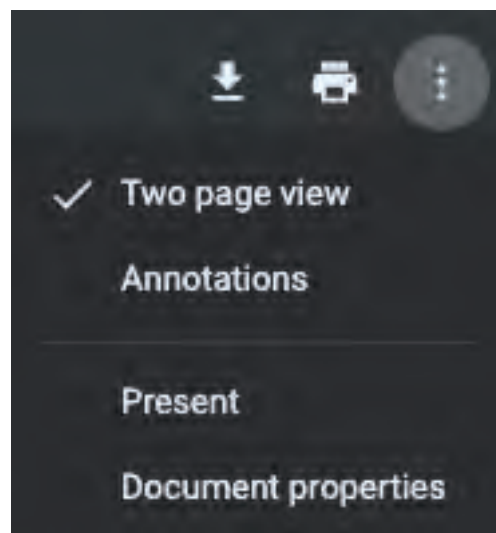


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THE GLASS AND GLAZING AUTHORITY JULY/AUGUST 2025

FOCUS ON
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PROGRAM

TOP

50

GLAZIERS

LEADING
GLAZIERS
GRAPPLE
WITH
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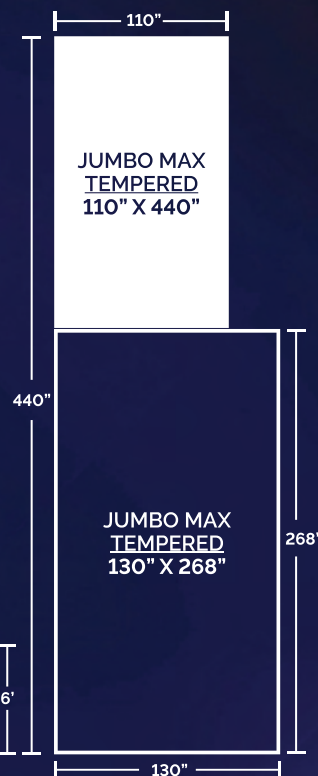
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ON THE COVER: Top 50 Glazier Aragon Construction Inc. was the design build glazier for the new student services building at Los Angeles Mission College. The project tasked Aragon to implement a hydraulic operable wall with a veneer curtain wall as a critical smoke control element. Photo by Ferrari Images.

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NGA presents new technical resource on glass nomenclature

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Industry report on glass and fenestration industry-specific data points

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Experts discuss fenestration assemblies for school building security

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TRENDS

Smart Specialty Finishes

By Tammy Schroeder,
Linetec, Tubelite and
Alumicor

PROJECT SHOWCASE



As part of a larger effort to restore the historic façade of the Outpost building in downtown Holland, Michigan, local business ODL Inc. contributed a unique window solution through its division, ODL Custom Solutions. The challenge was to obscure mechanical elements between floors while maintaining a traditional, decorative storefront appearance. ODL worked with Restore Consulting to explore several design mock-ups, ultimately landing on a cost-effective combination of satin etch and narrow reeded glass, enhanced with stick-on lead tape.

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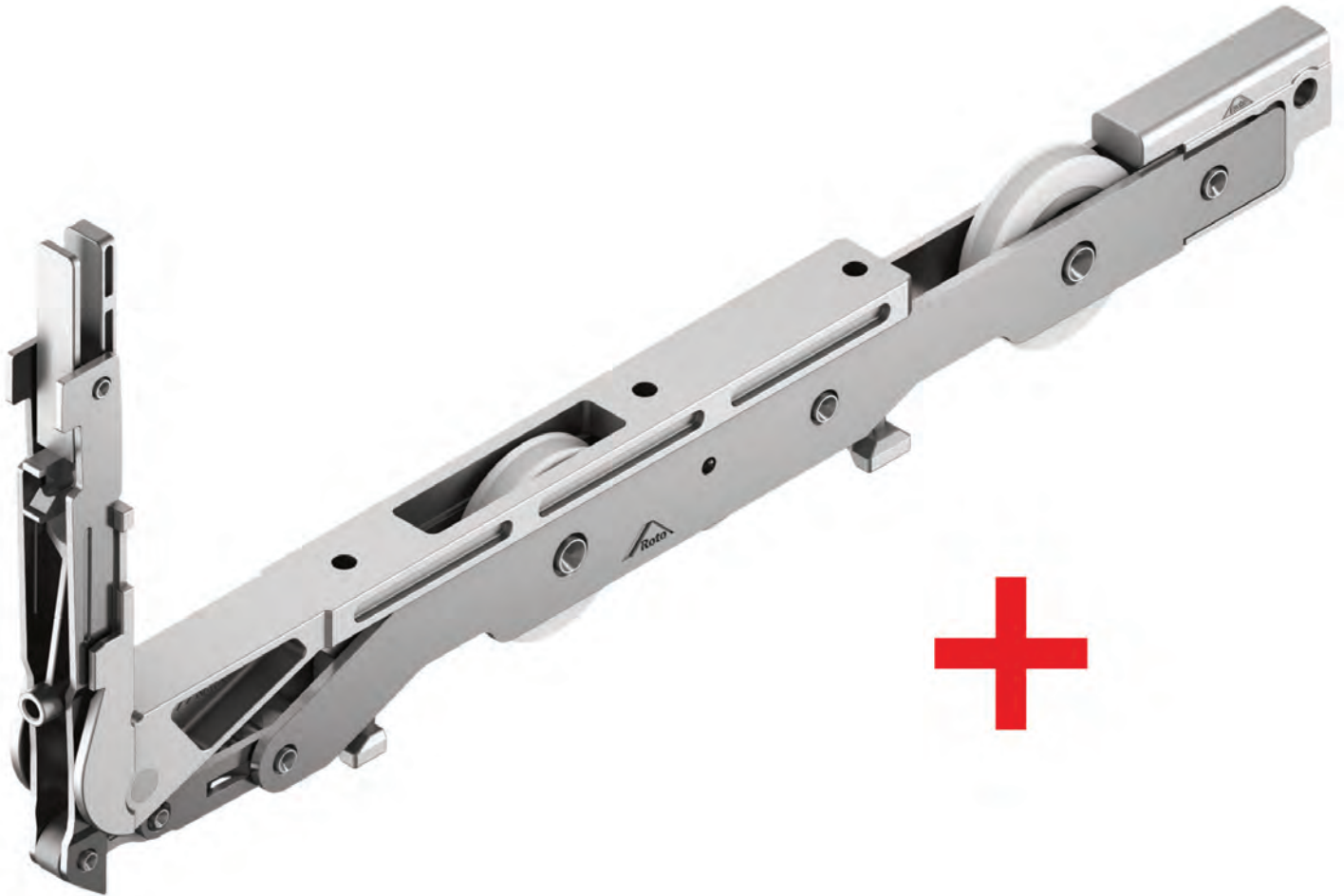
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The Data Belongs to You



NORAH DICK
Editor

My very first project when I was hired in 2017 was the Top 50 Glaziers' 25th anniversary issue. It was a big project. I combed through our print magazine archive, looking through 25 years' worth of the magazines, recording which companies had been on the industry ranking for decades and documenting the challenges they had faced.

The Top 50 Glaziers industry ranking launched in 1992, and after it was first published, some in the industry pointed out that the ranking did not capture the full breadth and quality of the contract glazing industry given that it ranks companies only by their North American contract glazing gross sales.

This is true. For the 33 years of its run, the ranking has featured leading contract glazing companies based on their reported or estimated gross sales. To underline the ranking's purpose, I'll throw back to former Glass Magazine Editor Charles Cumpston, who in his Editor's Notes in the 1999 Top 50 Glaziers issue reminded

readers that "The Top 50 is not a competition. It is our way of trying to give some perspective to the contract glazing community (which is not easy because it is so diffuse) and to give public recognition to companies which receive far too little of it for the work they do."

This remains true for the Top 50 Glaziers industry ranking. I would add that over the more than three-decade run of the list, it has also grown from a two-page industry ranking into a full market report. We ask responding glaziers to complete a 40-plus question survey that asks for gross sales information, but also solicits information regarding regional growth, recent and forthcoming trends, as well as their insights about new and perennial challenges for contract glaziers, and for the glass industry more broadly.

The information from that market report, which is available in print and online, remains free to the industry. Not every contract glazing company will be one that makes the Top 50 ranking. But hopefully, the insights and market data made available in the report, which now includes years' worth of insight into the growth and change of this segment of the industry, can help other contract glazing firms make decisions about their own businesses and help them take the temperature of the market.

I'll crib again from Cumpston, who in his June 2002 Ed Notes said, "Size isn't everything. It's only one way that a company can be measured. More important is the kind of good work performed day in and day out that gives a company a good reputation, that engenders repeat business, and that gives the sense of a job well done to its employees."

In Glass Magazine, we aim to provide the information and education that the industry needs to perform the crucial "day in and day out" work of creating the built environment. That means ultimately, the insights and indicators offered by leading companies, are for everyone's use. ■

“

SIZE ISN'T EVERYTHING. IT'S ONLY ONE WAY THAT A COMPANY CAN BE MEASURED. MORE IMPORTANT IS THE KIND OF GOOD WORK PERFORMED DAY IN AND DAY OUT THAT GIVES A COMPANY A GOOD REPUTATION, THAT ENGENDERS REPEAT BUSINESS, AND THAT GIVES THE SENSE OF A JOB WELL DONE TO ITS EMPLOYEES.

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NEED-TO-KNOW INFORMATION FROM THE NGA

LAKISHA ANN WOODS NEXT NGA PRESIDENT AND CEO



PHOTO BY KIRTH BOBB

The National Glass Association announced that Lakisha Ann Woods, CAE, will be the new president and chief executive officer

as of July 14, 2025. Woods will replace 35-year NGA veteran, Nicole Harris, in the association's staff leadership role.

Woods is the former executive vice president and CEO of the American Institute of Architects where she grew revenue 40% and grew membership to a historic high of over 100,000. Woods also previously served as president and CEO of the National Institute of Building Sciences and was the senior vice president and

chief marketing officer at the National Association of Home Builders.

"We are delighted that Lakisha will lead NGA following Nicole's well-deserved retirement, announced late last year," says Rick Locke, CEO of Montana Sash & Door and 2024-2025 NGA Board of Directors chair. "I want to thank the NGA CEO Search Committee, and especially Ron Crowl, NGA Board immediate past chair, who led the search effort over many months. It was a thorough search effort, and we were unanimous that Lakisha's credentials and experience will continue to grow NGA's excellent service and results for our members and the glass and glazing industry." ■

UPDATES FROM NGA'S INSTALLING COMMITTEE MEETING

NGA's Installing Committee met at the 2025 Building Envelope Contractors Conference in Las Vegas. About 200 glass and glazing industry representatives addressed topics from glazier training and Division 10 to value engineering and more. ■



Read the Installing
Committee Update

NEWLY UPDATED TECHNICAL RESOURCES

NGA updated three Glass Technical Papers, which are available for free download in the NGA Store at glass.org/store. FB39-25 Glass Properties Pertaining to Photovoltaic Applications, FB27-25 Considerations for the Appearance of IGU Edge at the Time of Fabrication, and FB40-25 Recyclability of Architectural Glass Products are part of over 100 Glass Technical Papers updated by NGA volunteers through a systematic review ballot process on a five-year cycle. FB39-25 explores the most important technologies and properties pertaining to glass used in photovoltaic applications, FB27-25 provides guidelines for the appearance of vision and spandrel insulating glass unit edges at the time of fabrication, and FB40-25 identifies architectural glass products that can be recycled and clears misconceptions about glass recycling. ■

NICOLE HARRIS RECEIVES FIRST BUSINESS LEADERSHIP AWARD

During his opening remarks at the BEC Conference 2025, NGA Chair Rick Locke announced a new award recognition from the National Glass Association: The NGA Business Leadership in the Glass and Glazing Industry Award. "This award was created to recognize individuals who exemplify transformative leadership, innovation and dedication to advancing our field," says Locke. "And with this inaugural award, we celebrate an individual whose visionary leadership has shaped the National Glass Association and the glass and glazing industry as a whole: Nicole Harris." ■

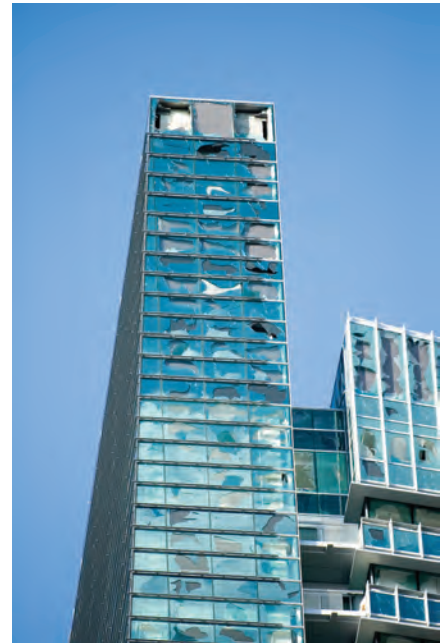




GLASS INFORMATIONAL BULLETIN



The Brickell Avenue area in Miami, Florida, suffered significant damage during Hurricane Wilma in 2005.



Tornado-Resistant Glazing

Windows and doors can be specified with a level of security performance to help protect buildings and occupants in the event of natural disasters such as hurricanes, tornadoes, earthquakes, floods and wildfires. The following is adapted from the National Glass Association's Glass Technical Paper FB61-24 Tornado Resistant Glazing: Standards and Performance Requirements, available for free download at glass.org/store.

Storm shelters

Storm shelters play a vital role in keeping people safe during a tornado in tornado- and hurricane-prone areas where high winds occur. These shelters can be detached from a building or contained as safe rooms within a building to provide a safe refuge for people.

Standard for storm shelters

Key to understanding the performance requirements for storm shelters in tornado-prone areas is a review of the ANSI/ICC 500 ICC/NSSA Standard for the Design and Construction of Storm

Shelters. This standard was developed through a collaboration between the International Code Council and the National Storm Shelter Association. It is currently available for adoption and use by any jurisdiction. The standard addresses wind load requirements, as well as missile impact criteria.

The debris impact test for tornado shelters is similar to the hurricane large missile impact test and uses similar equipment. However, for tornado shelter testing, the hurricane large missile 9-pound (4.1 kilogram) 2-by-4-foot sawn lumber is replaced by a 15-pound (6.8 kg) 2-by-4-foot



GLASS INFORMATIONAL BULLETIN—TORNADO-RESISTANT GLAZING

sawn lumber traveling at speeds specified according to the design wind speed (see Table 1).

Building code requirements

The International Building Code includes requirements for storm shelters. Storm shelters constructed in accordance with ICC 500 are required in specific occupancies where the shelter design wind speed is 250 miles per hour. These include 911 call stations; emergency operation centers; and fire, rescue, ambulance and police stations. Additionally, all Group E occupancies with an aggregate occupant load of 50 or more people are required to have storm shelters. Group E occupancies include buildings for educational purposes through the 12th grade, such as elementary, junior high and high schools. Day care and accessories to places of religious worship are exempt.

While there are no requirements at present for the use of impact-resistant glazing in exterior glazed openings of host buildings, the designer and specifier may want to refer to the performance requirements in the ICC 500 for testing of glazing systems intended for use in exterior applications. Manufacturers with commercially available systems will be able to provide testing information on these systems.

Systems testing

Doors, windows and skylight assemblies, as well as impact protective systems such as storm shutters, are required to be tested with anchorage devices and structure to which the system is to be mounted. Testing details are found in ASTM E1886 Standard Test Method for Performance of Exterior Windows, Curtain

NGA thanks the following companies for volunteering their time and expertise in developing the NGA Glass Technical Paper FB61-24 Tornado Resistant Glazing: Standards and Performance Requirements: Kuraray America, Viracon, Eastman Chemical, Technical Glass Products, Intertek, Curtain Wall Design & Consulting, and UL.

Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.

Window assemblies and other glazed openings shall be impacted in the center of the smallest glazed section and at one interface corner. Where interior mullions or other glazed section joints and/or latches are present, additional impacts are required. However, no more than two impacts shall be made on a single specimen. Any perforation of the interior surface of the tested component

constitutes a failure. Specimens and load-bearing fasteners shall not become disengaged or dislodged, nor excessive spall released during the test that could endanger occupants. Perforation of the witness screen by any dislodgment or spall constitutes a failure.

In addition to impact testing, static pressure testing is required for window assemblies and other glazed openings, as well as door assemblies with glazing, sidelights or transoms that are part of a tornado shelter. Testing is done according to ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference to a pressure of at least 1.2 times the pressures specified in the ICC 500 standard. The pressure testing is done prior to impact and is permitted to be conducted separately from debris impact tests. If part of a hurricane shelter, post-impact cyclic pressure tests shall be performed following ASTM E1886. ■

Table 1: Missile speed for tornado shelter debris impact test per ANSI/ICC 500 ICC/NSSA Standard for the Design and Construction of Storm Shelters.

DESIGN WIND SPEED (MPH)	Missile Speed and Shelter Impact Surface
130	80 mph vertical; 53 mph horizontal
160	84 mph vertical; 56 mph horizontal
200	90 mph vertical; 60 mph horizontal
250	100 mph vertical; 67 mph horizontal

Convert to SI: 1 mile per hour = 0.447 m/s.



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Oldcastle BuildingEnvelope to close three facilities across the U.S.

In spring and early summer, Oldcastle BuildingEnvelope shared communications with customers and staff saying that the company planned to close three facilities.

In an internal communication, company representatives announced plans to close its Midwest Glass Fabricators facilities in Highland, Michigan, and Louisville, Kentucky, effective Aug. 11. Company officials say that they will continue to serve customers with products manufactured at nearby Oldcastle BuildingEnvelope facilities, they expect no impact on delivery schedules and that Midwest Glass Fabricators customers will continue to work with the sales, estimating, and customer service teams. The company acquired Midwest Glass Fabricators in February 2024.

In a separate email to customers, Oldcastle BuildingEnvelope announced intentions to close its facility in Hauppauge, New York, effective Aug. 5 in an effort to optimize its business and better compete in the markets it serves. Products originally sourced from Hauppauge will now be sourced from facilities in Moorestown, New Jersey; Syracuse, New York; and Westbrook, Maine, with no expected impact on delivery schedules, according to company representatives.

Regency Glass and Corning Collaborate on Triple Glazing Solution

Regency Glass, in collaboration with Corning Inc., will launch a triple glazing solution that incorporates Corning's ultra-thin architectural glass. Over the past two years, Regency Glass has made

investments in personnel, processes and technology to enhance the quality of its glazing solutions.

Through extensive research and development and a strategic collaboration with Corning, Regency achieved advancements across all these areas and looks to deliver a more cost-effective, energy-efficient and advanced triple glazing solution for the UK market.

Commerce Announces Preliminary Determinations on Float Glass from China and Malaysia

On May 13, the U.S. Department of Commerce announced its preliminary affirmative determinations in the countervailing duty investigations of float glass products from China and Malaysia. Commerce is also conducting concurrent antidumping investigations of float glass products from China and Malaysia. Commerce's final determinations are expected in late September, ITC's final determinations in early November and the issuance of orders on Nov. 13, 2025.

Guardian Glass and the Velux Group Partner on VIG

Guardian Glass and the Velux Group have entered into a joint development agreement concerning tempered vacuum insulating glass. This agreement will allow Guardian and Velux to develop manufacturing processes and capabilities together to meet the growing, evolving demand for VIG. With more than 170 years of combined innovation and experience, Guardian and Velux will leverage their

collective technical teams, intellectual property and additional tools to advance tempered VIG technology.

ClearVue Partners with Viridian Glass

ClearVue has officially entered the New Zealand market through a manufacturing and distribution agreement with Viridian Glass. Under this agreement, Viridian will manufacture and distribute ClearVue's solar-integrated glazing solutions. This agreement gives ClearVue exclusive access to a partner in New Zealand and supports the country's broader push for renewable energy adoption and energy-efficient building codes. As cities grow and the pressure to decarbonize increases, solutions like ClearVue's building-integrated photovoltaic glass provide a way to generate on-site energy without compromising design. It's also part of ClearVue's global expansion strategy, which includes partnerships with leading international manufacturers, as the company builds a network of licensed partners.

Smart Glazier Software and BizDog Payments Partner on Payment Integration for Glaziers

Smart Glazier Software has partnered with BizDog Payments, a boutique electronic payments agency that focuses on blue-collar trades, to launch a payment integration tailored specifically for the glazing industry. The integration enables Smart Glazier Software users to accept electronic payments directly through the platform, with embedded payment links on invoices, integrated physical terminals, secure card storage



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Aeroshield Partners with ODL on Insulating Aerogels

AeroShield Materials produced transparent, super-insulating aerogel insulating glass for full-size entry doors. AeroShield is partnering with ODL Inc. to deliver this to homeowners.

As part of the partnership between the two companies, ODL will complete performance testing on hundreds of the aerogel-insulating doors and windows in various sizes and dimensions, including full-view, 22-inch by 64-inch door glass. The aerogel-insulating

patio and entry door prototypes that are currently undergoing testing are expected to be commercially available by the end of 2026.

PEOPLE



PHOTO BY KIRTH BOBB
Woods

The National Glass Association announced that *Lakisha Ann Woods*, CAE, will be NGA's new president and CEO as of July 14, 2025. Woods will replace 35-year NGA veteran, Nicole Harris, in the association's staff leadership role.

Woods is the former executive vice president and chief executive officer of the American Institute of Architects where she grew revenue 40% and grew membership to a historic high of over 100,000. Woods also previously served as president and CEO of the National Institute of Building Sciences

where she led efforts to expand the organization's programs and markets while growing and strengthening its membership base. Prior to joining NIBS, Woods was the senior vice president and chief marketing officer at the National Association of Home Builders.



Masutti

GIMAV and Vitrum announced that *Lucia Masutti* will succeed Fabrizio Cattaneo as managing director of both companies, also joining Vitrum's board of directors. Masutti is currently general manager of Glass Group and president of the transformers section of Assovetro. Masutti was selected for the position because of her consolidated knowledge of the flat glass industry players, extensive experience in developing strategic industrial partnerships, and strong expertise in institutional relations; developed through

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NEWS TO KNOW

her career at Fondazione Cariplo, one of the leading banking foundations in Europe.



Äppelqvist

The board of directors of **Glaston Corp.**

have appointed **Miika Äppelqvist** as the new president and CEO.

Äppelqvist began his career at Glaston in 2013 and has been a member of the executive leadership team since 2020. Äppelqvist takes over as CEO from the position of chief solutions and operations officer. His previous roles include senior vice president of architecture and senior vice president of Glaston Heat Treatment Technologies.



Yücel

Görkem Elverici has resigned as CEO of

Şişecam, according to a post on LinkedIn.

According to Şişecam's website, **Can Yücel** was appointed CEO on May 1, 2025. Yücel has been a member of the Şişecam board of directors since Jan. 3, 2022.



Eck

Viprotron North America announced

that **Kingston Eck** will be joining the company as the president. Eck brings with him extensive

industry experience and expertise. **Ric Schmidt** will continue in his role as vice president of sales.



Stolecki

Safti First announced the addition of **Dave Stolecki** as chief

operating officer. In this leadership role, Stolecki will oversee

the operations and production for Safti First's manufacturing facilities in Merced, California. He will also serve as COO for Safti First's affiliate companies O'Keeffe's Inc.'s architectural aluminum ladders division and Titan Metal Products' specialty doors and frames division. ■

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BUILDING A CULTURE OF SAFETY

PROACTIVE STRATEGIES FOR GLASS AND GLAZING COMPANIES **BY MATT JOHNSON**

Managing safety risks for glass and glazing companies cannot be limited to the shop floor or jobsite. There are many points and tools along the process of any project or sale that provide opportunities to review and consider safety for products, personnel and users. A few examples show how identifying and managing these points requires planning and consistency.

Plan review

The adage about the worth of “an ounce of prevention” is especially appropriate at the plan review phase.

Glazing systems are complex assemblies of materials and components that each have their own needs, tolerances and functional parameters. Education and knowledge of these performance factors and limitations can prove an essential risk avoidance step.

Designers and architects play primary roles in setting owner desires in the planning and specification process. Experience with glazing systems and published performance metrics sometimes needs to temper those desires into a functional structure.

Glaziers and product suppliers can play meaningful—and creative—roles

in seeing that concerns regarding use, location and specification receive proper attention, while also giving the systems themselves the best opportunity to function and have a reasonable lifespan. Identifying system use issues or incompatibilities with design intent early in a project lifecycle helps protect against complex change orders and the risk of revisiting or modifying completed work when it doesn’t meet real-world performance needs.

Employee empowerment

When on-site, glazing is dangerous. Technical compliance with safety requirements surrounding PPE, fall-prevention, and the Occupational Safety and Health Administration guidelines, or OSHA, can prevent injuries and save lives. Yet, one of the most meaningful, but sometimes overlooked, features of safety on construction sites is employee empowerment.

Repeatedly emphasizing safe practices is most effective when all employees have the authority to address compliance and even stop work if it is unsafe. Safety is everyone’s responsibility, and all employees must know they have the freedom to stop a project or process if it is unsafe and, importantly, not be criticized for that stoppage. This holds true from superintendents down to “gophers.”

End users

Some safety considerations only come into play once a project is completed, and sometimes years later. Proper selection and installation of product features are important in ensuring the users of products are protected from harm due to the product or its use.

Consider limiters and opening control devices used to help limit fall concerns.



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PROJECT SHOWCASE

Embry-Riddle Aeronautical University

Daytona Beach, FL

Pulp Studio contributed to the design and fabrication of the façade at the Cici and Hyatt Brown Center for Aerospace Technology at Embry-Riddle Aeronautical University in Daytona Beach, Florida. The 65,000 sq. ft. facility supports aviation, aerospace, and STEM education.

This project stands out for its vibrant, color-shifting glass panels, which deliver a dynamic visual experience across the building's exterior. Pulp Studio achieved these effects through custom-fabricated dichroic interlayers that interact with light to create rainbow and metallic finishes. The result is a bold architectural statement that reflects the innovative spirit of the university."

Architect: ikon.5

Photographer: West Tampa Glass

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These items are often required by code, but good planning and sitework can also identify these risks. Proper specification is crucial, but so too is installation of these safety features. These kinds of product options are important for protecting users from the potential for harm both immediately after installation and also years or decades into the future.

Similar safety considerations must be embedded within high-use components like glass and hardware for doors and other large openings. Proper function—and thus user safety—require attention to the component types (glazing types, tints and hardness,) but also the impact of the hardware systems on those items and their installation. Decisions regarding handle sets and hinge orientation can play as crucial a role in user safety as glass and threshold selection.

With so many points and variables involved in decisions regarding safety, how can glass and glazing companies

begin to address them? A starting point is to recognize that, regardless of where in the transaction chain one is, there are certain common steps that can be used to help address safety.

1. Start with attention. Paying attention to processes and work procedures can identify concerns relating to safety and when those items first appear. Project review can identify specification concerns, while project sitework can address worker safety and help inform how a site will ultimately be used. Paying attention to the various safety considerations along each step can help identify issues that need to be addressed and inform future project safety reviews.

2. Next comes business planning. Paying attention and identifying issues of concern are important, but only if there is a plan on how to address them. When safety issues have been identified—as either repeated items of concern or project-specific—preparing a checklist

to address those items and documenting steps that are taken not only help legally, but also avoid gaps in resolution.

3. Finally, consistency is crucial.

The return on the investment of paying attention to identifying safety concerns and documenting how to address them is maximized when those steps are used consistently across all projects and operations. Often there can be value in the simple act of asking questions where the answer is “known” because the act of asking can help ensure that nothing is missed or nothing new has developed. Doing this for projects, regardless of scope or scale, can prove especially important when it comes to safety. ■



Matt Johnson is a member of the Gary Law Group, a firm specializing in legal and risk issues facing manufacturers of glazing products.

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Urmilla Sowell (left) and Thomas Culp at the March BEC Conference in Las Vegas.

NAVIGATING THE FUTURE OF GLASS

EXPERTS UNVEIL CRITICAL UPDATES ON CODES AND STANDARDS SHAPING THE GLASS AND GLAZING INDUSTRY, EMPHASIZING ADVOCACY, SECURITY AND SUSTAINABILITY

BY TARA LUKASIK

The glass and glazing industry is on the cusp of transformative change, driven by evolving codes and standards that reflect broader environmental and security priorities. At the March BEC Conference, Urmilla Sowell, vice president of advocacy and technical services, National Glass Association, and NGA technical code consultant Thomas Culp from Birch Point Consulting, shed light on these critical shifts, emphasizing the need for professionals to stay informed and proactive. Their presentation outlined the NGA's steadfast advocacy for the sector, highlighting key proposals addressing school security and energy efficiency, while also navigating the legislative landscape that shapes their future. As pressures mount from both regulatory bodies and market forces, understanding these changes is not just beneficial—it's essential for safeguarding business interests within the industry.

Prioritizing security in school design

Integrating security measures into building codes is a key effort. "A couple of proposals that we are working on right now are a school security proposal and a daylighting proposal," says Sowell. "The building codes do not currently reference security other than the fire-rated section that references safety, but not security. One of the things that we're working on is how school security fits into the building codes. In our proposal, all of the main entrances should have a view of pedestrians or vehicle traffic and any windows, doors and sidelites in the main entrances shall be rated with ASTM F3561 Standard Test Method for Forced-Entry-Resistance of Fenestration Systems After Simulated Active Shooter Attack... which is an assembly test, not a glass test."

Shining a light on educational settings and performance

Sowell shared that research shows incor-



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porating daylight in classrooms results in significant educational benefits, with students experiencing faster learning rates and higher test scores. New proposals aim to integrate more daylighting in educational settings, including both K-12 classrooms and college dormitories. “Studies show that daylighting and views in classrooms result in 5% to 14% higher test scores, and students learn 20% to 26% faster. That’s a difference between a B student or even a C student, just based on having daylighting and views in the classroom,” says Sowell.

Promoting bird-friendly building

Culp emphasized a “defend and promote” mantra regarding bird-friendly glazing requirements, which are rapidly emerging across the U.S. and Canada, driven by local ordinances such as New York City’s Local Law 15. Many states are now incorporating these requirements for state-owned buildings, and the federal Bird Safe Building Act is a key advocacy goal for federally owned projects. “Bird-friendly glazing requirements are spreading like wildfire across the country, which is exciting but can also vary significantly from one place to another,” says Culp. “To help get in front of this, we introduced a proposal for bird-friendly glazing requirements as a jurisdictional option in the national level International Green Construction Code. And as a member resource, we also track

bird-friendly legislation as it is proposed around the country.”

Local adaptations in response to federal policy shifts

Energy codes are evolving towards higher efficiency products, reflecting a trend that may intensify at state and local levels amidst changes in federal policies. “We expect this to continue regardless of the political environment,” says Sowell, framing energy efficiency as a nonpartisan goal that reflects the industry’s commitment to sustainability.

“I’ve received a lot of questions and inquiries on the new administration and what it means for energy codes,” says Culp. “What does Trump 2.0 mean for energy codes and glazing products when they have an obviously different viewpoint than the previous administration. From a high-level perspective, I expect we’ll see the same reaction that we saw during Trump 1.0 ... where the federal government steps out, certain states and cities may fill in, setting their own targets and developing their own codes.”

Culp describes a chaotic, but ultimately positive, experience in adapting to evolving energy codes, highlighting how past disruptions led to new opportunities, particularly at the local level. “There are threats and opportunities,” says Culp. “Opportunities for high-performance building products, vacuum insulating glazing, triple glazing, fourth surface

low-emissivity, advanced spacers and advanced frames. However, it will be a scattered response across the country. In some places, it’ll just be status quo.”

He notes that some states have permitted cities and counties to adopt stricter energy codes than those set at the state level, a trend observed in major cities like New York and Boston, which enacted building performance standards aimed at reducing energy consumption in existing structures. Culp anticipates similar developments in the coming years, with incremental changes in energy codes and increased local activity driven by political and regulatory dynamics.

With Environmental Product Declarations providing a transparent assessment of the environmental impacts associated with manufacturing products and sustainable building practices, particularly focused on embodied carbon, the emerging demand for EPDs in construction specifications was stressed. “These EPDs will become critical for fulfilling green building initiatives,” says Culp. NGA’s proactive measures and funding efforts to develop comprehensive EPDs for various glass products is a response to the shift among architects and builders in considering the environmental impact while selecting materials.

“What can you do if you’re asked for an EPD?... We need to be proactive rather than reactive,” says Culp. “The programs currently require only the EPD for the primary flat glass, not the processed, fabricated glass. They also allow you to ignore some of the minor components that have less of an overall impact, like fasteners and hardware. But in the future, we’re going to see increased demand for more granular EPDs; not just the primary glass but the processed glass. Once you look at all the possibilities—different glass thicknesses, tints, tempered, laminated, coated, insulated—it gets complex fast with nearly infinite combinations. That is why we are looking into methods such as EPD calculator tools to assist the industry to provide this more detailed information in a timely and cost-effective manner.” ■

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NEGOTIATING DIFFICULT SUBCONTRACT PROVISIONS

INSIGHTS FOR SUBCONTRACTORS ON NAVIGATING RISKIER CONTRACT CLAUSES **BY NORAH DICK**

Contracts and subcontracts have to be negotiated for every job, and sometimes terms do not benefit subcontractors like contract glaziers. At BEC Conference, Chip Bachara, Florida Bar certified construction law specialist, provided negotiating language and guidance for some of the riskiest subcontract provisions for glaziers and other subcontractors.

Pay-if-paid

THE CHALLENGE. Pay-if-paid clauses in a contract can mean that, should the general contractor not be paid by the owner, the subcontractor will also not be paid. If nonpayment happens, the subcontractor may have no legal recourse against the owner. Essentially, the subcontractor bears the risk of nonpayment by the owner.

NEGOTIATING TACTIC. Bachara recommends including language in the subcontract that makes clear that nonpayment should only happen in the case of an issue with the quality or completion of the subcontractor's actual work. "If the general contractor asks you to share in the risk of owner insolvency, respond that your credit risk is with the contractor," Bachara says. "You have no contractual relationship with the owner."

As an example, Bachara provided the following language for this clause (suggested addition italicized):

Payments shall not become due to Subcontractor unless and until Contractor receives payment for such Work from Owner and the amount due shall not exceed the amount actually received by

Contractor as applicable to Subcontractor's Work; otherwise, the time when such payments shall be due Subcontractor shall be postponed until Contractor has received same from Owner. Such receipt of payment by Contractor is intended as a condition precedent to Contractor's duty to pay Subcontractor and Subcontractor accepts such risk; provided, however, Contractor shall not withhold payment from Subcontractor if non-payment by Owner is caused by acts or omissions of Contractor, another Subcontractor, or a third party over which Subcontractor has no control. Contractor may only withhold payment from Subcontractor in the amount Owner withholds from Contractor due to Subcontractor's failure to meet the requirements of the Subcontract.

Indemnification

THE CHALLENGE. Indemnification clauses shift risk from one party to another. Subcontractors will be asked to indemnify the contractor, owner and architect from liability resulting from the subcontractors' negligence.

NEGOTIATING TACTIC. Bachara again recommends ensuring that what is in the contract indemnifies the contractor, architect and owner but solely based on the performance of the subcontractors or the performance of anyone the subcontractor hires. "You want your indemnification to match your performance. I'll indemnify you from something I've done wrong [as a subcontractor]. ... But if it's somebody else's problem, I shouldn't be indemnifying you," he explains.

Bachara suggests the following language for the indemnification clause:

To the fullest extent permitted by law, the Subcontractor shall defend, indemnify and hold harmless the Contractor, the Contractor's other subcontractors, the Architect/Engineer, the Owner and their agents, consultants and employees (the Indemnities) from all claims for bodily injury and property damage that may arise from the performance of the Subcontract Work to the extent of the negligence attributed to such acts or omissions by the Subcontractor, the Subcontractor's subcontractors or anyone employed directly or indirectly by any of them or by anyone for whose acts any of them may be liable.

Additional insured/insurance coverage requirements

THE CHALLENGE. It is likely that the subcontractor will have to provide insurance coverage for the general contractor, owner and architect. Sometimes subcontractors are asked to provide insurance for many project players, and to cover liability beyond the performance and work of the subcontractor, or those hired by the subcontractor.

NEGOTIATING TACTIC. Bachara recommends limiting additional insured language so that only damage caused by the subcontractor's work is covered by the subcontractor's insurance policy and not for all claims resulting from the defective work of other subcontractors or of the owner or contractor.

If you are providing an insurance policy that also insures the general contractor, be sure that the policy provides coverage for damages caused by your defective work, Bachara explains. "It is okay to provide a policy that names the general contractor as an additional insured to the extent such coverage is for my defective work, but I should not have to pay for [the general contractor] to have extra insurance coverage."

He also recommends contract glaziers consult their insurance broker and confirm in writing that the subcontractor has the coverage required by your subcontract. ■



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Top: Ballistic-rated glazing can support exterior hardening for enhanced school security. Photo by Shea Cox, courtesy of LTI. **Bottom:** Multifunctional, fire-rated glazing defends against multiple threats to life safety. Photo courtesy of TGP.



UNDER THE SECURITY-RATED UMBRELLA

WHAT TEST STANDARDS SAY ABOUT PERFORMANCE
BY DEVIN BOWMAN

Security-rated glazing can help create buildings that are safer and more secure against violent threats. Unlike opaque materials such as bricks, concrete and security-rated steel, this material is transparent, contributing to daylight access and visual connection.

While both benefits support occupant-centered design, visual connection can also contribute to a robust approach to building security. When occupants can identify incoming threats, they are given more time to alert first responders and take appropriate action.

That said, because there are many standards for testing security glazing products and systems, it can be difficult to know which type of security rating would most benefit a project. In addition to consulting with a reputable security professional, knowing the differences between security ratings can help ensure project stakeholders have selected appropriately rated systems.

Different levels of bullet resistance

Bullet-resistant glass can withstand ballistic attack within the limits of its rating. This type of security-rated glazing is tested according to UL 752 standards, which rate the bullet-resistance of a glazing assembly across eight levels. It is important to note that these levels do not progress linearly. Instead, each level corresponds with different threats based on shot pattern, caliber and number of rounds. These levels are grouped into similar but distinct categories.

Selecting the right UL 752 level often involves working with security professionals to identify which threats are most probable depending on a project's location, occupancy type and other considerations. During this collaboration, it may also be recommended that ballistic glass would not be the most effective solution for adequate protection.

Forced-entry glass delays and deters would-be intruders

Another category of security-rated

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glazing is forced-entry glass. It resists physical attacks from unskilled or semi-skilled intruders. It is often rated on a time-based scale based on its ability to withstand attacks while staying intact within its framing components.

Instead of stopping bullets and other projectiles, forced-entry glazing acts as a time barrier between occupants and violent threats. Given most active shooter events are over before first responders can arrive, this type of glazing can be essential in delaying access to occupants as they enact lockdown protocols.

Multifunctional, fire-rated glazing solves challenges in building design

While both forced-entry and ballistic-rated glass offer different performance capabilities for enhanced security, these components are often only tested to security standards. This can complicate specifications when a security-rated system also needs to

meet fire- and life-safety requirements.

When security-rated glazing components are exposed to fire, they can burn quickly and intensely as they are often plastic-based. As such, if added to a fire-rated assembly, they can reduce or entirely negate the level of defense the full system provides by creating fire conditions that exceed those typical of a standard building fire.

In applications where security goals and code-driven requirements for fire and life safety overlap, specifiers are encouraged to use systems that are built from compatible components or are tested as a full system to multiple standards. Doing so ensures one form of protection does not compromise the other.

Balance is key when planning for occupant safety

While improving building security is an important concern, especially when it comes to schools, it should not take

precedence over maintaining code-driven requirements. These codes have been developed and refined over the years to ensure buildings are safe. With more buildings meeting fire- and life-safety requirements, it is no surprise that the National Fire Protection Association has found the number of building fires has generally decreased year after year over the past few decades.

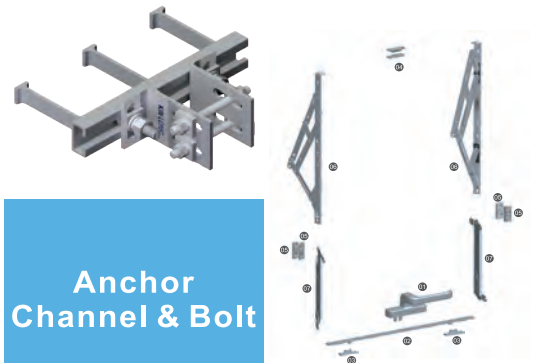
That said, even one building fire is too many. The same can be said for active shooter events. To keep occupants safe, it is important that we consider what types of enhanced security a building needs and how these systems work with established standards for fire and life safety. ■



Devin Bowman is general manager of Technical Glass Products and AD Systems. Contact him at 800/426-0279 or devin.bowman@allegion.com.



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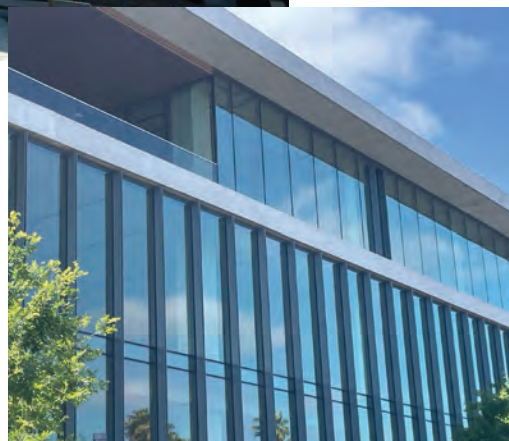
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Headquarters Point in San Diego, California, features over 70,000 square feet of glass, including Solarban 72 VT on Acuity glass by Vitro Architectural Glass.

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Headquarters Point in San Diego's Sorrento Mesa district in Southern California is a purpose-built life science campus combining cutting-edge design, high-performance lab space and panoramic views. Set atop the area's highest elevation, this remarkable development is poised to become a landmark destination for biotechnology and life science enterprises seeking exceptional space in one of San Diego's premier innovation hubs.

Purpose-built for innovation

The project includes Building A with 119,450 square feet and Building B at 125,046 square feet, both tailored to modern life science needs with flexible lab-ready infrastructure, abundant natural light and energy-efficient systems. This state-of-the-art facility, which features over 70,000 square

feet of glass, exemplifies the seamless integration of aesthetics, functionality and sustainability. Lab suites offer a variety of configurations with integrated office space, support rooms and scalable layouts suited to growing firms. Building B features extensive lab and office capabilities, while shared campus amenities include a 3,000-square-foot fitness center with lockers and showers.

Designed for discovery and wellness

Sustainability and functionality are key to the campus, with daylight-optimized façades and a contemporary aesthetic that mirrors the region's scientific energy. The building's façade combines sleek lines and innovative glasswork, utilizing Solarban 72 VT on Acuity glass manufactured by Vitro Architectural Glass, creating a structure that is both visually striking and highly functional. Low-emissivity coatings on the glass minimize heat transfer while maxi-

mizing natural light, reducing reliance on artificial lighting and further lowering the building's carbon footprint. The integration of lab and office spaces ensures seamless workflows, while the campus location near Torrey Pines and top research institutions positions it at the center of San Diego's innovation ecosystem.

Headquarters Point isn't just another life science building—it's a landmark development that reflects San Diego's leadership in biotech. With its thoughtful design and adaptable lab spaces, it creates an environment where discovery thrives, and the future of life science takes shape. ■

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Two Clinton Park in New Rochelle, New York. Photo by Steven Bitondo, courtesy of Grace—LLC/Capell.

REIMAGINING SKYLINES

INNOVATIVE SEALANT SUSTAINABILITY PROGRAM IS PAVING THE WAY FOR SUSTAINABLE CARBON-NEUTRAL ARCHITECTURE

BY TARA LUKASIK

In the world of modern architecture, the quest for sustainability stands as one of the most pressing challenges. With every new skyscraper piercing the sky, the construction industry is compelled to rethink its practices to reduce environmental impact. A pioneering example producing ripples across the sector is the Two Clinton Park luxury apartments in New Rochelle, New York. With its innovative architectural design and commitment to sustainable

practices, this project sets a new standard in urban architecture.

Spark of change

Spanning a vast 145,000 square feet, Two Clinton Park is not just another high-end residential complex; it is a testament to sustainable engineering. The building showcases a unitized aluminum curtain wall system with carbon-neutral silicones from Dow, representing a significant leap in environmentally friendly construction

practices. “Thanks to back-integration and full ownership of our production process, Dow has made the choice to reduce the carbon footprint of its raw material extraction, processing and transportation, as well as the sealant manufacturing process,” says Jessica Mijal, marketing manager for Dow, “therefore, lowering the carbon footprint of the finished DOWSIL™ sealants sold to the market.”

The use of DOWSIL™ products on the project—including silicone sealants for insulating glass, structural glazing, installation and weatherproofing—embodies a multifaceted approach to reducing embodied carbon without compromising performance or aesthetics.

Leading by example

Two Clinton Park marks an important milestone as the first building in North

America constructed using carbon-neutral silicones. Every component of the façade employs Dow's carbon-neutral silicones, certified to meet the PAS 2060 standard for carbon neutrality. The successful melding of aesthetics and sustainability in Two Clinton Park serves as an enticing blueprint for future urban revitalization. Collaboration among Dow, curtain wall contractor Cherry Hill Glass Co. and glass fabricator Press Glass Inc. emphasizes a collective desire for a greener construction industry while still offering high-performing products.

"Sustainability should not be an afterthought," says Sean Capshaw, vice president, Cherry Hill Glass. "Instead, it must be woven into the initial conversation to create a more streamlined and cost-effective path forward."

"The shift toward sustainable building materials is well underway," says Brett Ashley, president, Press Glass. "This transformation is being driven by stricter building codes, growing climate change awareness and the increasing demand for energy-efficient buildings."

Breaking down carbon-neutral silicones

At the heart of this project lies the innovation of carbon-neutral silicones, which maintain the same formulation and manufacturing process as their traditional counterparts with lower environmental impact achieved through an inseting program.

Dow's Mijal explains the simple process for customers to certify their Dow sealants as carbon-neutral. "With a lower carbon footprint manufacturing process already in place, only a small portion of the carbon emissions must be inset to achieve carbon neutrality. This necessitates the need to accurately track the volume requiring inseting. A simple form to track this volume needs to be completed to receive a carbon neutrality certificate for DOWSIL™ products."

Cherry Hill's Capshaw recounts how integrating the carbon-neutral sealant program into existing processes

didn't compromise efficiency. "We collaborated with Dow to understand the characteristics of their carbon-neutral DOWSIL™ silicone sealants... allowing us to maintain our installation procedures while adopting the [carbon-neutral program]. The integration of carbon-neutral products into the glazing industry is not merely a trend but a fundamental shift towards sustainable construction practices."

"Press Glass is committed to supporting the future of sustainable construction and we stay up to date on emerging technologies to advise customers on sustainable solutions tailored to their project needs," says Ashley. "Dow's carbon-neutral silicone sealants help reduce embodied carbon in high-performance building facades while delivering the same high level of performance as traditional silicone products."

The future is collaborative

As industries evolve, collaboration emerges as a central theme for advancing sustainable practices. The construction industry must work collectively to drive innovation and fulfill sustainability goals. "We are enthusiastic about partnering with architects and consultants to integrate these sealants into specifications," Mijal notes, striving for a collective approach toward greener construction practices.

Focusing on the necessity of partnerships and solidarity in empowering the industry to explore new sustainable solutions and effectively integrate them into project designs, Ashley adds, "Open, transparent, honest dialogue and actively listening to the needs of all stakeholders are key to building strong partnerships. It's important to have a deep understanding of available solutions, remain open-minded and be willing to think creatively to overcome challenges."

"Collaboration is key to success in sustainable construction," adds Capshaw. "It requires a coordinated effort among all stakeholders, including architects, engineers and contractors, to ensure

smooth procurement and installation. Our collaboration with Dow and Press Glass has fundamentally transformed the way Cherry Hill Glass approaches both new projects and our overall operations."

Overcoming sustainability challenges

The process of adopting sustainable materials often encounters obstacles. Capshaw highlights potential hurdles such as cost, availability and the need for regulatory compliance. Yet, addressing such challenges requires clear communication about the long-term benefits. "The integration of carbon-neutral products into the glazing industry is not merely a trend but a fundamental shift," says Capshaw. "As a glazing contractor, we've seen a pivotal shift towards sustainability, particularly for building facades. And as environmental regulations become more stringent worldwide, there is a growing demand for sustainable practices and products."

"We expect ongoing innovation in materials, coatings and fabrication processes that will push the industry toward more environmentally responsible and transparent production standards," adds Ashley.

Additionally, partnering with trusted suppliers on sustainability efforts is critical to ensure credibility. "Using Dow's offering of third-party verified, carbon-neutral silicones is a straightforward and reliable way to enhance the sustainability of your project," says Mijal. ■



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SPONSORED CONTENT



TOP FIFTY GLAZIERS

50





▼
THE LIST

PP. 40-51

SALES + GROWTH

PP. 52-53

MARKETS + SERVICES

PP. 54-55

LABOR + HEADWINDS

PP. 56-57

TARIFFS COMPLICATE GROWTH AND BROADER MARKET
LANDSCAPE FOR LEADING GLAZIERS **BY NORAH DICK**

The leading glaziers serving the North American market reported higher overall sales and healthy capital investment as well as expansion in 2024. But the larger picture remains complex for companies as 2025 unfolds, as the industry weathers cascading challenges related to tariffs, including ongoing cost-rises due to inflation and supply chain disruptions, as well as the number one barrier to growth: the shortage of unskilled labor.

This year's Top 50 Glaziers posted total sales of \$4.39 billion in 2024—up from 2023's \$4.17—surpassing the highest total gross sales in recent years in 2017 at \$4.3 billion. For more on the growth of the installing and contract glazing industry, see pages 52-53.

More so than in previous years, it feels important to state that this introduction is being written in the middle of May during a time of economic turbulence. As trade relationships shift, some in the industry report uncertainty about the status of larger projects and see a longer-term potential for slowdown. For more on market headwinds and challenges moving into 2025, see pages 56-57.

For Top 50 Glazier Vos Glas, the start of 2025 has been a recovery from the economic turbulence in the last few years. "Prior to tariffs, it had felt like the first year in many that there weren't outside headwinds that would be affecting our business, be it material price increases, lead times, COVID or looming economic slowdown," says Josh Turner, president, Vos Glas. "Like most, the uncertainty surrounding tariffs has the potential to affect our pricing and overall building costs. Our concern is that some projects in development become over budget and are put on hold."

The beginning of the year also saw a major consolidation, as long-time Top 50 Glazier Permasteelisa acquired the assets of Benson, another longtime member of this industry ranking. "The expansion of our North American footprint is a crucial component of our long-term growth strategy and this acquisition is an exciting milestone on our path toward achieving it," says Liam Cummins, CEO, Permasteelisa Group, in a press release.

Glass Magazine has been facilitating ongoing conversations regarding Divisions 8 and 10, and questions in this year's survey reflect that. Leading company perspectives remain mixed, though many are interested in glaziers working on interior glass and glazing systems. "Division 10 has historically been a part of our business but over the last few years has slowly eroded," says Brock West, president and CEO of Top 50 Glazier Glass Systems Inc. "We are committed to regaining that business within Division 8 in 2025 and beyond." For more on this conversation and insights into contract glazing services, products and capacity, see pages 54-55.

Top 50 Glazier Aragon Construction Inc. provided contract glazing services for LA Mission College Student Services. Photo by Ferrari Images.





Top 50 Glazier Vos Glass provided contract glazing services for Studio Park Tower in Grand Rapids, Michigan.

T

he Top 50 Glaziers List is the longest-running architectural glass industry ranking, celebrating 33 years this year. Glass Magazine's editorial staff cannot compile an accurate list of these leading contract glazing firms without the full support of the industry. If you feel your company should be on this list, please contact Glass Magazine Associate Editor Rachel Vitello.

This ranking is organized by company-reported gross sales of contract glazing services for 2024. Any sales not submitted by glaziers were estimated using the previous year's information. We recognize that the ranking and report do not capture the full breadth of the challenges that contract glaziers of all sizes face. If you are a contract glazing firm not on this list but want to get involved with Glass Magazine or the National Glass Association, please reach out to Glass Magazine Editor Norah Dick.

200+ MILLION

1

Harmon Inc.
harmoninc.com
Bloomington, Minn.
20 additional locations
Full-time and total employees:
850

2

New Hudson Facades
newhudsonfacades.com
Linwood, Pa.
5 additional locations
Full-time and total employees:
350

3

Reflection Window + Wall
reflectionwindow.com
Chicago, Ill.
6 additional locations
Full-time employees: 91
Total employees: 300

4

W&W Glass LLC
wwglass.com
Nanuet, N.Y.
No additional locations
Full-time and total employees:
200

5

Enclos Corp.
enclos.com
Bloomington, Minn.
14 additional locations
Full-time and total employees:
400



Top 50 Glazier Sunrise Erectors Inc. provided contract glazing for the Rhode Island State Health Lab in Providence, Rhode Island. Photo by Alexa Abely.

100-200 MILLION

6

Flynn Group of Companies

flynncompanies.com
Toronto, Ontario, Canada
36 additional locations
Total employees: 6,000+

8

Permasteelisa*

permasteelisagroup.com/
america
Bloomfield, Conn.
4 additional locations

9

Binswanger Glass

binswangerglass.com
Memphis, Tenn.
42 additional locations
Full-time and total employees:
585

10

GM&P Consulting and Glazing Contractors Inc.

gmpglazing.com
Miami, Fla.
2 additional locations
Full-time and total employees:
75

11

Architectural Glass and Aluminum Co.

aga-ca.com
Livermore, Calif.
3 additional locations
Full-time and total employees:
75

12

Massey's Plate Glass Aluminum Inc.

masseysglass.com
Branford, Conn.
2 additional locations
Full-time and total employees:
225+

13

Pioneer Cladding Glazing

pioneerglazing.com
Mason, Ohio
6 additional locations
Full-time employees: 359
Total employees: 370

7

Crown Corr Inc.

crowncorr.com
Gary, Ind.
6 additional locations
Full-time employees: 105
Total employees: 500



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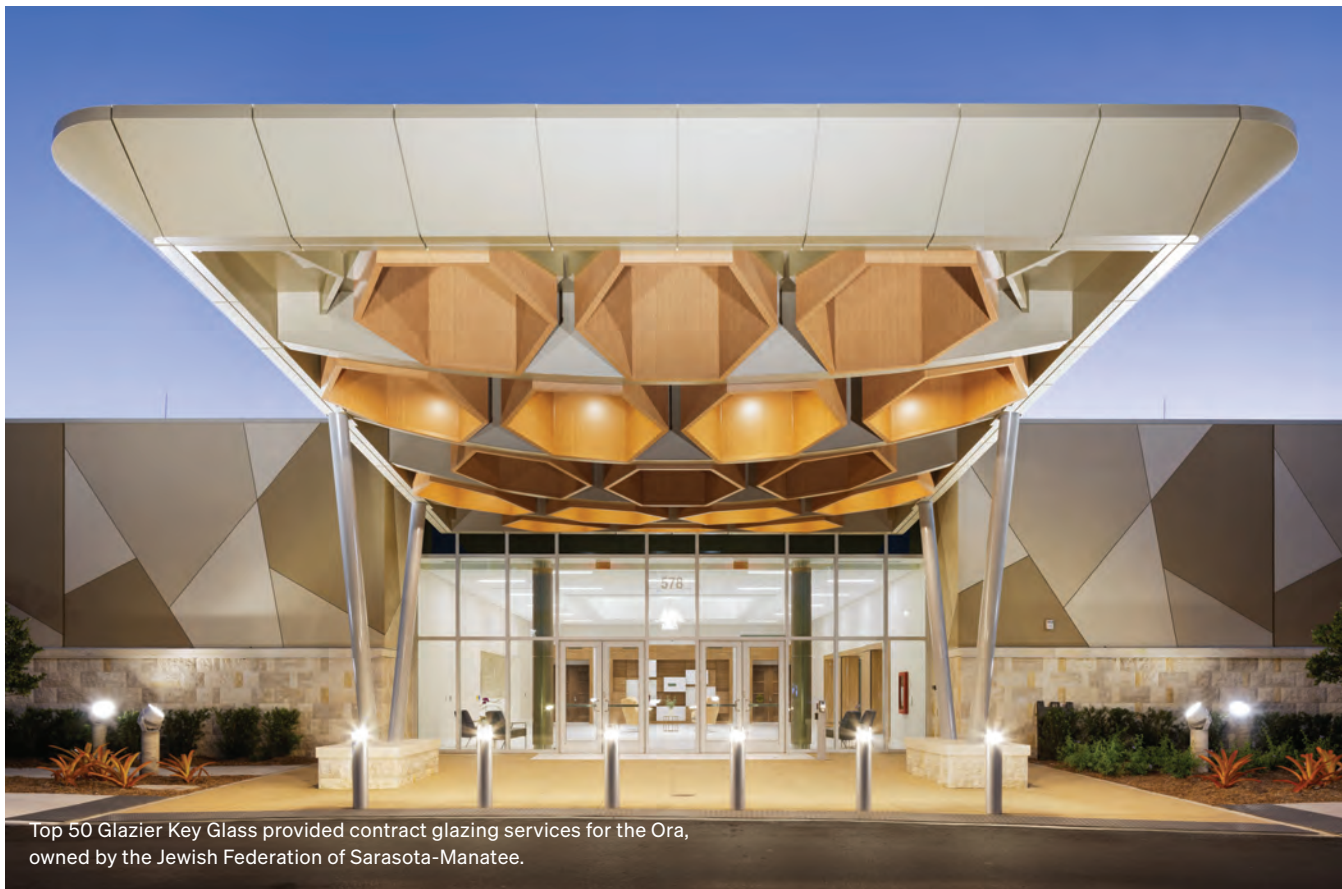
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14

Dynamic Glass

dynamicglass.com

Houston, Texas

3 additional locations

Full-time employees: 400

Total employees: 405

15

Sunrise Erectors Inc.

sunriseerectors.com

Canton, Mass.

2 additional locations

Full-time and total employees:

342

50-100 MILLION

16

Giroux Glass Inc.

girouxglass.com

Los Angeles, Calif.

4 additional locations

Full-time and total employees:

253

17

SPS Corp.

spscorporation.com

Apex, N.C.

3 additional locations

Full-time and total employees:

95

18

Advanced Window Inc.

advancedwindow.net

Frederick, Md.

2 additional locations

Full-time and total employees:

90

19

Above All Store Fronts Inc.

aboveallstorefronts.com

Hauppauge, N.Y.

2 additional locations

Full-time employees: 210

Total employees: 212

20

Eastern Glass and Aluminum

buildegas.com

Atlanta, Ga.

2 additional locations

Full-time and total employees:

100

21

Momentum Glass

momentum-glass.com

Houston, Texas

4 additional locations

Full-time and total employees:

268

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to 3.21 x 9.00m (126 x 354 in.)
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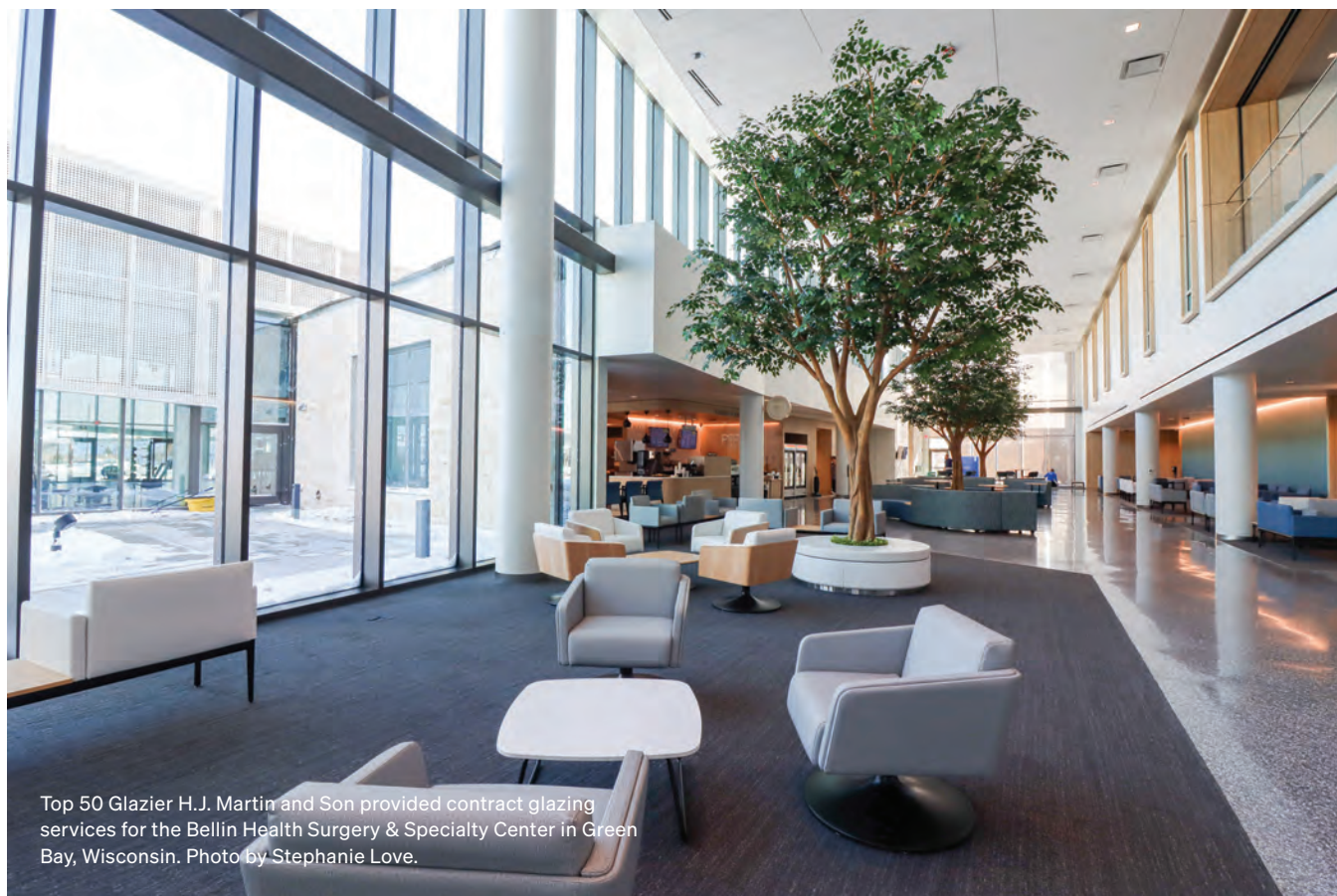
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United States of America



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22

Cherry Hill Glass Co.

cherryhillglass.com

Branford, Conn.

1 additional location

Full-time and total employees:
180

24

Glass Systems Inc.

glasssystems.biz

Atlanta, Ga.

1 additional location

Full-time and total employees:
104

26

Vetro, a Division of Roschmann Group

vetrodrgr.com

Linthicum Heights, Md.

3 additional locations

Full-time employees: 45
Total employees: 65

28

A-1 Glass

a1glassnc.com

Kannapolis, N.C.

1 additional location

Full-time and total employees:
70

23

1st Choice Glass

glass1st.net

Charlotte, N.C.

3 additional locations

Full-time and total employees:
72

25

Karas & Karas Glass Co.

karasglass.com

Boston, Mass.

1 additional location

Full-time and total employees:
128

27

seele Inc.

seele.com

Long Island City, N.Y.

No additional locations

Full-time employees: 14
Total employees: 35

29

8G Solutions LLC

8g-solutions.com

Denver, Colo.

3 additional locations

Full-time employees: 86
Total employees: 100+

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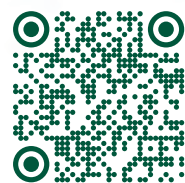
Precise, tempered corner marks ensure our patterns align perfectly from floor to floor, simplifying installation and guaranteeing seamless visual continuity.

REGULATORY COMPLIANCE

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White-throated
Sparrow



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30

Kovach Enclosure Systems

kovach.net

Chandler, Ariz.

1 additional location

Full-time employees: 343

Total employees: 346

30-50 MILLION

31

Glass Solutions Inc.

gsichicago.com

Itasca, Ill.

1 additional location

Full-time and total employees:

100

32

Alexander Metals Inc.

alexandermetalsinc.com

Nashville, Tenn.

1 additional location

Full-time and total employees:

60

33

ACE Glass Construction Corp.

aceglass.net

Little Rock, Ark.

2 additional locations

Full-time and total employees:

80

34/35

Desa Glass

desa.ca

Rocky View County, Alberta,

Canada

1 additional locations

Full-time and total employees:

140

Top 50 Glazier Desa
Glass provided glazing
to City Centre 4 in
Surrey, British Columbia.



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trosifol.com



Top 50 Glazier
Desa Glass
provided contract
glazing services to
the City Centre 3
building, in Surrey,
British Columbia.



34/35

Ranger Specialized Glass Inc.

rangerglass.com

Houston, Texas

3 additional locations

Full-time and total employees:
120

37

MY Shower Door / D3 Glass

myshowerdoor.com

Fort Myers, Fla.

10 additional locations

Full-time and total employees:
190

39

David Shuldiner Inc.

davidshuldiner.com

Brooklyn, N.Y.

1 additional location

Full-time employees: 90
Total employees: 100

41

Aurora Glazing Solutions Ltd.

auroraglazing.com

Vancouver, British Columbia,
Canada2 additional locations
Full-time and total employees:
124

36

Aragon Construction Inc.

aragonconstruction.com

Montclair, Calif.

1 additional location

Full-time employees: 60-70
Total employees: 90-100

38

National Enclosure Co.

nationalenclosure.com

Ypsilanti, Mich.

2 additional locations

Full-time employees: 42
Total employees: 60-90

40

Key Glass LLC

keyglass.com

Bradenton, Fla.

1 additional location

Full-time employees: 45
Total employees: 47

42

AAC Glass Inc.

aacglassincsf.com

Hayward, Calif.

1 additional location

Full-time and total employees:
54

43

TSI Corp.

tsicorporations.com

Upper Marlboro, Md.

1 additional location

Full-time and total employees:

90

45

Alphacladding

alphacladding.com

Doral, Fla.

No additional locations

Full-time and total employees:

65

46/47

Brin Glass Co.

bringlass.com

Minneapolis, Minn.

4 additional locations

Full-time and total employees:

200

49

H.J. Martin and Son

hjmartin.com

Green Bay, Wis.

2 additional locations

Full-time and total employees:

509

44

Horizon Glass Glazing Co.

horizonglass.net

Denver, Colo.

1 additional location

Full-time employees: 35

Total employees: 150

46/47

American Glass

american-glass.us

Livermore, Calif.

1 additional location

Full-time and total employees:

50

20-30 MILLION

48

Vos Glass

vosglass.com

Grand Rapids, Mich.

1 additional location

Full-time employees: 86

Total employees: 88

50

Golden Glass Inc.

goldenglass.com

Fullerton, Calif.

1 additional location

\$Full-time employees: 50

Total employees: 105

OSPREY 25

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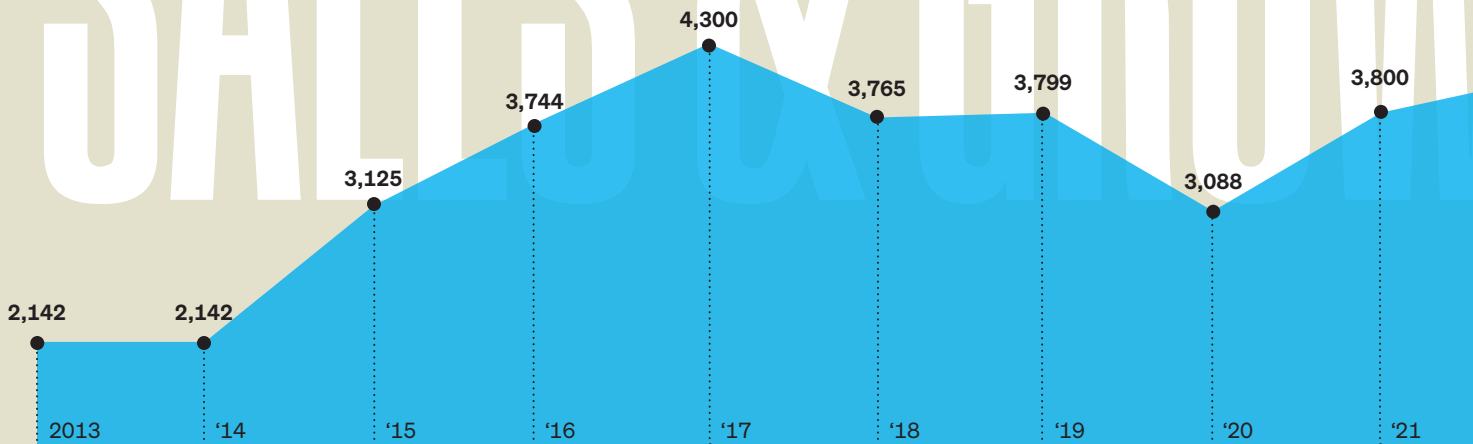
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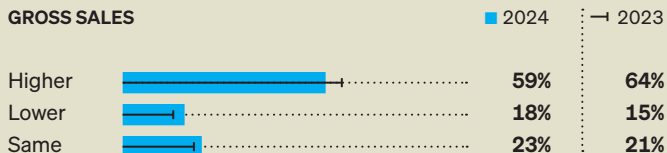


SALES & GROWTH

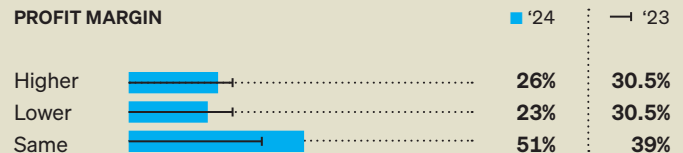


SALES REACH 10-YEAR HIGH (in millions, USD)

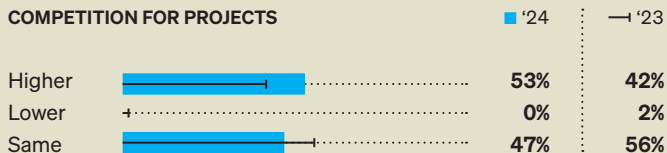
GROSS SALES



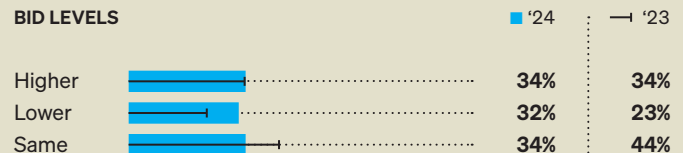
PROFIT MARGIN



COMPETITION FOR PROJECTS



BID LEVELS



The growth—both for leading glaziers and the North American contract glazing market—is again a mixed picture. Sales growth has slowed for some companies, but competition has not.

Sales slow, competition increases and profits remain static

Top 50 Glaziers survey respondents reported slower year-

over-year growth; 59% said their sales had increased year over year, compared to 64% last year. More significantly, no companies reported lower competition year over year, and 53% said they experienced higher competition in 2024, a nine-point increase from last year's report. This follows a similar pattern to Glass Magazine's Top Glass Fabrica-

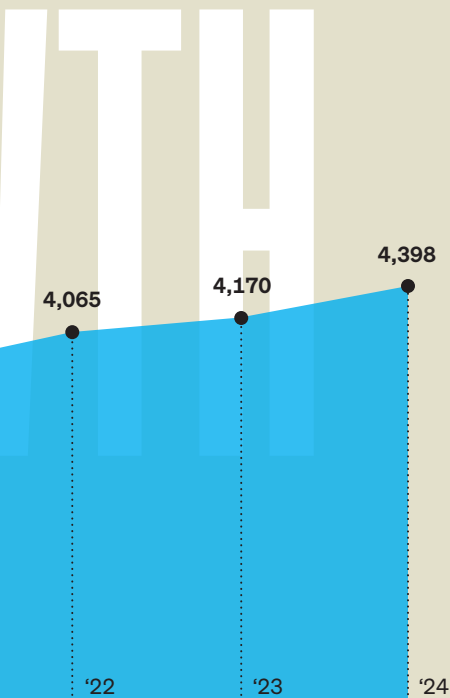
tors report, published in April, in which only 32% of respondents reported year-over-year growth.

Related to these changing indicators, respondents reported that profit margins were fairly static, while bid levels trend slightly down. Company backlog also didn't show a dramatic amount of movement, though slightly more companies report

having a backlog of six months or more compared to last year.

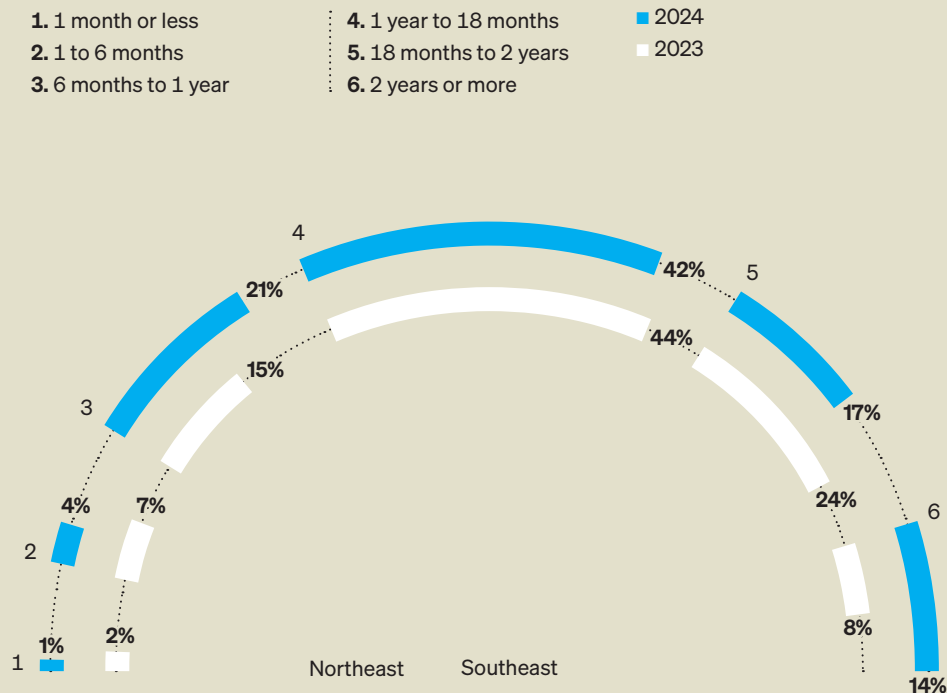
Regional growth swings between Northeast and Southern regions

Regional growth swung back to the Northeast in 2024, according to Top 50 respondents, upsetting last year's predictions, which pointed instead to the



BACKLOGS REMAIN STRONG

- 1. 1 month or less
- 2. 1 to 6 months
- 3. 6 months to 1 year
- 4. 1 year to 18 months
- 5. 18 months to 2 years
- 6. 2 years or more



Northeast
31%
30%

Southeast
31%
45%

2024 GROWTH REGIONS AND 2025 PREDICTIONS

■ '24 ■ '25

Region	'24 (%)	'25 (%)
West	24%	17%
Midwest	23%	22%
Southwest	20%	27%

Respondents could select several regions

10

companies
opened new
locations in
2024

Southeast. Companies identifying it as a region of growth for 2024 and 2025 attribute growth to government projects, health care and an interest in school security. "The Northeast has a well-supported economy fueled by outside factors of higher education, travel/tourism, four seasons and good employment," say reps of Top 50 Glazier

Sunrise Erectors Inc. "Whilst the economy has slowed and competition increased, there has still been market capture."

Despite this, respondents still point to the Southeast again as the most likely to see growth in the coming year. A plurality of respondents say population growth is spurring the growth of projects in this area. A signif-

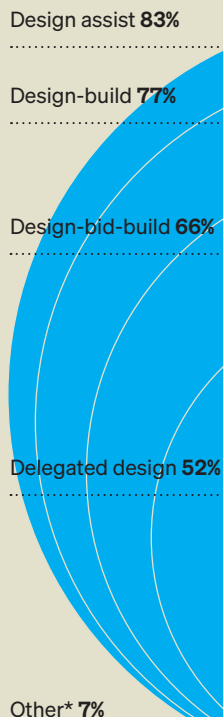
icant number of respondents also named the Southwest as a growth area, attributing the expansion to population growth and migration. "Population growth in Nevada and Arizona is another key contributor, particularly in Las Vegas and Phoenix," says Andrew Phipps, director of of marketing for Top 50 Glazier Giroux. "With the demand for

infrastructure, commercial properties have surged."

Ten glazier respondents said their companies also recently added new locations, including Harmon, which opened a new manufacturing facility in Dallas, Texas, at the start of the year. The project represented an expansion of an existing facility to add new capacity.

MARKETS & SERVICES

COMMON PROJECT DELIVERY METHODS IN 2024



*Hard bid, integrated project delivery, sub-bid and negotiated projects

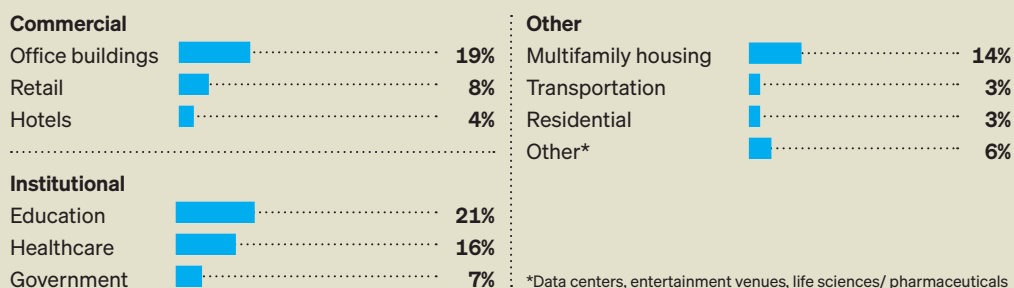
76%

of glaziers' work is in new construction.

23%

About 23% of glaziers' commercial business focuses on interior glass and glazing.

PROJECTS GLAZIERS WORKED ON, BY SEGMENT



*Data centers, entertainment venues, life sciences/ pharmaceuticals

In addition to asking glaziers about project delivery methods and the type of services they provide, we asked about an issue we know has been a topic of discussion: Division 8 and 10 work. About a quarter of fabricator respondents for the Top Glass Fabricators report noted Division 10 work as a 2024 design trend.

The Top 50 Glaziers survey respondents said that, on average, interior glass and glazing systems comprise about 23% of their work. About 7% said that interior glass comprises 50%-100% of their commercial work. Several responding companies do not work in the Division 10 segment at all.

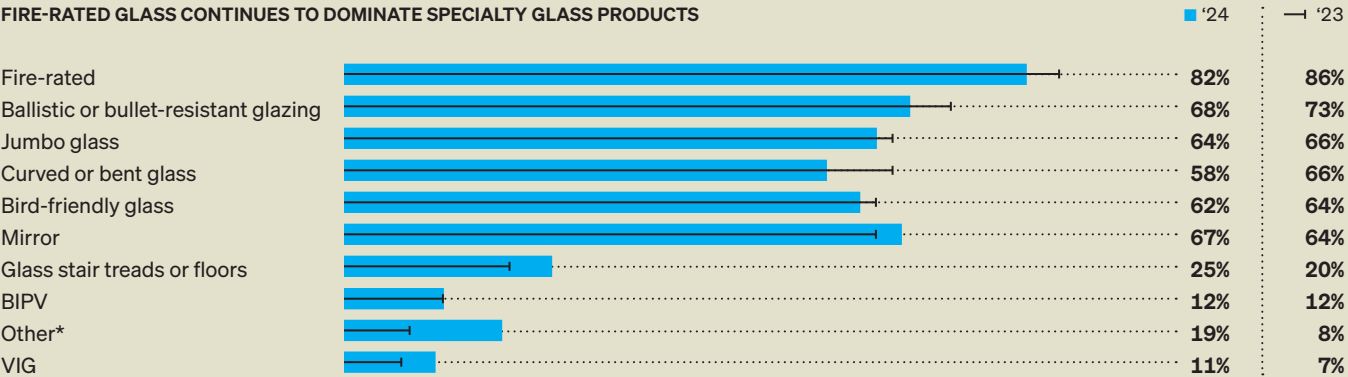
Plurality of glaziers question Division 10 segment

Companies had a range of viewpoints regarding the separation of Divisions 8 and 10. Representatives of Top 50 Glazier Vetro, a Division of Roschmann Group, said that Division 10 tends to include more specialty or unique

glazing scopes, such as custom cast glass light boxes. "All predetermined product assemblies should be listed in Division 10, making them proprietary to a certain extent, providing transparency about cost, functionality and warranty."

Though not all agreed, several companies voiced support

FIRE-RATED GLASS CONTINUES TO DOMINATE SPECIALTY GLASS PRODUCTS

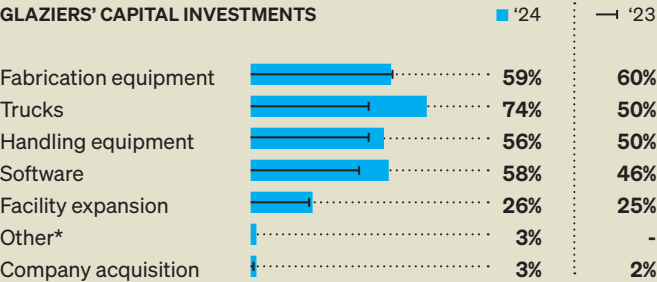


Respondents were asked to select all specialty glass products they encountered on a project in 2024.
*Blast-resistant, electrochromic, switchable, decorative, digitally-printed, impact-rated

IN-HOUSE FABRICATION

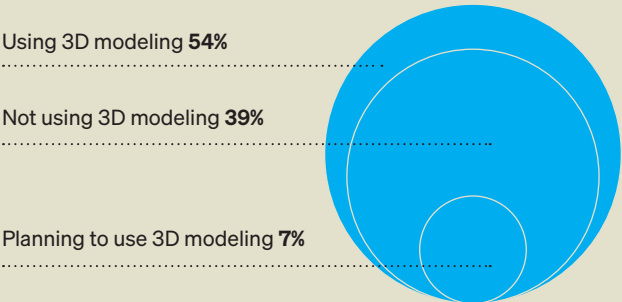


GLAZIERS' CAPITAL INVESTMENTS



*Mockup structure, tools

GLAZIERS USING 3D MODELING/BIM



for glaziers installing glass, regardless of the division. “Glass and glazing subcontractors are already specialized in handling interior and exterior glass systems with the precision, engineering and installation expertise required. Keeping partitions and demountable walls under Division 8 makes the

process smoother for everyone—owners, architects and general contractors—because it consolidates responsibility with a trade that understands the nuances of glass products,” say representatives of a Top 50 Glazier survey respondent.
“Division 10 is a loophole to pay less for labor compared to

glaziers’ prevailing wage rates,” says Rush Golden, president, Golden Glass.
Beyond Divisions 8 and 10, survey respondents did not report much change in the market segments that comprise their commercial, institutional and other project types, except for the educational segment,

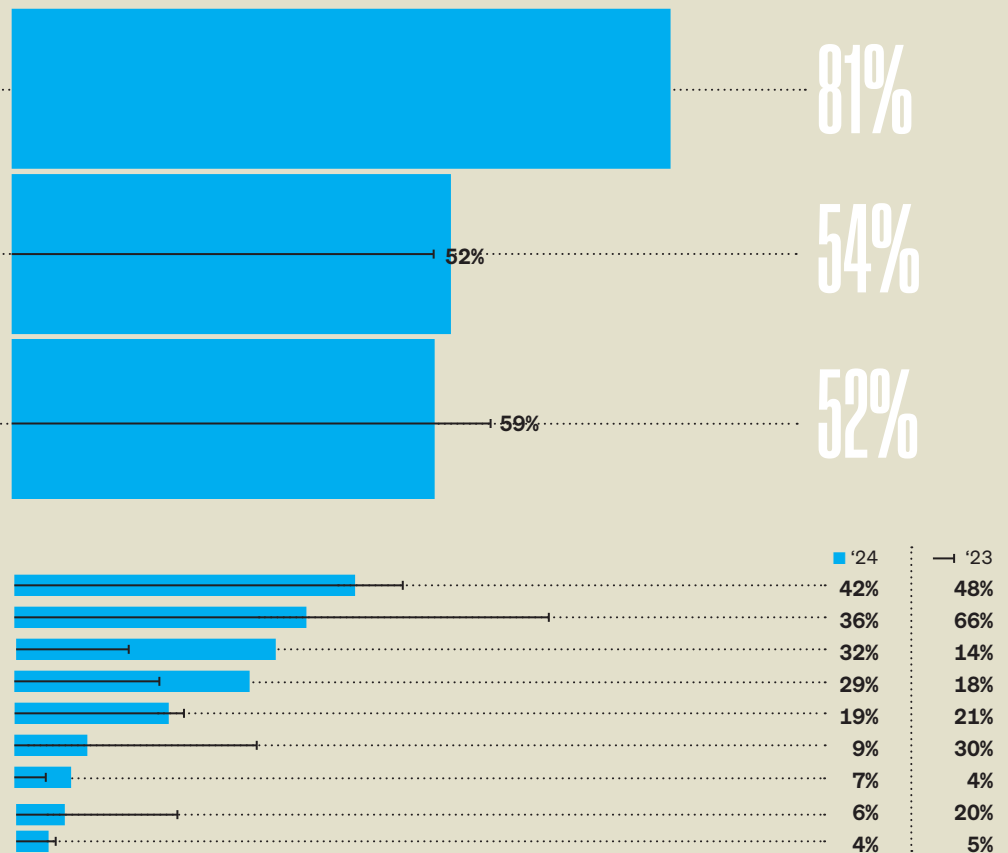
which increased five points from 2023 to 2024. According to a new survey question, 74% of responding glazing firms provide contract glazing for school construction.

LABOR & HEADWINDS

TARIFFS AND EXISTING CHALLENGES

Respondents were asked to check all that apply.

- Tariffs
- Economic slowdown
- Inflation
- Labor shortage
- Interest rates
- Supply chain
- Lead times
- Scheduling
- Growth in pre-contract work
- Difficulty getting building materials
- More complex curtain wall designs
- Other*



*Labor rules, lack of projects, difficulty with general contractor teams

Given that Glass Magazine received Top 50 survey responses in spring of 2025, tariffs were ranked as the number one headwind moving further into 2025, followed by fears of economic slowdown and inflation. As during other moments of economic uncertainty, companies worried

about increased costs, project pauses and long-term financial stability.

"We see market instability as a foreseeable challenge in 2025, with a trickle-down effect possibly lasting into 2026," says Ricky Urbach, chief operation officer, A-1 Glass.

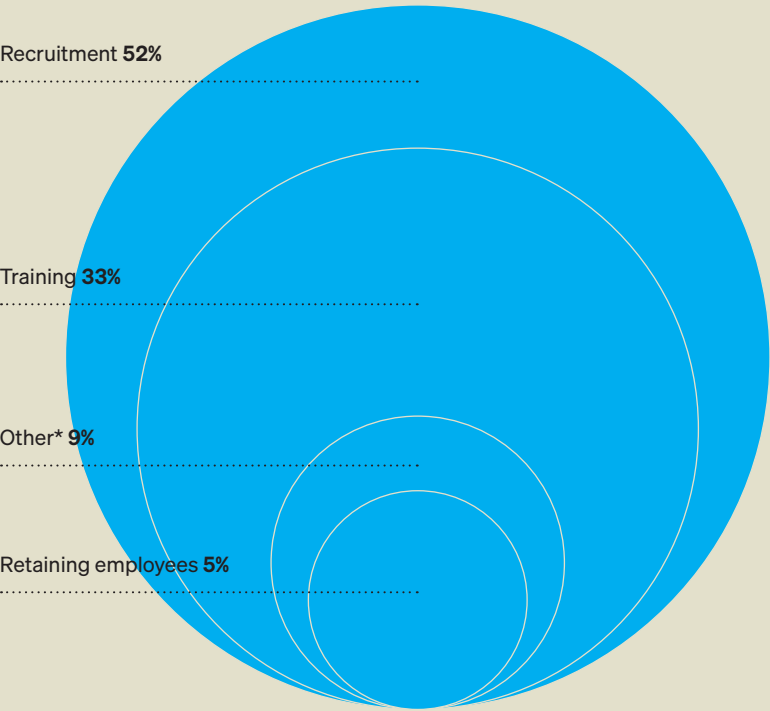
Glaziers say lack of skilled labor can be costly

Finding, retaining and training employees remains a perennial issue for companies. Recruitment remained a top challenge this year, with 52% of respondents marking it as their top labor challenge. A plurality of respondents say that the limited

labor pool results in a workforce characterized by high turnover and lack of relevant skills, which in turn limits the company's growth. This mitigation of growth can show up in several ways—from costly rework because of an unskilled field worker to competitive wages and investment in training that

"WE SEE MARKET INSTABILITY AS A FORESEEABLE CHALLENGE IN 2025, WITH A TRICKLE-DOWN EFFECT POSSIBLY LASTING INTO 2026"

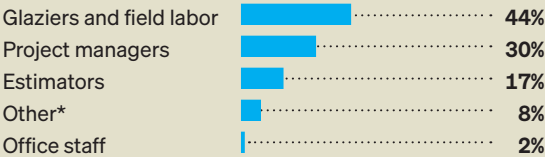
GLAZIERS' BIGGEST LABOR CHALLENGE



*Level of employee qualifications and skills, keeping up company culture

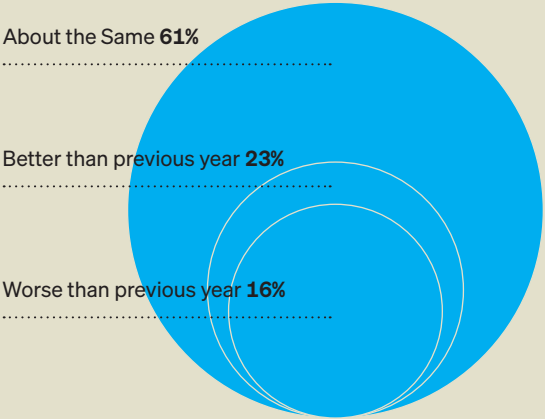
POSITIONS THAT WERE DIFFICULT TO FILL

Glaziers were asked to check all that apply.



*Project manager assistants, project engineers, manufacturing and shop labor

AVAILABILITY OF LABOR IN 2024



can further strain the company's budget.

"With fewer skilled workers available, projects take longer to complete," say representatives of Top 50 Glazier Eastern Glass & Aluminum. "This delay affects everything—from the initial planning stage to the final handover. And the labor

shortage limits the number of projects a company can take on at once. Even if demand is high, a company may need to turn down potential projects due to insufficient workforce. The company's plans to diversify or grow into new sectors might stall, preventing long-term growth."

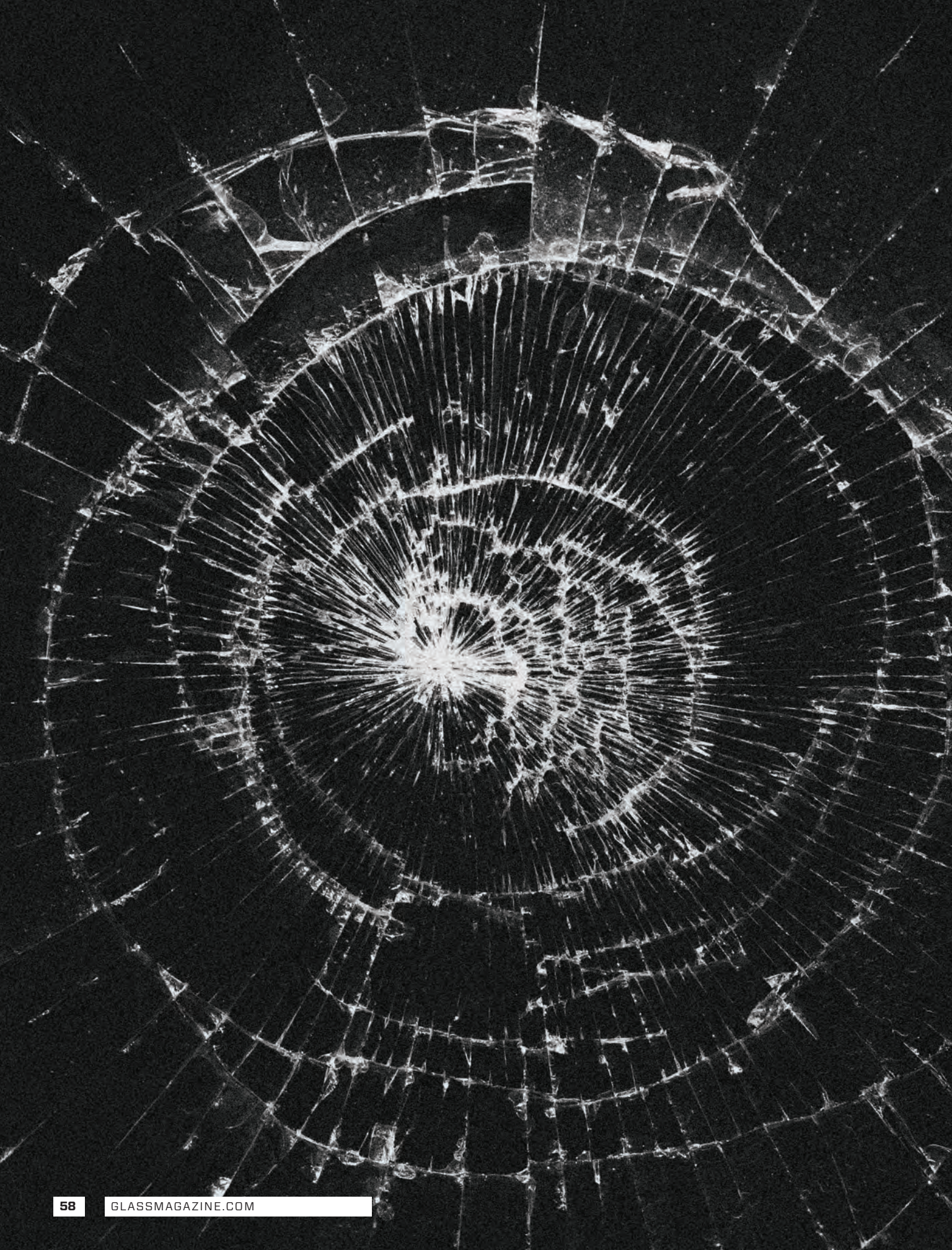
Top 50 Glazier Momentum's

CEO Omar Maalouf says that a lack of skilled labor can also result in the company's "inability to move into other markets and expand [their] footprint across the southern U.S."

Companies provide diverse employee benefits

Companies continue to offer

a range of employee benefits, including but not limited to health care, additional days off, financial management courses and leadership development opportunities. A plurality of companies offer access to addiction-recovery programs and mental health and/or counseling. ■



WHAT TO
KNOW ABOUT
SCHOOL

SECURITY GLAZING

SCHOOL SECURITY GLAZING REMAINS TOP
OF MIND FOR THE INDUSTRY

BY RACHEL VITELLO

The evolution and implementation of school security standards have been at the forefront of the glass and fenestration industries for years now, particularly since the Sandy Hook Elementary School shooting in 2012, which resulted in the deaths of 20 children and six educators. In 2024, there were 200 incidents of

school shootings, with 59 deaths and over 150 injuries, according to a report by Everytown Research & Policy. All of this was discussed during a school security workshop held during the National Glass Association's Glass Conference: Carlsbad in Southern California this past February.

NGA ADVOCATES FOR SCHOOL SAFETY

At press time, the National Glass Association reports its top policy priority for 2025, Windows and Doors Respond First, is to advocate for increased school security and safety through the use of security, ballistic and forced-entry-resistant windows and doors. NGA staff and consultants are currently meeting with the offices of the Congressional sponsors of previous federal Securing Our Students and SAFE School acts to work toward the reintroduction of one or both bills. Upon successful reintroduction, NGA expects to canvass at multiple Congressional offices in late 2025 to support enacting legislation to make schools safer with security windows and doors.

HOW YOU CAN LEARN MORE

NGA has a school security one-pager for legislators called “School Security: Window & Doors Respond First” that can be found at glass.org/advocacy/initiatives/priority-issues.

An NGA Thirsty Thursday webinar in April also clarified the role of surface-applied film in security glazing. A full recording of this webinar, presented by NGA code consultant Thom Zaremba and Lisa Winckler, can be found at glass.org/webinars.



CURRENT LANDSCAPE OF SCHOOL SECURITY GLAZING

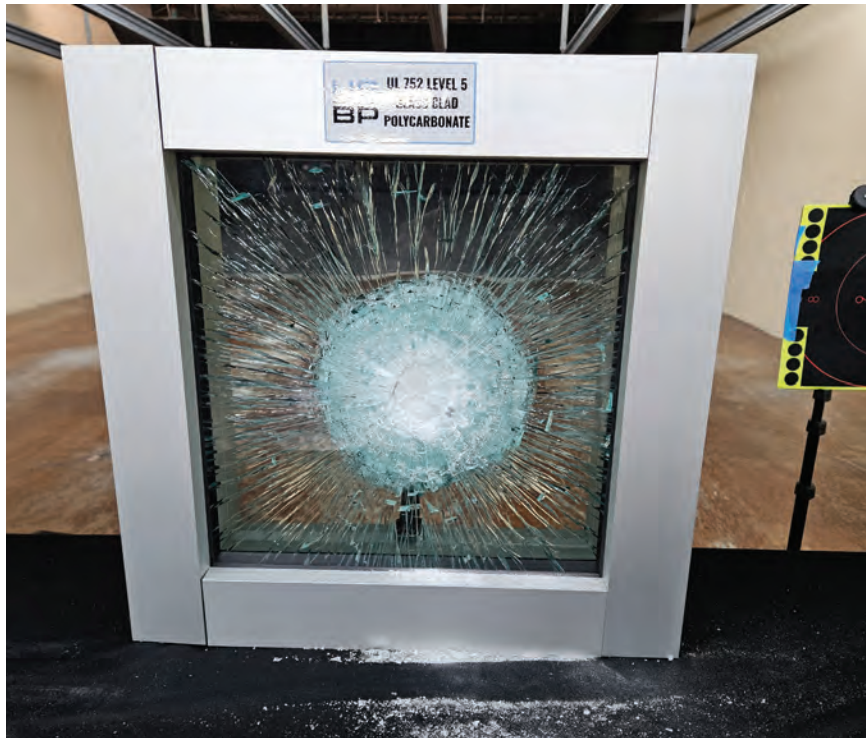
The landscape of school security is rapidly growing, largely driven by schools trying to mitigate the risks of forced entry and active shooter situations. “Although legislative initiatives have been discussed, most haven’t yet translated into mandated action,” says Tom Donovan, president, Thompson Innovative Glass. “This is concerning, especially given the tragic and ongoing instances of school shootings that highlight the urgent need for enhanced security measures. Schools are taking matters into their own hands, prioritizing advanced glass solutions to improve student safety.”

ASTM F3561-22 Standard Test Method for Forced-Entry-Resistance of Fenestration Systems After Simulated Active Shooter Attack is the newest school security-related standard. It includes eight levels of testing for the entire fenestration system, each with increasing impact force and drop height. This standard focus-

es on forced-entry resistance after glass has already been weakened by ballistic attack. According to NGA officials, this standard was born of a need for a simpler, economically viable test method. The NGA examined existing standards and evaluated what worked, and what did not, to help develop an effective standard.

“We looked at the ability for us to provide an understandable, comprehensive test method. There were some great methods out there, but very complicated, very hard for everybody to specify portions of them to pull together. We wanted it to be comprehensive and fill the gaps in what we found during a review of all these standards. We also wanted to ensure reproducibility,” says Julie Schimpenning, Eastman technical engagement manager and NGA Fabricating Committee’s Laminating Glazing Liaison, during NGA’s Glass Conference in February.

So, why use ASTM F3561-22? The current standard fills in gaps left by other tests by providing



Opposite: Trulite SafetyLine product installed at the Boys & Girls Club in Tucson, Arizona. **Left:** Glass-clad polycarbonate ballistic-rated system by Quikserv, tested at the Guns & Glazing demonstration that took place at Glass TEXpo where the unit was shot with a 7.62-millimeter rifle.

forced-entry resistance and responder enhancement. Moreover, because the test relies on mechanized testing, it is reproducible. Additionally, ASTM F3561-22 offers multiple levels of testing and is certified through international consensus and review from ASTM's system of structured updates.

The standard fills previous existing test gaps providing forced-entry resistance, responder enhancement and mechanized testing; it is reproducible; and includes multiple levels of testing, and international consensus and review because ASTM standards are reviewed and updated systematically. When it comes to testing for this standard, systems are tested as a complete assembly, meaning the glass and locking mechanism must both pass the different levels of impact.

"The whole intent of this test is to make sure the intruder, after he has shot the glass and starts hitting the door and glass, is not able to get in and gain access to our children. That's the real purpose of this test," says Doug Penn, vice president engineered systems, Trulite, during the NGA Glass Conference. Penn adds that he believes ASTM F3561

"THE WHOLE INTENT OF THIS TEST IS TO MAKE SURE THE INTRUDER, AFTER HE HAS SHOT THE GLASS AND STARTS HITTING THE DOOR AND GLASS, IS NOT ABLE TO GET IN AND GAIN ACCESS TO OUR CHILDREN."

should be a part of every school specification for entrances and storefronts.

"Security glazing is only as good as the system it is in and the way it is glazed. Failure, or in this case forced entry, will happen through the weakest part of the system. If a sash or door isn't locked or if the glass can be pushed out of the frame, it doesn't matter if you have bullet-, blast- or mob-resistant glazing in your opening—the systems need to work together to delay, defend and deter potential threats," says Schimmelpenninck.

COMMON MISCONCEPTIONS AND WHAT TO KNOW

"Window film does not stop bullets," emphasizes Lisa Winckler, technical/advocacy consultant with the International Window Film Association. "Window film does not have a home [in security glazing applications.] It is not designed to impact glass in any way other than solar energy or changing how [the glass] looks."

However, Winckler says that safety and security film is different, which is why language is so important when it comes to this topic. Not all things that



Thompson Innovative Glass rack truck equipped with a curtain that advertises school security glass.

have been called window film are the same thing. Safety and security film is not bullet-resistant, and when installed on standard existing glazing it should not be represented as a product that will stop bullets. However, this product can help buy valuable time to alert resources and implement lock down strategies, she says.

Wade Arnold, commercial sales director, Specialty Fenestration Group,

says it's important to understand the term "bulletproof" is a misnomer, meaning there is no single material or solution that can stop all ballistic threats. But there are varying levels of ballistic protection, each designed to address different threats. Arnold adds that selecting the right option involves careful consideration of several factors—from interpreting performance criteria for testing standards and understanding

the different protection levels, to evaluating the benefits and limitations of each solution. It's also essential to account for long-term durability and the potential for material degradation over time. According to Arnold, an effective strategy, especially in environments such as schools, requires a holistic approach: implementing effective security solutions that provide lasting, comprehensive protection while preserving a welcoming and aesthetically appealing atmosphere.

Arnold says a common misconception is that security products mean sacrificing large amounts of money and drastically changing the appearance of a building. "While security fenestrations may require a larger initial investment, their costs are often overstated. However, they offer a durable, long-lasting solution that can replicate the dimensions and aesthetics of standard storefronts or curtain wall systems," says Arnold.

Retrofitting school security products is another concern. Part of the hurdle of designing a standard for something that's retrofit is taking into account glass



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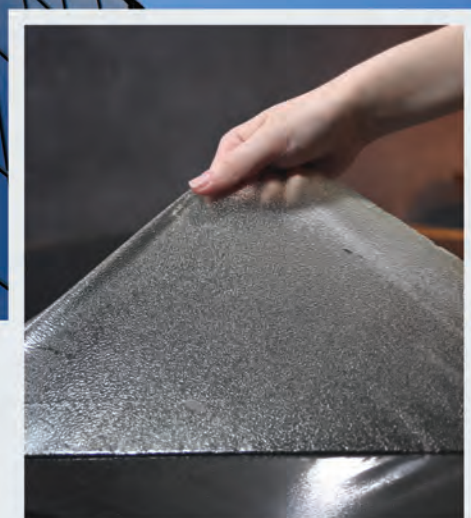


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and framing type, gaskets, windows and their size, age of the building, how the framing system is attached to the building, and more. There are no current standards for retrofit solutions. Schimmelpenninck says that not all openings necessarily need security glazing; instead, many experts choose to focus on entry vestibules and other targeted locations where attackers are more likely to attempt forced entry.

LOOKING AHEAD

There are currently no building codes that mandate school security. The Glazing Industry Code Committee has a proposal to include security glazing for schools in the 2027 building codes, but this proposal was disapproved during the May Code Committee Action Hearings. The GICC will collect feedback and come back with an updated proposal in October for the second Code Action Hearings in Cleveland, Ohio. The proposal could help to clarify and harmonize the requirements for school

security in local and state jurisdictions.

Urmilla Jokhu-Sowell, NGA's vice president of advocacy and technical services, discussed school security's current status in state and federal legislation during the NGA Glass Conference in February. Utah currently has House Bill 84, requiring security glazing for any public or private schools spanning from kindergarten to 12th grade. NGA provided comments helping to inform some of the language of this bill.

There is also a connection between demand for school security and requirements for fire-safety. "With approximately 3,200 fires in educational buildings each year, demand for fire-rated glass continues to remain strong," says Devin Bowman, general manager, Technical Glass Products. "At the same time, as more architects and project stakeholders look to bolster security levels in schools, there is an increasing need for forced-entry protection and ballistic glass."

Bowman adds that in this evolving landscape, it will be critical for project teams to identify areas in schools that not only need one form of protection or the other, but also areas where multiple forms of protection overlap. Since security-rated products are usually only tested to their specific security standards, and fire-rated products to their fire-specific standards, there could be unintended consequences when they are simply layered together. "Looking ahead, the future lies in fully integrated, multifunctional systems—ones that are tested as complete assemblies against multiple standards. This approach will help ensure that schools can confidently specify glazing systems that meet both security and fire safety demands," says Bowman.

"Security shouldn't just be a priority, it must be recognized as a necessity to protect our children," says Donovan. ■

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How to Set Up an Internal Training Program

COMPANIES USE MYGLASSCLASS.COM TO CREATE SKILLED WORKFORCE
BY RACHEL VITELLO

As companies continue to navigate the labor shortage, an effective internal training program can help onboard new personnel and keep existing employees' skills up-to-date. The National Glass Association offers MyGlassClass.com, which provides more than 100 online courses for glaziers and glass fabrication personnel to complement hands-on training.



Mike Kaichen (farthest left) and Myra Hopkins (farthest right) with the Portland Glass team, who utilize MyGlassClass.com for their training.

STEP 01

Determine the scope

As you investigate how to set up an internal training program, think about what you want it to look like. Ask the following questions: Who needs training? Is it new hires? Is it employees who are adding new skills? Who will lead this training effort? How do you want to organize training? Do you want to have one group that includes all employees? A group for new hires? A group for a specific location? These are all important questions to ask.

At Garrety Glass in Dallastown, Pennsylvania, for example, the company uses the Intro to Glass & Glazing and Safety course bundles on MyGlassClass.com to onboard all new hires in its commercial department.

“We were looking for a structured and accessible training program to introduce new employees to the fundamentals of the glass and glazing industry, along with essential safety practices,” says HR Manager Aimee Dietz. “MyGlassClass.com’ Intro and Safety bundles provided the perfect solution—offering a clear, well-organized way to begin training on Day One following new hire orientation.”

STEP 02

Assign a training lead/administrator

When assigning a staff member to lead your training program, make sure that person has the time and resources to be successful. If that employee already has several other responsibilities, you may be setting them up for failure. Create space for the training lead to develop, oversee and maintain the training program.

STEP 03

Select the right courses

Go through the MyGlassClass.com or MyGlassFAB course catalogs to select the training that is right for your employees. Make sure to choose a well-rounded course offering. On the installer side, for example, you might have glaziers who do residential work day in and day out, but who also could use education on storefront work. Use courses to expand existing employees’ skillsets, in addition to training new hires.

When NGA made MyGlassClass.com courses free to all members this year, Enclosures Unlimited of Sterling, Virginia, took advantage of that to assign training to staff that they could do in their downtime, to keep continuing education and safety a part of the company culture.

“Make the training be required for some items, like safety and PPE, but others

[can be assigned] as continuing education,” advises General Manager Lori Ann Benish. “Trying to sit our crews down and just train all day would have been difficult for all of us. Letting them do it at their own pace was something that made the training accessible and the employees were happier taking it because of this.”

STEP 04

Choose a training format

All MyGlassClass.com and MyGlassFAB courses are assigned to individual employees so that training supervisors can monitor employee participation, see what courses they have completed, and view test scores. However, how employees participate in these courses is customizable.

For some companies, the self-paced option is best, in which employees are assigned specific courses to complete and given a timeline to do so. This allows employees to take courses on their phones, on their own. Supervisors can monitor their progress using the Team Manager function on MyGlassClass.com.

Group training is another option, where a supervisor walks through a course with employees—adding their own experience and comments on the course material—and staff follows along on their phones or laptops. If you go this route, employees will still need to enroll individually in courses and quizzes, but it allows for group discussion.

For example, Portland Glass, a New England-based

glass fabricator and installer, gets employees together in a classroom-like setting and goes through the courses together, and then employees individually complete the quizzes at the end. Employees also have the option to complete the training during their own downtime.

Portland Glass Flat Glass Training Manager Mike Kaichen says that a typical 15-minute course ends up taking an hour on average with the amount of discussion that the class has, which he says is a positive thing because it's how he knows that employees are really absorbing the material.

Although Portland Glass team members do the courses together, employees also have the option to refer back to their library of classes whenever they want. If they are struggling with something at work on Monday, they can take some time to review a course on that issue, then come back in on Tuesday ready to hit the ground running.

STEP 05

Train your administrators and trainers

The NGA MyGlassClass.com Customer Care Team will train supervisors and administrators how to use MyGlassClass.com to track employee course progress and test scores, and how to run reports.

While MyGlassClass.com and MyGlassFAB can get new employees up to speed faster and teach people best practices for new skills, they do not replace hands-



"MyGlassClass.com was a great, more official training module that could supplement our hands-on training for both our office and installation crew."

on training, so companies should not forget about their in-person trainers, says Jenni Chase, vice president of workforce development at the NGA. Chase adds that the best company training programs are those that combine MyGlassClass.com or MyGlassFAB with hands-on training. Invest in your hands-on trainers as well by providing them the resources they need, and reward them for their efforts.

Portland Glass Director of Organizational Development Myra Hopkins says that "hands-on experience helps to connect the dots," and that scheduling the learning to happen in tandem with the work itself will help support effective training.

STEP 06

Request access to MyGlassClass.com

After completing all these steps, request access to MyGlassClass.com by emailing myglassclass@glass.org to set up group and team manager access, and to schedule a walkthrough of the new system for training administrators. Once the company is set up, ask employees to create their MyGlassClass.com accounts and enroll in the courses you have chosen for them.

STEP 07

Recognize and reward employees

Recognize and reward employees who participate and excel in training programs. Consider incentivizing employees to participate in online and hands-on training and reward those who do with lunches, leaving early on a Friday, opportunities to advance on the payscale, or whatever makes sense for your company. It shows that you not only value their education, but that you recognize their efforts, which can help in employee retention.

"MyGlassClass.com offers

Portland Glass employees
discussing training.

The New MyGlassClass.com: Free to NGA Members!

a tremendous amount of vital information, but it also becomes a significant platform to open up interactivity with our associates that we're training," Kaichen says. "[The employees] start inquiring about things. They start relating something we're learning in class to something they've seen out in the field or dealt with in their day-to-day." Kaichen adds that it has helped fill a void for training within the glazing industry that has been missing. ■

NGA recently upgraded the MyGlassClass.com online learning platform to provide new training for glaziers and glass fabrication personnel, as well as a new Learning Management System that allows training supervisors to better monitor employee training compliance.

MyGlassClass.com glazier training is for installers at full-service or contract glazing companies. Courses cover everything from the basics of the glass industry to safety, glass and metal fabrication, system fabrication and installation, and codes and estimating.

MyGlassFAB training is designed for entry-level production personnel: employees who are responsible for tasks like inspecting and measuring glass; loading and unloading glass; rotating glass through the various phases of the tempering, laminating, cutting, or shipping processes; etc. New courses for tempering furnace operators and quality technicians are also in development.

All MyGlassClass.com and MyGlassFAB courses can be taken on a phone, tablet or laptop and are available in English and Spanish.

To allow training supervisors to better monitor employee participation, NGA introduced a new Learning Management System with a Team Manager function that allows supervisors to see what training courses employees are enrolled in; what courses they have completed; and their test scores. Companies can customize their Team Manager to monitor training for individuals or employee groups. Users can also run reports from the system to get an overall view of employee training progress.

Access to NGA courses on MyGlassClass.com is available free to NGA members with active NGA membership. Email myglassclass@glass.org for more information about training, or visit www.glass.org/membership to join NGA today!

PRODUCTS



LiSEC laser etch sample. Photo by LiSEC Group.

KEY FEATURES

First-surface, laser-etched glass

Viracon's portfolio of high-performance coatings on second surface

Multiple patterns

No chemicals required for laser etching process

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Viracon helps birds see buildings with its revolutionary first-surface bird-deterrent solution for exterior glass facades called SoarSafe®.

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SoarSafe combines bird-friendly design with architect-friendly aesthetics as a laser-etched pattern applied to the first surface of glass. SoarSafe is subtle, but effective, when combined with Viracon solar performance coatings on the second surface to lessen reflectivity and increase bird safety. SoarSafe is available in three dot patterns that are recognizable to birds and help mitigate bird collisions with the glass. In addition, SoarSafe is environmentally friendly—no chemicals are used in the laser etching process.

Design without compromise

Architects and building owners do not need to sacrifice aesthetics or thermal performance for bird-friendly design. SoarSafe is available with Viracon low-emissivity coatings on the second surface of an insulating unit to achieve the desired design intent. Viracon offers more than 25 coatings with SoarSafe to allow flexible design options that accomplish a wide range of project requirements for the exterior glass façade.

SoarSafe sets the standard

As regulations for bird-friendly commercial buildings continue to evolve, SoarSafe meets the first surface pattern criteria desired by bird experts and approved by birds.

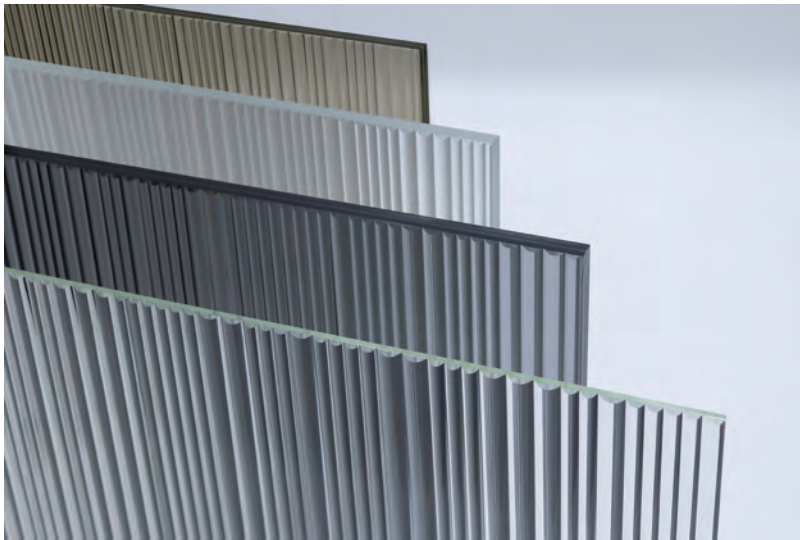
SoarSafe is ideal for buildings that are at increased risk for bird collisions due to location or commercial buildings where minimizing bird impacts is a priority. SoarSafe meets evolving building code requirements, helps to prevent bird collisions and perfectly reflects the industry's compassion for our avian friends. ■



Learn how SoarSafe can elevate your next bird-friendly project design

SPONSORED CONTENT





01



02



03

01. Decorative glass

Bendheim's Varis glass is an architectural glass that balances transparency and privacy. Varis' linear pattern is composed of alternating flutes in varying widths that shift light and reflection. Varis glass enriches interiors with its texture and kinetic interaction with light and is designed for a wide range of applications; from conference rooms to guest rooms, health care spaces, lobbies and lounges.

800/221-7379 | BENDHEIM.COM

02. Software

S. Albert Glass Co. developed iSpeedPix2PDF and iSpeedScan out of a need for faster, simpler documentation and file-sharing. These apps solve issues that glaziers, project managers and office teams deal with daily; from organizing jobsite photos to digitizing work orders on the go, both apps provide practical, time-saving solutions. With iSpeedPix2PDF, quickly convert multiple images into a single, neatly formatted PDF. iSpeedScan is a mobile scanning app that instantly turns physical documents into high-quality digital files.

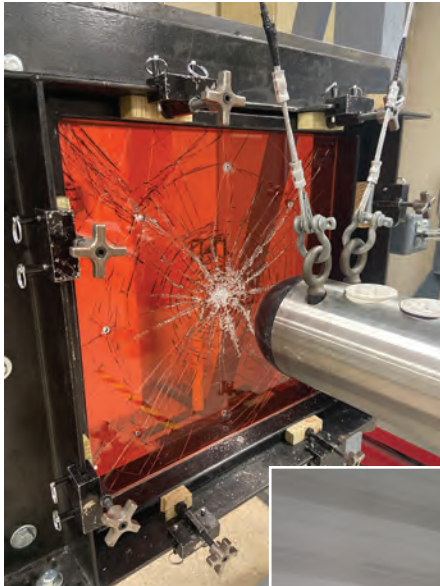
301/931-7800 | SALBERTGLASS.COM

03. uPVC window system

Alpen High Performance Products offers new, slimmer profile options in its Tyrol uPVC window system. Tyrol Edge and Tyrol Contour advance the platform's design flexibility while preserving its energy efficiency, with whole-window thermal performance up to an R-value of 11 (U-value of 0.09). Alpen's Tyrol eliminates the warping, cracking and thermal performance loss. The system serves a wide range of high-performance building applications, from code-compliant commercial buildings and affordable multifamily housing to passive house and net-zero homes.

303/834-3600 | THINKALPEN.COM

PROTECTIVE PRODUCT SHOWCASE



01. Security glazing system

Designed to replace traditional entrance glazing materials, DefenseLite AccessShield integrates with existing doors of all types and materials, offering a barrier that deters and prevents unlawful access. DefenseLite AccessShield is cost-effective and easy to install, making it an accessible option for a wide range of retail businesses, from small boutiques to large department stores. By retrofitting existing entrances with DefenseLite AccessShield, retailers can enhance their security measures without undertaking extensive renovations or incurring prohibitive costs.

888/689-5502 | DEFENSELITE.COM

02. Security interlayer

Saflex Clear interlayer by Eastman adds security features to laminated glass, which is designed to be versatile in both preventing injuries and rapid entry while protecting the building interior. Laminated glass made with Saflex Clear PVB interlayer helps ensure glass stays in place, and resists entry or penetration in cases of bomb blasts, ballistic attack, forced entry or vandalism.

423/229-2000 | SAFLEX.COM

03. Security latch

CRL's Blumcraft security latch features a distinct flat back that provides stronger engagement with the overhead door strike to keep glass doors resilient against exterior pull force when locked. This prevents the door from being forced open by pulling the exterior handle. The latch will come standard with all Blumcraft panic handles. To assist glaziers with proper installation, the security latch has a painted blue portion that indicates sufficient engagement with the door strike.

800/421-6144 | CRLAURENCE.COM



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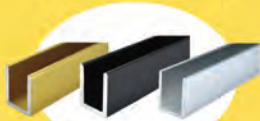
Offset Hinge



Door Rail



Ladder Pull



U Channel



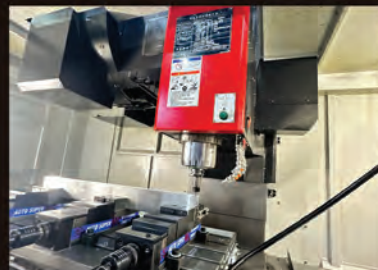
Center Lock



Door Header



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Hinge



Door Rail Machining



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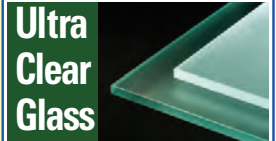
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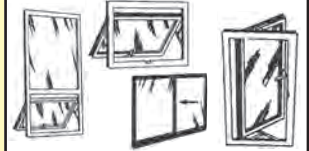
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UNIVERSITY STUDENTS LEARN ABOUT GLASS METROLOGY

K-SPACE ENGINEERS ASSIST STUDENT-LED PROJECT ON AUTOMATED VISUAL INSPECTION SOLUTIONS **BY NORAH DICK**

Students from the University of Michigan Materials Science and Engineering program visited k-Space Associates Inc. to see firsthand how to build automated visual inspection solutions for the glass industry. They also worked with the glass metrology engineering team to test a new kind of tempered glass detection solution.

k-Space metrology tools are used in research labs and production facilities by scientists and manufacturers to extend compound semiconductor use cases, leverage materials to make glass more energy efficient and improve solar panel output, say company officials.

About the project

Each year, senior students in the University of Michigan MSE program participate in a senior capstone project class coordinated with an industry partner. This year, k-Space donated expertise and equipment to support the project, “Automated Visual Inspection of Tempered Amorphous Glass Substrates.”

With assistance from k-Space engineers, students used the company’s glass breakage and defect detection tool to explore whether the birefringence effect could be adequately detected and processed into a tempered glass detection system. The students spearheaded this effort. k-Space provided the experimental setup, which included its glass breakage defect detection tool running on its in-house conveyance system, with minimal engineering guidance. Image captures via a 4k color linescan camera included multiple scans over a diverse range of glass and plexiglass samples, providing the students valuable insight.

Project success hinged on two defined deliverables:

1. Whether the system can detect and determine if tempering is present in the presented sample (basically a go/no-go determination), and
2. Whether the system can discriminate a degree of tempering by the contour map of birefringent intensity.

“While there are well-established metrology techniques to measure stress in glass, an automated solution is needed to better quantify, record and track tempered glass used in high-volume manufacturing,” says the students’ project statement.

“It was a good day of work and collaboration with the MSE program students. We look forward to continuing our support of the students’ capstone project,” says Tony Daniels, k-Space software engineer and lead developer of the barcode inspection tool. ■

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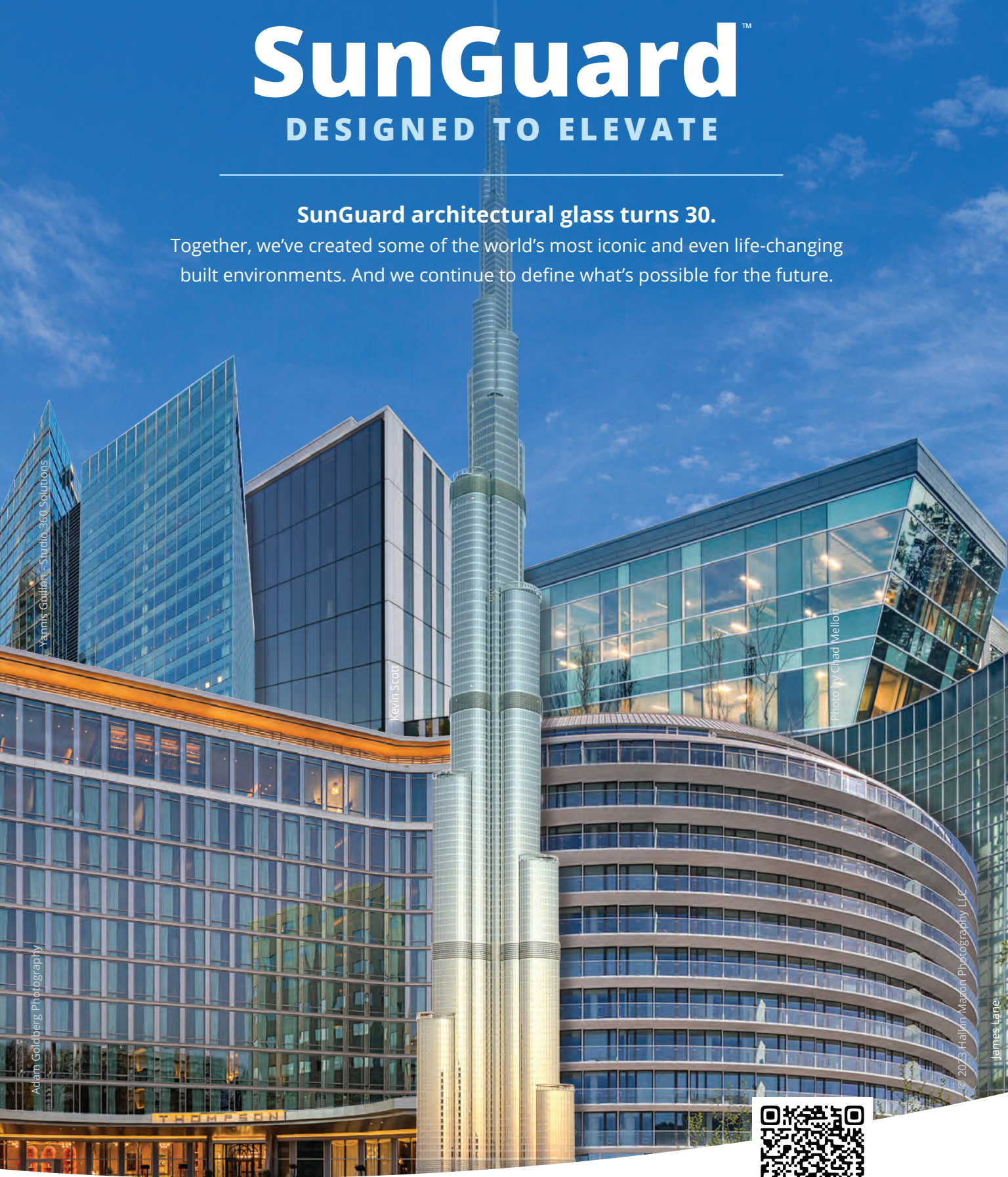


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