

Architects' Guide™ TO GLASS & METAL

Volume 24 • Issue 2

March/April 2010

Glazing Las Vegas

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- Annual Guide to New Products
- Industry Education
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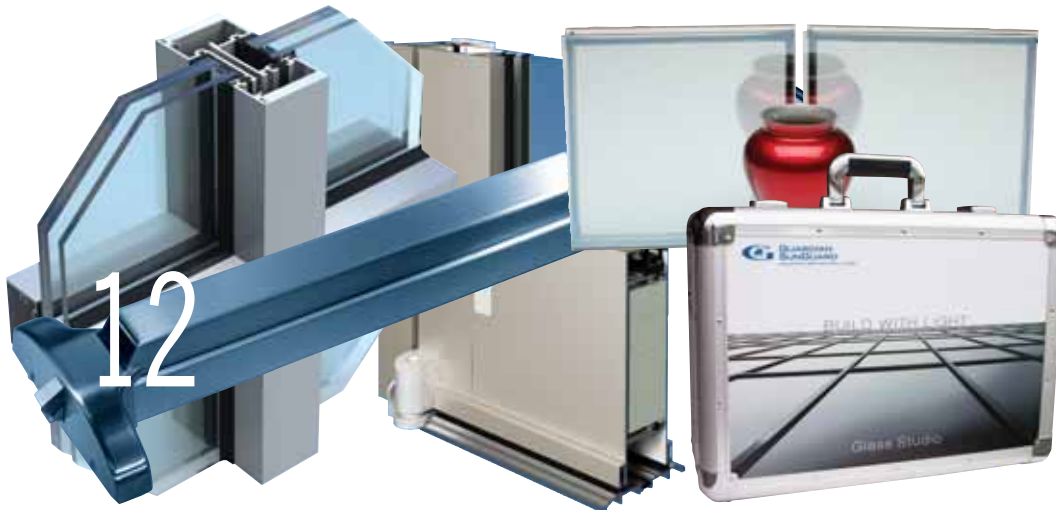
Architects' Guide

TO GLASS & METAL

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On the Cover
Extensive glazing surrounds the registration desk area at the ARIA Hotel & Casino in Las Vegas. Turn to page 8 to read more about the project.
Photo provided by Novum Structures.

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From the Editor

Building a City



Ellen Rogers

Las Vegas has never been my favorite city, but every year I find that I must travel there at least once, usually twice (and sometimes more) for a conference, trade show or convention. In fact, as I write this, I will be boarding a plane in just a few short hours that will take me there for Glass Week, the Glass Association of North America's annual conference.

While I may not be a gambler, there is something I am looking forward to with this visit to "Sin City": CityCenter.

Last December CityCenter, the new "city within a city" in Las Vegas, officially opened. The complex includes ARIA, a 61-story, 4,004-room gaming resort; luxury non-gaming hotels including Las Vegas' first Mandarin Oriental and Vdara Hotel & Spa; Veer Towers, the development's only strictly residential buildings; and Crystals, a 500,000-square-foot retail and entertainment district. CityCenter is also one of the largest sustainable developments in the world, with six Gold LEED certifications.

While glass was used extensively throughout the construction of all the CityCenter buildings, the Aria tower, designed as the heart of the project, stands out as a glazing showstopper. Designed by Pelli Clarke Pelli architects, the project's tower features 1.2 million square feet of curtainwall as well as two massive structurally glazed canopies and a point-supported wall system.

The glazing also played a key part in Aria's sustainability features. In fact, the project is currently the largest building in the world with LEED Gold status. The high-performance curtainwall system, installed by Enclos, features glass from Viracon that is designed to allow in daylighting while blocking the sun's heat-producing rays.

Green was important to the project's owners from the start and the glass systems helped them achieve their LEED goals.

Turn to page 8 of this issue for an in-depth look at the construction of Aria.

Visiting CityCenter yourself? Share your pictures of the project with the *Architects' Guide to Glass & Metal* by emailing me at erogers@glass.com. **AG**

Ellen Rogers



The Aria Resort and Casino opened December 16.

Architects' Guide TO GLASS & METAL

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Projects

Trump SoHo New York is sheathed in a silver glass curtainwall.



Silver Glass Curtainwall Shines on New Trump® Hotel

Designed by Handel Architects, Trump SoHo™ New York is the Trump Hotel Collection's first hotel in Downtown New York, and is set to open its doors later this year. The, 46-story, 391-room tower is clad in a silver glass curtainwall supplied by Viracon.

In describing the tower, information from Handel Architects says, "As a 24-hour building type, hotels have the unique ability to activate the streetscape as well as distinguish the skyline. The intent of the building design is to express this internal, dynamic life and its relationship to its urban surroundings by creating a singular material expression revealing the public theater of the hotel public spaces through clear glass while concealing the more private functions with translucent glass. The banquet level will be clad in glass with a metal-mesh interlayer and colored glass accents, both revealing and concealing the ever-changing life of its interior. Above the podium, the tower reaches skyward 450 feet. Within the body of the tower, select vistas from the hotel suites are 'captured' from urban-scaled windows projecting out from the face of the tower."

Georgetown University's New Building Wins Craftsmanship Awards

The Washington Building Congress has awarded the Whiting-Turner Contracting Company the Craftsmanship Awards for its work on the Georgetown University McDonough School of Business Rafik B. Hariri Building. The award was presented for its glass railing and ornamental metal work in the Simone McDonough Atrium and Lohrfink Auditorium, which was done by Tate Ornamental.

The Craftsmanship Awards recognize the outstanding skill and achievement of individual craftsmen in the local construction community.

The Rafik B. Hariri Building at Georgetown's McDonough School of Business is a 179,000 square foot structure that opened in June 2009. It houses all of the school's business education programs. Major gifts from alumni funded the design and construction of the \$82.5 million facility.



The Rafik B. Hariri Building at Georgetown University was recognized for its glass railing and ornamental metal features.

Emporis Selects Chicago's Aqua Tower as 2009 Skyscraper of the Year

The jury of the Emporis Skyscraper Award named Aqua, an 81-story residential and hotel tower in Chicago, its 2009 Skyscraper of the Year. The award, now celebrating its tenth year, is given annually to a building at least 100 meters tall and completed within the award year.

Designed by Jeanne Gang of Studio Gang Architects of Chicago, Aqua intersperses undulating balconies with flat glassy planes to create a wavy facade in keeping with its nautical theme. Gang says the effect has been compared to a rippled curtain or the striated limestone formations common to the Great Lakes region.



Photo by Steve Hall at Hedrich Blessing

With a height of 249.7 meters, Aqua is currently the 40th tallest building in the United States.

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Projects

The tower features low-E coated insulating glass in all windows; frit patterned glass was also used in the railings to help prevent bird strikes.

Aqua is currently the 40th tallest building in the United States and has a height of 249.7 meters (819.34 feet) measured from its main entrance.

According to the announcement, members of the jury praised Aqua for having a fascinating shape and appearance that change dramatically depending on the perspective. It was also cited as a "brilliant technical achievement" for the precision of its construction, and lauded as an application of green design innovations to an extremely large building project.

The developer, Magellan Development Group LLC, has applied for LEED certification. **AG**

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First Things First

by Ellen Rogers

Building the ARIA Tower at CityCenter Proved a First for Many Groups Involved



In just three short years an architectural and construction team consisting of some of the industry's best players designed and built a glittering city within a city that has forever transformed the famous Las Vegas skyline. Where the old Boardwalk Casino once sat, today stands CityCenter, a 67-acre complex that is home to hotels, casinos, retail establishments, restaurants and residences. CityCenter is a joint venture between MGM Mirage and Infinity World Development Corp. of Dubai.

The CityCenter project was divided into several "blocks," each of which included different building segments. The 3.8-million-square-foot glass and steel ARIA Resort & Casino, though, is located in the heart of CityCenter. The 4,000-room tower was designed by Pelli Clarke Pelli Architects and stands as the firm's first casino project, as well as its first Las Vegas project.

"ARIA was [CityCenter's] centerpiece and the owners wanted it to announce itself on the skyline of Las Vegas," says Gregg Jones, the project's design team leader with Pelli Clarke Pelli.

And announce itself the tower indeed does. Not only does it feature floor-to-ceiling, wall-to-wall glass, but also massive glass canopies and structural, point-supported wall systems. In addition to its aesthetics, the tower is a beacon of sustainable design, having earned Leadership in Energy and Environmental Design® (LEED) gold

certification. In fact, owners and developers approached the entire CityCenter project with an eye toward green as it is the first hotel, retail district or residential development in Las Vegas to earn LEED Gold certification—not just one, but a total of six Gold certifications.

Creating a project of this scale was no easy feat. Architects, contract glaziers and suppliers all had to work closely throughout all phases to ensure a successful completion.

Creating a Vision

In 2004 MGM approached Pelli Clarke Pelli to discuss the CityCenter project, which they were contemplating at the time.

"We were not particularly interested in doing a themed architectural structure; luckily MGM was not either," says Jones. "The theme that they wanted was good design. So it was very easy to say yes because all of our intentions and goals [were in sync]."

And while the architectural firm, which has designed such well-known structures as the Petronas Towers in Kuala Lumpur and the International Finance Center in Hong Kong, had done casino studies, this project would be its first casino project.

"And up until that time we had done hotels, 200 or 300 keys; this was 4,000 keys. So this project was several first for us," adds Jones.

Included in the design of ARIA is a massive, high-performance curtainwall system that was created to allow in natural daylight while blocking the sun's rays. Enclos served as the contract glazier for the tower, which features Viracon's VRE -138 1 1/8-inch, insulating, low-E glass in the vision and spandrel areas. Working through a joint venture with Baker Metal Products, Enclos provided design, engineering, fabrication and assembly and erection of 1.2 million square feet of curtainwall—the company's largest curtainwall project. Installation took 22 months.

"From an aerial view of the site the building geometry is very unique. Two overlapping arc segments create its footprint," says Bobby Zammetti, senior project manager with Enclos. "But one of the most unique features of the curtainwall are the corner units. There are roughly 3,300 of these, all of which are designed without a corner mullion that you would have in a conventional curtainwall unit."

The high-performance features of the glass proved an attractive selection for MGM, particularly since sustainability was so important.

This building has floor-to-ceiling, wall-to-wall glass and every single room has a faceted bay and the glass is probably the most cost-effective way to achieve remarkably high performance levels," says



Extensive glazing in both the ARIA tower and its canopies are highlights of this addition to the Las Vegas skyline.

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First Things First

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Jones. "The glass has surprisingly high light transmission and also, in many lights, has a high degree of reflectivity and in other lights and shades it looks surprisingly transparent. At night, when you look up and down the strip, most buildings [appear] highly mirrored and very dark. This glass really comes alive when you look at it at night and it glows from within."

And, it's the way that glass interacts with daylight as well as its ability to be both reflective and transparent that Jones says makes it a material his firm works with frequently.

"It's so unique and [has the ability to do so much]. It has the ability to span pretty impressive distances with large thicknesses and it's a quite cost-effective material. It also has the ability to stand the test of time," says Jones. "It's a material we constantly use and we try and use it in as many different [ways] and look at it in new ways each time we work with it. It seems to always be able have a new and different look."

Looking Up

In addition to the curtainwall system, glass was also used in other ways throughout the ARIA project. Two massive canopy systems, as well as structural walls in the entrance areas are also defining elements of the project.

Speaking of the canopies, Jones says, "[We thought] it would be nice to not be under a dark cantilever and instead have the Las Vegas sun and

ambient daylight, which would have a real glow while still achieving both weather protection and solar protection. So we used a fairly dense, 60-70 percent ceramic frit, which provides a constant ambient glow as well as protection from the direct sun and the weather."

Novum Structures manufactured and supplied a number of these glazing systems, while installation was subcontracted to the Las Vegas branch of Giroux Glass. This work included a 37, 200-square-foot canopy located at the front entrance, and the front entry vestibule, which features stainless steel elliptical structural columns and swing doors. On the Harmon Avenue entrance, the company built a similar 18,400-square foot canopy and also a three-story, curved and inclined 32,000-square-foot wall.

"This wall is comprised of suspended steel fins with a machined groove in them and the glass is edge clamped," says Ian Collins, president and chief executive officer of Novum. "The wall includes several vestibules and doorways, which use elliptical stainless steel profiles." He adds that there is also a series of water features behind the wall comprised of cast glass braced by tension cables. The company also supplied a glass and steel atrium that's located in the registration area.

"Immediately upon arrival you have a view into the building and when you are in the building you have a view out," says Jones. "We wanted to achieve that in a way that did not involve a lot of mullions and together with [Novum] we developed a fascinating horizontal glazed system, barely 50-mm thick. Since it spans column-to-column we did not need any additional vertical mullions and since we hung them, all of the vertical dead load was taken out so the glass spans from horizontal blade to horizontal blade and it was all hung from the ceiling and attached to the column."

Sanxin Glass from China was Novum's glass supplier for the entrance and canopy portion of the project. The canopies are constructed of laminated glass with a white frit.

Installation took Giroux glass about one year to complete and Jonathan Schuyler, a Giroux preconstruction executive and partner, says toward the end they had about 120 people on the job at one time.

"It was very dramatic the way it all came together in the end," says Schuyler.

Relationships Matter

With so many parties involved in the construction of the ARIA tower it's not surprising that constant, open communication was critical. Jones says he talked with members of the subcontract-

The ARIA's glass canopies cantilever out nearly 100 feet.



ing team daily for about 30 months.

"The scale was so extraordinary; and with Novum their pieces were so large. It was truly the complexity of the structures and how the structures interacted with the glass and how the glass and structures interacted with the building," Jones says. "There was an incredible degree of complexity with Novum; we were speaking with each other almost hourly."

Collins adds, "We had a lump sum design build arrangement in that the bid drawings were incomplete and so we had to develop many of the details with the architect, and all the interfaces with surrounding trades had to be coordinated via the general contractor. Our suppliers were responsive and we avoided manufacturing on a changing field schedule by pre-making items as we could and storing them in Nevada. That way the fabrication was less interrupted than if we were trying to fabricate just-in-time from the factories."

Speaking of the tower's construction, Zammetti adds, "The schedule dictated everything. With a project of this size, lead times and deliveries of materials from our suppliers were critical. Constant communication with the architect and general contractor was necessary to ensure that any design issues would not impact any material flow from our suppliers."

Careful Considerations

Just as designing, constructing and completing the ARIA project was a unique process, it also posed its share of unique challenges and considerations. Jones says the biggest challenge, regarding the tower and the canopy, was the massive scale.

"Any time you are doing 28 acres of curtain-wall with 30-plus kilometers of sunshade, there is phenomenal complexity," says Jones. "If you see the building form, it's a pair of intersecting arcs and every room has a bay window and literally hundreds of corners on each floor; each floor is 112,000 square feet. As much as we tried to standardize the basic unit, there were an enormous number of unique conditions that had to respond to the evolving form. As far as the canopy, it involved an extraordinary number of phenomenal cantilevers. In both cases, the Harmon entrance canopy as well as the casino circle canopy, these cantilever out nearly 100 feet."

Scheduling was also a challenge.

"Despite having a fixed opening date for the casino we could tell at the outset that the schedule and sequencing would be a moving target on such a large overall undertaking. So we opted to

open a large storage yard and inventory thousands of pre-fabricated custom elements in Las Vegas," says Collins. "Daily deliveries were made to the site from this yard so virtually any change in sequence or request could be accommodated quickly. This was a massive field inventory control effort, which is unusual in a construction environment." Other challenges he points out included shop drawing coordination, field activity overlap, access and scheduling conflicts.

Zammetti agrees that while working on the tower portion they, too, saw their own share of challenges.

"The site logistics were the biggest challenge on this project. With four other buildings being built on the same 67-acre site, deliveries were difficult. Storing materials on the ground, staging and installing the curtainwall units required intense daily coordination with the general contractor," says Zammetti.

All for One

The ARIA project provided many firsts for all of those involved and it now stands as an example of that hard work and dedication. It was a project that also proved to be a learning experience for everyone involved. Jones says it wasn't just any one thing he learned, but hundreds of things. Excellent communication made the project a success.

"And that's something that not a lot of firms do well, not a lot of contractors do well and not a lot of architects do well. It's something we make a concerted effort at and it's extremely important to communicate your intentions and stay in constant contact and to have partners in a process who want to be partners and share ideas.

Without that intellectual climate this project would not have happened, especially given the complex scope and the astoundingly compressed time line," says Jones.

Collins says he learned the importance of being proactive and helpful to the client's construction team.

"It is very easy to say 'not my scope' when problems arise, but if problems continue unsolved then the time will eventually run out for everyone. So it is actually in your interests to help and keep things moving," Collins says.

And such efforts, Schuyler points out, "make you proud of the entire Las Vegas subcontractor community. We built an entire city block in just three years." **AG**

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

"This building has floor-to-ceiling, wall-to-wall glass and every single room has a faceted bay and the glass is probably the most cost-effective way to achieve remarkably high performance levels."

—Gregg Jones,
Pelli Clarke
Pelli Architects

The Architects' Guide to Glass & Metal Annual Guide to New Products

Looking for the latest glass and glazing developments for your next design? Then check out these next four pages as we're bringing you some of industry's newest products. From energy-efficient glass and glazing to curtainwall, windows and architectural metals, this section gives you look at some of the newest launches to hit the market.

glass Color Selection

Pilkington expanded its architectural line of energy-efficient solar control low-E products with additions to the Solar-E™ palette of natural colors: Arctic Blue, Blue-Green and Grey. The additions are intended to complement Solar-E on clear and other lines of pyrolytic low-E products.



The product line features low solar heat gain coefficients and low reflectivity, and provides the same benefits of the online hard coat technology, the company reports. Solar-E can be bent, insulated, laminated and tempered, and edge deletion is not required. A ceramic or frit can be applied to the coated surface for spandrels or a silkscreen pattern for vision lites.

→ www.pilkington.com

A New Blend

Solarban R100, a transparent-reflective, solar-control, low-E glass, is the latest development from Pittsburgh-based PPG Industries. According to a company announcement, because it is based on the same coating technology as Solarban 70XL

glass, Solarban R100 glass offers solar performance with color-neutral, low exterior reflectance of 32 percent. Interior reflectance for Solarban R100 glass is 14 percent.



The R100 glass has visible light transmittance of 42 percent and a solar heat gain coefficient of 0.23. The company also says the glass's 1.79 light-to-solar gain ratio is up to 29 percent greater than that of other transparent-reflective, solar control, low-E glasses.

→ www.ppgideascapescapes.com

resources "Build With Light" Studio Hits the Road

The SunGuard "Build With Light" trade show exhibit from Guardian Industries is now portable on the "Build With Light" traveling glass studio, which allows architects to evaluate SunGuard advanced architectural glass under different light conditions. The studio simulates natural daylight and shows how the appearance of glass changes when viewed in transmitted and reflected light.

In addition, the traveling studio also demonstrates how light changes the appear-



Architects' Guide to Glass & Metal

ance of coated products and how this should be taken into consideration in the design process.

→ www.guardian.com

fire-rated glass A Fire and Safety Combo



SuperLite X-90 by SAFTI FIRST in San Francisco is a fire- and safety-glazing designed to meet all of the standards for 90-minute temperature rise doors.

It is non-wired, clear glazing that the company says provides visual clarity and is also impact safety rated to meet federal and code requirements.

SuperLite X-90 has a lifetime warranty and is manufactured in the United States.

→ www.safti.com

spandrel Chromatic Glass Cuts Its Teeth on Spandrel



Chromatics Glass Inc. in Rancho Santa Fe, Calif., has begun offering its architectural glass panels in the United States. The cuttable architectural opaque spandrel glass panels were

designed for both external and internal applications. The company reports that any color from the RAL spectrum can be replicated consistently, even years after the original panels were supplied.

In addition to its range of color panels, the company can print images and textures digitally

storefront and curtainwall Green Scene

Expanding its enerGfacade line of products, YKK AP in Austell, Ga., has added two new aluminum fenestration products for commercial use, the MegaTherm® XT entrance and the YCU 750 TU unitized curtainwall.

The MegaTherm XT is an energy-efficient, aluminum swing entrance system that has U-factors as low as 0.49 when used with standard low-E glass. It is thermally-broken with the company's low conductive polymer strips, which separate exterior metal from interior metal, providing a continuous thermal barrier to reduce heat flow and condensation, and is available in medium-stile and wide-stile configurations.

The YCU 750 TU is a dry-glazed, unitized curtainwall system that is also thermally-broken. Utilizing the company's patented screw spline and dry glazing process, the YCU 750 TU can be assembled and glazed quickly in the shop to reduce the chance of weather delays and increase the quality control of the assembled unit. It has been tested to industry standards for air, water, structural, seismic, acoustical and thermal performance.

→ www.ykkap.com

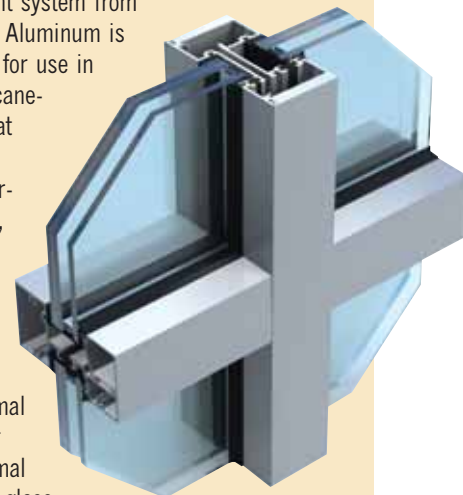


Stand and Defend

The Defender Series BT601 storefront system from Waxahachie, Texas-based United States Aluminum is a thermally improved product designed for use in a blast-mitigation environment, a hurricane-resistant environment or a condition that requires a system to meet both.

In its primary configuration as a thermally improved blast-mitigation system, the BT601 can be specified for up to a 1 psi blast load. BT601 is tested in accordance with both DOD UFC and Dade County Protocols to make the product applicable for blast mitigation projects in HVHZ coastal regions. Thermal efficiency is accomplished using a pour and debridge thermal barrier. The thermal improvement, combined with insulating glass, produces a system compliant with the U.S. Department of Energy's Building Energy Codes Program, according to company information.

→ www.usalum.com



directly onto the glass. The Chromatics' aluminum backing also allows invisible fixing with structural adhesive systems such as "Sikatak."

→ www.theglasswallcompany.com

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Annual Guide to New Products

Continued from page 13

windows Big Options

Majesta double-hung, wood windows now are offered by Kolbe in sizes as large as 6 x 12-feet with high-performance glass, and a selection of hardware, colors and finishes. In addition, several types of divided lites are available, as well as matching single hungs, radius and cottage style units.

While pine is the standard wood species, optional wood species are available including those certified by the Forest Stewardship Council. The windows also offer a double row of weatherstripping around all sides of the sash, plus a triple-glazed glass option.



The Majesta double hung windows can be specified as all-wood with durable K-KRON finish or as aluminum-clad windows. The extruded aluminum can be painted or have an anodized finish with up to a 30-year warranty to meet AAMA 2605-05 specifications.

→ www.kolbe-kolbe.com



A New Twist

Based on European design, a new tilt and turn window line from Montag Windows and Doors is now available to the U.S. market. The dual-functioning line was created to swing in like a door or tilt in at the top for ventilation. The in-swing operable windows are available in sizes up to 3 by 7 feet, have a design pressure of +65/-85 and are available with impact-resistant glass.

Using Maco's Tri-Coat multi-point locking mechanism for severe coastal environments,

the windows are designed to ensure protection and long-term operability, and have also been tested to meet Florida Building Code requirements, including those of Miami-Dade County. The windows are also water-resistant.

→ www.montagwindows.com

security glazing

A New Option for Detention Glazing

Dlubak Corporation is offering glass clad and laminated polycarbonate products designed to meet requirements for jails and correctional facilities.

Dlubak has tested eight glass clad polycarbonate make-ups to meet the four levels of ASTM F1915 along with modified bullet-resistant levels. For tougher threats, the company has five types of all polycarbonate laminates with mar-resistant surfaces to help eliminate the worry of glass breakage.

The company says it is backed by its ISO quality program.

→ www.dlubakglass.com

architectural metals Eco Awareness

Architectural, extruded aluminum products from Tubelite Inc. are now manufactured with EcoLuminum™, a recycled-content aluminum billet composition featuring environmentally-friendly finishes. The company says it developed this formulation to support customers' green goals, such as contributing to commercial building projects seeking LEED® certification. The

company's new Thermal=Block™ 300ES curtain-wall, for example, features a 1.5-inch thermal strut, and is the newest product manufactured using EcoLuminum. EcoLuminum's standard billet composition contains a minimum of 80 percent reclaimed aluminum, incorporating a post-consumer content average of 34 percent.

→ www.tubeliteinc.com

door hardware Making the Grade

A new line of Grade 1 narrow stile exit devices that combines performance, durability and



aesthetics is now available from DORMA Architectural Hardware. Based on the company's 9000 Series heavy-duty devices, the new 9600/9700/9800 Series narrow stile devices have been tested beyond 2,500,000 operating cycles. The exit devices are also designed to retrofit the company's 5000 series, as well as most other manufacturers' narrow stile devices.

The doors are available in a variety of aesthetic options, including 14 ANSI/BHMA architectural finishes and custom colors. A number of trim and lever combinations are available, as well as an antimicrobial coating option. A clear powder coating option can also be specified for outdoor or highly corrosive applications.

→ www.dorma-usa.com

Briefly ...

Superior Window Corp. has launched a new website for its louver window. The site, www.thelouverwindow.com, was created to be an educational resource for those in the architectural community seeking information about the performance and design possibilities of louver windows. The new website outlines the features and benefits of the louver window, includes project galleries and provides technical product and performance information, including detailed drawings, technical data, sustainability accreditation and references.

→ www.superiorwindow.com AG

sunshades Shading for Storefronts

To address the growing demand for sunshade applications for storefronts, Kawneer Co. Inc. in Norcross, Ga., has introduced its Trifab® sunshade, which combines energy conservation and aesthetics.



By utilizing pre-engineered outriggers, louvers and fascia, designers can mix and match components to maintain consistency between the curtainwall and storefront areas of the overall building façade when sunshades are used. The sunshade is pre-engineered and assembled using screw spline joinery and then attached to a channel that is bolted to the Trifab® vertical mullion, resulting in a 30-inch projection.

→ www.kawneer.com



AIA Continuing Education Update

Safety and Beyond

While laminated glass may have gotten its start as an automotive glazing material, its use in architectural applications has seen steady growth in recent years. As a safety glazing material, much of the demand for laminated glass has been for use in hurricane-resistant products, however the applications where this material can be used, and the benefits it offers, extend beyond just safety and security. Several organizations have created AIA-accredited courses to help you expand your knowledge of laminated glass.

how laminated glass is manufactured, as well as different types of laminated glass products and the various types of window styles and applications in which it can be used.

→ www.saflex.com

Laminated Glass 101

Glass Association of North America

Learning units: 1

Those taking part in this program will participate in a study of the manufacturing process for laminated glass. The course provides an in-depth overview of how laminated glass is manufactured and utilized, as well as its features and uses. The presentation concludes with an explanation of the benefits of using laminated glass in architectural applications, along with additional educational resources.

→ www.glasswebsite.com AG

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

Designing with Laminated Glass

Saflex®, a division of Solutia Inc.

Learning units: 1

Architects taking part in this course will learn not only about laminated glazing products, but also about applications and the benefits of designing with laminated glass. Discussions focus on

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