or tinted state with the push of a button.

While daylighting may still be a relatively new concept, it is growing as a design trend—not surprising since so many people have a desire to connect with the outdoors and even more want to reduce their use of electric lighting.

Here at the *Architects' Guide to Glass & Metal* we'd like to know how often you design buildings with daylighting in mind. Or, is daylighting a completely new concept for you? Feel free to e-mail me your thoughts, comments and experiences on working with daylighting. Also, be on the lookout for a future issue where we will take a more in-depth look at designing with daylighting in mind. **AG**

Ellen Rogers



Ellen Rogers

Architects' Guide TO GLASS & METAL

Editor	Ellen Rogers Extension 118 • erogers@glass.com
Contributing Editors	Charles Cumpston Extension 0 • ccumpston@glass.com Tara Taffera Extension 113 • taffera@glass.com
Assistant Editor	Megan Headley Extension 114 • mheadley@glass.com Katie Hodge Extension 0 • khodge@glass.com
Managing Editor	Erin Harris Extension 130 • eharris@glass.com
Art Directors	Chris Bunn Extension 132 • cbunn@glass.com Dawn Campbell Extension 150 • dcampbell@glass.com
Exhibit Manager	Tina Czar Extension 115 • tczar@glass.com
Marketing Director	Holly Biller Extension 123 • hbiller@glass.com
Marketing Assistant	Ally Curran Extension 133 • acurran@glass.com
Customer Relations Mgr.	Janeen Mulligan Extension 112 • jmulligan@glass.com
Web Developer	Bryan Hovey Extension 125 • bhovey@glass.com
Publisher	Debra A. Levy Extension 111 • deb@glass.com
Published by Key Communications Inc. P.O. Box 569 Garrisonville, VA 22463 USA 540/720-5584; fax 540/720-5687	
Advertising Offices:	
Midwest	Lisa Naugle Associate Publisher lnaugle@glass.com 312/850-0899 Fax 312/277-2912
Northeast & Eastern Canada	Deb Levy dlevy@glass.com 540/720-5584 x111 Fax 540/720-5687
Southeast	Scott Rickles srickles@glass.com 770/664-4567 Fax 770/740-1399
West Coast & Western Canada	Ed Mitchell emitchell@glass.com 805/262-2932 Fax 805/262-2933
Europe	Patrick Connolly patco@glass.com 99 Kings Road, Westcliff on Sea Essex SSO 8PH ENGLAND (44) 1-702-477341 Fax (44) 1-702-477559
China & Asia	Sean Xiao sean.xiao@glass.com Rm.403, Block 17, Wuyimingzhu, No.6 Jinshan Road, Fuzhou, Fujian, 350001, China. (86) 591 83863000

All Others Contact Publisher Directly

Debra A. Levy
Extension 111 • deb@glass.com



Two Great Ways to Learn About Glass



March 17-18, 2011

Hyatt Regency Long Island at
Wind Watch Hotel & Golf Club
Long Island (Hauppauge), New York

Glass Expo Northeast™ is the region's largest conference and trade show dedicated to the architectural glass and metal industry. Join industry suppliers, dealers, and other attendees close to home at Glass Expo Northeast!

Sponsored by:



Learn more about Glass Expo Northeast™ at www.usglassmag.com/gene or call 540/720-5584

GLASS EXPO MIDWEST 2011™

April 7-8, 2011
Indianapolis Marriott East
Indianapolis, Indiana

Co-sponsored by the Indiana Glass Association, the Illinois Glazing Association, the Michigan, Ohio, Minnesota, and Wisconsin Glass Associations, Detroit Glass Dealers Association and the Association of Glazing Contractors, USGlass, Door & Window Manufacturer, Architects' Guide to Glass, and Solar Glazing magazines.



Glass Expo Midwest™ returns to Indianapolis alongside Fenestration Day™ and Architects' Educational Forum. Instead of traveling to the coasts for education, Glass Expo Midwest is bringing the information and networking opportunities straight to your area.



Learn more about Glass Expo Midwest™ at www.usglassmag.com/gems or call 540/720-5584

Metal Matters

The Next Level

Assuring Peak Thermal Performance of Fenestration

by Ken Brenden

Many of today's window systems take advantage of an assemblage of components of various materials to optimize all aspects of thermal performance.

The discussion about the thermal performance of fenestration has moved beyond yesteryear's debate over the thermal properties of a product's predominant framing material. Today's highly engineered profiles take maximum advantage of an assemblage of components of various materials to optimize all aspects of thermal performance. The key elements of this are minimizing heat conduction between the interior and exterior (as measured by the U-factor) and optimizing solar heat gain (as expressed by the Solar Heat Gain Coefficient [SHGC]).

Note that the proper term is optimizing, not minimizing SHGC. While energy use in commercial buildings is typically dominated by cooling loads that dictate a lower SHGC, buildings in northern climates can benefit from higher SHGCs to offset thermal transmittance losses.

Thermal Performance Contributors

Aside from green scoring systems, energy-specific rating systems and energy codes, specifiers (and others) should be aware of the specific physical attributes that contribute to maximum thermal performance.

1. Insulating glass unit (IGU): Double glazing is well-recognized as a key means to minimize U-factor;

2. Gas fill: Replacing the "dead air" within IG units with an inert gas, such as Argon or Krypton, further reduces heat flow;

3. Warm-edge spacers: This technology upgrades the more traditional metal spacers to material that reduces heat flow around the edges of IG units and also reduces the tendency for condensation to form around the perimeter of the glass;

4. Low-E glazing: These glass coatings have been shown to reduce solar heat gain and the loss of internal heat via re-radiation. This solution can be fine-tuned for heating-dominant or cooling-dominant climates by varying the IGU surface to which the coating is applied;

5. Tinted or reflective glazing: Especially viable in hot, southern or southwestern climates, this is a well-known option for reducing unwanted solar heat gain;

6. Thermal barriers: For commercial applications, aluminum is commonly used due to its inherent structural strength and light weight.

Aluminum's naturally high thermal conductivity has been largely overcome by advanced thermal barrier technology; and

7. Effective sealing and weatherstripping: Air leakage around frame and sash members can work against all other energy-conserving solutions. Reasonably tight construction and effective weatherstripping will do the job, but its application must not unduly increase operating force.

Added Benefits

Minimizing thermal transmission also carries the added benefit of minimizing the tendency to form condensation. In commercial facilities, condensation resistance can be an important factor in the building's functionality. For example, in hospitals moisture provides fertile ground for growth of potentially dangerous molds or bacteria and can lead to hospital-acquired illnesses in patients as well as compromise sensitive diagnostic equipment.

The tendency of a window design to form condensation can be predicted by its Condensation Resistance Factor (CRF). AAMA offers an online calculator to provide general guidance on defining a target minimum CRF based on a project-specific set of environmental conditions. (Visit <http://www.aamanet.org/CRFtool> for details.)

Thermal performance of a completed commercial fenestration unit is quantified by testing according to industry consensus standards, such as AAMA 1503, *Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections*, initially published in 1980.

Also, AAMA 507-07, *Standard Practice for Determining the Thermal Performance Characteristics of Fenestration Systems Installed in Commercial Buildings*, provides a simple means to verify the energy performance of commercial fenestration using graphs and linear interpolation based on one-time test results. **AG**

Ken Brenden is the technical services manager for the American Architectural Manufacturers Association (AAMA) based in Schaumburg, Ill. Mr. Brenden's opinions are solely his own and not necessarily those of this magazine.

If we have our way, there will be no shortage of natural light in the future.



- Entrances
- Storefronts
- Curtain Walls
- Sun Controls
- Windows
- Balcony Doors



YKK AP is dedicated to being your best single source for fenestration systems that support sustainable design practices. Our enerGfacade™ family makes it easy to select the right products for green building designs. Within the family, our MegaTherm® XT entrances and YOW 350 XT window system provide best-in-class thermal performance to minimize energy loss and maintain warm interior surfaces. Our award-winning sun control systems, ThermaShade® and Luminance®, reduce solar heat gain and enhance interior daylight. When the building envelope needs to be green, YKK AP's enerGfacade family is all you need to know.



Re-Birth

Glass Plays a
Critical Role in
Downtown
Pittsburgh's First
New Skyscraper
in 20 Years

3 PNC Plaza was designed to be clear and open to those inside as well as those passing by outside.

m

ore and more developers and planners are searching for ways to restore the life, culture and excitement of cities, culminating in the revitalization and renewal of many urban areas. Consider downtown Pittsburgh. For centuries this Pennsylvania locale was known for its strong industrial ties, particularly in coal mining, steel production, aluminum and glass. And today, while manufacturing remains a big part of Pittsburgh's economy, the city's industrial focus has evolved into more high-tech fields, ranging from robotics to healthcare. And just as the city's economy has changed, so too, has the face of its downtown district.

"Cities are trying to create more diversity in the use of their downtown areas so they are not just a financial district or a business district. Developers are trying to get people living and shopping downtown and getting more 24/7 use out of their urban core," says Ben Tranel, a project architect with San Francisco-based Gensler. "You see that among the post-industrial towns, such as Pittsburgh, but you also see it in smaller communities that aren't necessarily post industrial but have been subjected to a lot of urban sprawl and urban growth and are trying to find a way to create an identifiable downtown urban core."

Earlier this year downtown Pittsburgh saw the completion of its first new high-rise in 20 years, when the Fairmont Hotel at 3 PNC Plaza opened its doors. Designed by Gensler, 3 PNC Plaza is a 752,000-square-foot, 23-story, mixed-used high-rise constructed to meet LEED standards. The cladding area of the building was 250,000 square feet and about 4,000 pre-glazed frames were installed. Construction began in 2008 and the office portion was completed in 2009.

The 3 PNC Plaza project was one about urban renewal, renovation and bringing some life back to downtown Pittsburgh. It changed the city's skyline, and would not stand as it does or have achieved the desired performance measures without the use of glass.

Key Considerations

"The idea was to create a building that would be a part of the skyline in a light, bright and refreshing way," says Tranel. "We were looking for glass products that would feel light and airy, as we did not want something heavy like stone. We also wanted a glass that would have some coloration and warmth so on those cold, gray, winter days the building would still have warmth and brightness."



Photo by Bruce Damonte.

Another design consideration was the fact that the tower would be a mixed-use building, having a hotel, condo and office portion, as well as different aspects in the base, such as a retail component.

"We were looking to break down the mass of the building so it would not feel too big and massive and we wanted to articulate the different programs inside the building, both formally, but also through the type of glass," says Tranel, who explains that the condo portion incorporates a different glass type, as well as some articulation in the architecture, so it has a different mass offsetting it from the rest of the building.

"The different glass type creates a differentiation as you read the building from the exterior," he explains. "Then between the offices and hotel we used ceramic frit on the office, but not on the hotel, and we differentiated the mass by using the ceramic frit in some areas but not others. In the storefront portion it's all very clear and open to activate the street from the pedestrian level when you're walking by. People can see in and those inside can see out so it's like an urban room, which

The design and construction of 3 PNC Plaza was about urban renewal and bringing new life to downtown Pittsburgh.

continued on page 8

Re-Birth continued from page 7

“The idea was to create a building that would be a part of the skyline in a light, bright and refreshing way.”

—Ben Tranel, Gensler

Contract glaziers installed 4,000 pre-glazed frames as part of 3 PNC Plaza's construction.

Photo by Bruce Damonte.

was one of the concepts we were working with—the hotel lobby wanted to feel like an open room that was connected to the urban fabric around it and revitalizing to the streetscape. Glass was just a natural material to support a lot of those ideas.”

Glass Selection

When it came to selecting the glass, the culture and history of Pittsburgh came into play, particularly since PNC is headquartered in the city.

“There was a desire to, if at all possible, work with PPG because its headquarters are a block and a half away,” says Tranel. “The company provided us with a new coating that had not been used extensively before; it wasn’t brand new and it wasn’t the first time it was used, but it was something relatively new for them. It was exciting to work with them in, not only revitalizing downtown, but also supporting a local business.”

The majority of 3 PNC Plaza features PPG’s 70XL, as well as a green body tinted glass.

“Those products, together with the coating on the number-three surface and the frit on the number-two surface, gave us the energy efficiency we needed because the building is also targeting LEED certification,” says Tranel. “Part of that achievement is energy performance so the glass

was carefully selected based on environmental performance and its aesthetic.”

Trulite Industries in Mississauga, Ontario, fabricated the insulating glass (IG) for the project.

The company had previously served as the glass fabricator for Heinz Field Football Stadium, also in downtown Pittsburgh.

Oldcastle BuildingEnvelope (which acquired contract glazier Antamex in 2006) handled the glazing portion of the project. R. (Rocco) Parzanese, vice president of contracts, said they were brought on to the job by P.J. Dick, the general contractor.

“We were pretty well involved beginning with the design-assist stage of the project. There were architectural drawings available when we came on board, but a lot of the architectural details were not developed yet,” says Parzanese. “We went through all of the development details and conditions with the architects, which involved several meetings and a lot of conference calls.”

Parzanese explains that while architects already had a vision of what the project would be, his company was involved helping finalize the working details. He says his company was responsible for completing the envelope of the building, which included the pre-glazed curtainwall, alu-

minum cladding, doors, soffits, grills, etc.

"The architects wanted to work with one entity as much as possible and we took on that role," says Parzanese. "They already had in mind what the glass and colors and finishes were going to be. We were on board to make sure it would all work properly."

Form and Function

For a project so heavily focused on the glazing element, both performance and aesthetics were critical. Tranel says one of the challenges with which they were faced involved making sure the color of the glass was exactly right.

"It was tough to get the right combination of substrate and low-E coating to get the color we wanted," he says. "While it was a challenge to get the right color and balance with environmental performance, in the end we were happy with the way it turned out."

He says a unique feature of the glazing was the use of the low-E coating on the number-three surface.

"In Pittsburgh this was somewhat unexpected that it would work out as well as it did from an environmental performance," says Tranel. "Being able to do that and still get the ceramic frit to read through from the number-two surface was something we were excited about."

Also, on all the condos a laminated inner lite was used on the IG unit to reduce ultraviolet infiltration so there wouldn't be fading of fabrics, carpet or upholstered furniture in the condo units.

"It's a unique amenity that's not typically offered to a condo owner," says Tranel.

Working with large glass lites also posed challenges.

"There were some very large pieces of glass, especially in the storefront of the hotel lobby. So it was a bit of a challenge to get some of those made because they were 7-feet, 6 inches wide—quite big insulating, low-E coated units," says Tranel.

Parzanese adds that his team spent a lot of time at the main entrance of the hotel because of the large glass lites.

"It took quite a bit of planning and logistics to make sure they would work," he says. Speaking of the project in its entirety, he adds, "[The glass work] was quite intricate in the sense of some of the interfacing details, especially at the terrace areas and the soffit areas where we had to integrate with the curb and roof conditions."

He adds that they also spent a lot of time on levels 12 and 13 where there is a roof terrace.

"They also have an outside patio, where we had to work through the details for the soffit conditions. The space was comprised of column claddings and doors in those areas, all of which were within view at the roof area. Everything had to be integrated for a presentable look," says Parzanese, who adds that they also went through visual mock ups with PPG.

"We also had a number of tests to do in order to get our system approved. It was essentially a custom system; we started with a clean sheet of paper and probably had a minimum of 18 new extrusion dies."

In It Together

According to Parzanese, one thing about this project that made it different compared to others was the fact that Gensler, the design architect, and the local architect, Astorino of Pittsburgh, were on two different coasts.

"So [working around] the time difference could sometimes lengthen the time to communicate between all the parties," Parzanese says.

However, he points out that despite the logistical considerations, everyone involved was able to work well together.

"We had a number of face-to-face, on-site meetings [which had to be coordinated when Gensler architects were in town] and we also had weekly conference calls and those conversations took place [from the beginning]," says Parzanese. "It wasn't a case of coming to a certain point in time and saying, 'OK, I guess we better ask some questions.' The questions [were asked] continually and we worked through them every week with the architects and contractor."

Tranel agrees.

"It was a very positive experience," he says, adding that this project, like many others, provided a learning opportunity and lessons that will be valuable on future jobs. "You always learn about how products go together and it's enlightening to experience the differences in how a material appears from a 12 x 12 standpoint to a mock up to the actual site," he says. "And that's also an experience that you accumulate and take with you to the next project." **AG**

Ellen Rogers is the editor of the *Architects' Guide to Glass & Metal* magazine.

Photo by Bruce Damonte.



The majority of 3 PNC Plaza features PPG's 70XL, as well as a green body tinted glass.

New Product Focus

components New Additions

Intercept® stainless steel and tin-plated spacers from PPG have been added to the National Fenestration Rating Council's (NFRC's) Component Modeling Approach Software Tool (CMAST) database.

According to the NFRC, Intercept stainless steel or tin-plated spacers each can be modeled in CMAST in 21 finished airspace widths ranging from 6.35 to 22.23 millimeters (0.250 to 0.875 inches). The products are configured as Path III spacers, which enable software users to benefit fully from the actual Intercept spacer geometry and effective conductivity (Keff).

Under the NFRC's Component Modeling Approach (CMA), fenestration products such as doors, windows and skylights are examined in terms of their glazing, frame and spacer components. CMAST software calculates the performance values of these components in combina-

tion to help energy consultants maximize the energy efficiency of fenestration products.

→ www.ppg.com

sealants Made to Order Color Selections

Dow Corning® created its Color It Right program as a way

to expand color availability of its brand silicone construction sealants without sacrificing time, quality or ease of installation. The company says the made-to-order Color It Right catalog color



sealants are ready to ship in three days and minimum order requirements as low as two cases of sausage packs can help eliminate waste and keep jobs on budget.

In addition to catalog colors, computer-matched custom colors that meet building project requirements are ready to ship in nine business days. Factory-pigmented, one-part sealants are available to ensure consistent color from start to finish and access to small quantities helps ensure availability of colors for unique applications and small-scale projects.

→ www.dowcorning.com/ColorItRight

storefront and curtainwall Finishing Touches

A new copper anodize finish from Tubelite was created to provide visual effects while also retaining a bright, metallic appearance. It also provides the same low-maintenance benefits of the company's storefront, curtainwall, entrance and daylight control systems.



sunshades Out of the Sun, Into the Shade

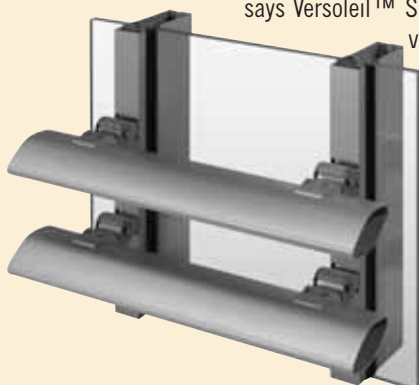
Versoleil™ SunShades are the latest development from Kawneer Company Inc. Beginning with the Single Blade SunShade System, the company says Versoleil™ SunShades offer a broad range of versatile products to suit almost any project.

To maximize energy saving potential, reduce solar heat gain and increase occupant comfort and productivity, the blades can be oriented horizontally or vertically. The new sunshades have also been designed and tested to withstand the stresses resulting from wind, snow or other factors.

In addition, Versoleil™

SunShades can add aesthetic appeal to building envelopes, as they can be seamlessly incorporated into multiple Kawneer curtainwall platforms in horizontal and vertical configurations. The new sunshades are available in various depths from 6 to 14 inches and can accommodate a full range of color options.

→ www.kawneer.com



According to the company the finish is abrasion resistant, durable and is applied and tested to meet all AAMA 611 Class 1 specifications. Offered as a standard color choice, custom color-matching is not necessary. Clear coat or periodic lacquer treatments are also not required to preserve the copper color. The company adds that the copper anodize creates a matte finish that helps hide imperfections that may occur on the surface of recycled aluminum.

→ www.tubeliteinc.com

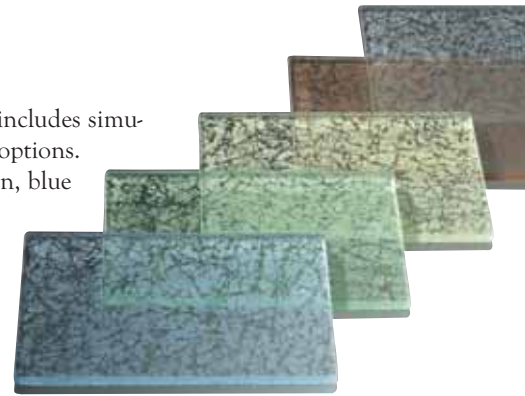
decorative glass Distinctive Details in Glass

The recently expanded Viraspan Design Distinction Series from Owatonna, Minn.-based Viracon includes four standard patterns that can be used in interior applications. In addition to the new patterns, five new tinted translucent frits

broaden the current offering that includes simulated acid-etched and sandblasted options. The new colors, fog gray, sage green, blue frost, spice and yellow moon, are tinted ceramic enamels that are silk-screened onto the glass and fused onto the surface during heat treatment.

Viraspan Distinction Series patterns can be applied to clear or tinted glass substrates and can be combined with any of Viracon's high performance coatings. The patterns are available in any of the standard opaque or new translucent color options. In addition, the Distinction Series and translucent color options are suitable for laminated glass, monolithic and insulating configurations.

→ www.viracon.com AG



www.e-bentglass.com

One piece or thousands, our custom fabricated BENT GLASS is bringing form and function to the designs of tomorrow.



**Architectural, Interior, Solar
& Transport Applications**



Precision Glass Bending

THE WORLD LEADER IN
CUSTOM FABRICATED
BENT GLASS

Precision Glass Bending Corporation
PO Box 1970, 3811 Hwy 10 West
Greenwood, AR 72936-1970
UNITED STATES OF AMERICA



TEL (800) 543-8796 • FAX (800) 543-8798 • sales@e-bentglass.com

AIA Continuing Education Update

Curtainwall and glazing systems have evolved tremendously over the years. Today, one of the trends that continues to grow in popularity among the architectural community is the transparent, all-glass façade. To help provide a better understanding of such systems, a number of companies offer AIA continuing education courses.

Exposed Structural Systems and Long Span Glass Facades

Enclos Corp.

Learning Units: 1

This course provides education about designing and creating structural glass and long span glass facades. Participants will learn to identify and compare seven different structural systems used in the support of long span glass facades; list at least four of the relevant evaluation criteria used in comparing different structural systems; identify and com-

pare three different glass systems for applications in long span glass facades; define an optimum delivery strategy for an innovative long span facade solution; and propose a long span facade solution in response to given project parameters.

→ www.enclos.com

Structure and Structural Glass 08

Perkins & Will Inc.

Learning Units: 1

Those taking part in this course will take away knowledge about the analysis and engineering for structural glass with an emphasis on long span structural solutions. The presentation includes case studies of a variety of structural solutions including the Toronto Performing Arts Center, which course organizers say promotes architectural transparency and reduces structural steel utilization.

→ www.perkinswill.com AG

If your company offers an AIA Continuing Education Course please let us know about it by emailing erogers@glass.com

Receive the Architects' Guide™ FREE

Fax this order form to 540/720-5687 or subscribe online at www.glass.com/subcenter.php

I want to receive the Architects' Guide to Glass™ FREE of charge: Yes No

Name: _____
 Signature: _____
 Company: _____
 City: _____
 Phone: _____
 Country (if not USA): _____

Title: _____
 Date: _____
 Address: _____
 State: _____ Zip: _____
 Fax: _____
 Email: _____

1. Please check the ONE category that BEST describes the business activity of your company:

- Architect Specifier Manufacturer
 Other (please specify): _____

2. Please check ALL the types of work your company performs:

- Commercial Residential
 Other (please specify): _____

3. Number of employees: 1-4 5-9 10-19 20-49 50-99 100+

4. Please check all the products or services your company designs with or specifies:

- Windows/Window Hardware Plastic/glazing alternatives Storefronts/curtainwall systems
 Doors/Door Hardware Sealants/adhesives Insulating glass
 Architectural Metals Shower doors/tub enclosures Bent, etched, beveled glass
 Mirror and mirror products Machinery and equipment Other (please describe): _____

Check here to also subscribe to the free, bi-monthly e-mail newsletter.

My business is engaged in Glass and/or Metal Related Architecture. Yes No

Subscriptions are free to all qualified recipients at U.S. addresses. Addresses outside the U.S. please add \$65 per year. Digital edition is free world wide.
 By subscribing and signing this form, I also agree to allow publisher to contact me via fax, e-mail and/or telephone in the future.

ANA Glazing Manual

50th Anniversary Edition

Considered the “industry bible” by the
commercial glass and glazing industry.

Half a century of next generation design.

The future of architecture.

Order today at
www.glasswebsite.com



GLASS ASSOCIATION OF NORTH AMERICA

www.twitter.com/glassnation



The right glass can do wonders
for indoor environments.

And the outdoor one.

Project credits at ppgideasces.com/SB70XL

Cut cooling costs, equipment costs, and carbon emissions with Solarban Low-E glass.

With over a billion square feet of Solarban sold, impossible-sounding LSG ratios may no longer impress you. But the results you'll find with our online energy analysis tool certainly will. For instance, with our leading Solarban glass, your next project could save \$400,000 in up-front equipment costs and reduce carbon emissions by 21,000 tons. Find out more at ppgideasces.com/SB70XL.

Solarban, IdeaScapes, PPG and the PPG logo are trademarks owned by PPG Industries, Inc. | Cradle to Cradle Certified™ is a certification mark of MBDC.

