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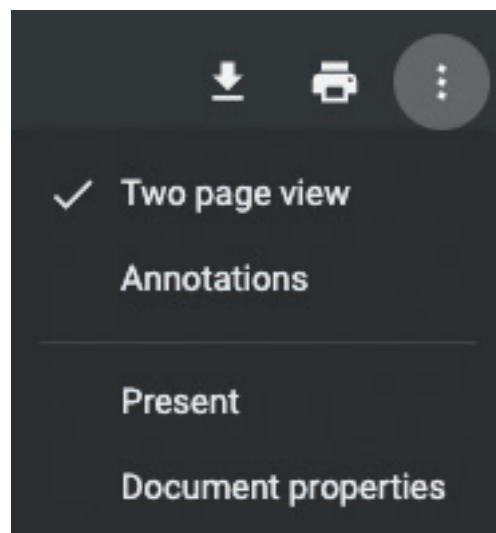
MAGAZINE®

THE GLASS AND GLAZING AUTHORITY

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GLASS

MAGAZINE®

THE GLASS AND GLAZING AUTHORITY • JULY 2024

GLASSMAGAZINE.COM

OFFICIAL PUBLICATION

NGA

NATIONAL GLASS ASSOCIATION

GLASS.ORG

TOP

FIFTY

INTEREST
RATES
COMPLICATE
GROWTH OF
LEADING
CONTRACT
GLAZIERS

GLAZIERS

FIRE-RATED
GLAZING MEETS
MULTIFUNCTIONAL
DEMANDS

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One 22 One office building in Nashville features work from Top 50 Glazier Pioneer Cladding & Glazing Systems Inc. Read more about the Top 50 Glaziers on page 46.



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ON THE COVER: The façade of office tower Harwood No. 14 in Dallas consists of a custom curtain wall system with 16 inch vertical blades and perforated panels for parking garage cladding, from Top 50 Glazier Harmon Inc., ranked No. 1 in the 2024 report. Read the report on page 46.



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16 feet high

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10 feet high

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ADVOCACY

A Q&A on the importance of glazing for school security

RESOURCES

NGA publishes updated technical resource on fabrication of flat glass mirrors

WEBINAR

AI & Automation Unleashed, on demand through the Thirsty Thursday series

GLASSBLOG



DESIGN

High-performance Health Care Fenestration

By Mary Avery, Tubelite, Alumicor, EFCO, Linetec



SUSTAINABILITY

Glass Industry’s Circular Economy

By Marc Everling, Marc Everling Sustainable Communications



TRENDS

The Chill Period

By Max Perilstein, Sole Source Consultants

PROJECT SHOWCASE



Featured in Glass Magazine Weekly and on GlassMagazine.com.

Pictured: Bendheim provided over 5,400 square feet of laminated glass for a compression-clipped glass parking façade system on a commercial office and garage in Austin, Texas. The compression fittings provide the strength and support necessary to seamlessly integrate the glass and metal louver panels.

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344 Maple Ave. West, Unit 272
Vienna, VA 22180
P: 703/442-4890

EDITORIAL

Content Director

Katy Devlin • kdevlin@glass.org

Managing Editor

Tara Lukasik

Senior Editor

Norah Dick

Assistant Editor & Researcher

Rachel Vitello

Creative Lead

Cory Thacker

Associate Director,
Comm. & Digital Media
Bethany Stough

Digital Media Specialist
Wendy Vardaman

Production Director
Beth Moorman

Circulation Manager
Jo Ann Binz
jbinz@glass.org

ADVERTISING

Publisher

Emily Thompson

ethompson@glass.org
703/442-4890 ext. 150

Senior Sales Consultant

Chris Hodges

chodges@glass.org
703/442-4890 ext. 131
Cell: 410/459-8619

Senior Sales Consultant

Holly Robinson

hrobinson@glass.org
703/988-3164

Sales Consultant

Tristan Scoffield

tscoffield@glass.org
703/442-4890 ext. 194

Suppliers Guide Sales

Tim O’Connell

toconnell@glass.org
703/442-4890 ext. 129

Media Sales &
Sponsorships Manager

Cameron Francis

cfrancis@glass.org
703/442-4890 ext. 132

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Hey ChatGPT, Can We Talk?

A Q&A WITH AN AI ABOUT THE RISKS AND REWARDS OF EMPLOYING ARTIFICIAL INTELLIGENCE TOOLS AT YOUR GLASS BUSINESS



KATY DEVLIN
Content Director
Editor-in-Chief
kdevlin@glass.org

Artificial intelligence has firmly taken root in the glass industry, with companies in all areas beginning to utilize AI tools throughout their businesses—often successfully. However, the use of AI also presents risks to companies. One major challenge is the possibility that AI will “hallucinate,” aka generate false information. Thus, all AI-generated content requires careful review. Additionally, AI output is only as strong as the input. In other words, humans must provide very clear, detailed prompts to achieve useful AI responses. Given the rapidly increasing

role of AI in our day-to-day lives, I thought it was time to invite an AI to comment directly to describe its capabilities and address the risks companies face when using it in our industry. What follows is a transcript from a conversation with ChatGPT, the language model by OpenAI.

Hey ChatGPT, can I interview you for a column I'm writing about the risks and rewards of using AI at architectural glass industry companies?

ChatGPT: Of course! I'm ready for your questions.

What do you see as the role of AI in the architectural glass industry?

In architectural glass, AI revolutionizes design, quality control, and efficiency. Adapting to technology's evolution, integration promises innovation, reshaping aesthetics and methodologies for professionals.

Can you be more specific? For example, how might a company that handles shower door design and installation, working directly with the customer, use AI in its business?

A company could use AI to generate custom shower door designs based on customer preferences, optimize

installation schedules, and enhance customer service through chatbots for queries and support.

What about a glazing subcontractor?

A glazing subcontractor could use AI for:

- Automated design and modeling of glass façades.
- Optimizing material usage for cost efficiency.
- Predictive maintenance for installed systems.
- Real-time monitoring of glass performance for safety and energy efficiency.
- Enhanced project scheduling and logistics management.

What are the risks of using AI in construction?

AI can make mistakes in construction projects through design errors, poor scheduling, misallocated resources, safety risks, quality control issues, legal non-compliance, technical failures, and over-reliance on AI, leading to human oversight neglect. Ensuring data quality, thorough testing, and maintaining human oversight can mitigate these risks.

Has a subcontractor faced legal issues because they used AI on a project?

Yes, subcontractors have faced legal issues for AI-related mistakes in projects, such as faulty design decisions or safety hazards, leading to litigation over liability and damages.

How can a subcontractor protect themselves?

Subcontractors can protect themselves by:

- Ensuring AI systems are thoroughly tested and validated.
- Having clear contractual agreements that outline responsibilities and liabilities.
- Obtaining appropriate insurance coverage for AI-related risks.
- Maintaining human oversight and expertise to mitigate AI errors.
- Staying informed about legal and regulatory developments related to AI in construction.

Will AI take jobs away from people working in architectural glass?

While AI may automate some tasks in architectural glass work, it's more likely to augment human capabilities rather than replace jobs entirely. Workers will still be needed for tasks that require creativity, critical thinking, and manual dexterity, while AI handles repetitive or data-intensive tasks, leading to more efficient processes rather than job displacement. ■



READ THE FULL VERSION OF THIS ARTICLE AT GLASSMAGAZINE.COM. AND SEE PAGE 32 OF THIS EDITION FOR A COLUMN ABOUT MANAGING RISKS OF AI IN YOUR BUSINESS.



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APPLY NOW FOR AGMT CERTIFICATION AT GLASSBUILD

The Architectural Glass and Metal Certification Council will host its hands-on certification testing program for experienced glazing supervisors and technicians, live on the show floor at GlassBuild America 2024, Sept. 30-Oct. 2 in Dallas.

AGMT tests glaziers via a written, knowledge-based test and a hands-on performance-based test. The performance-based test at GlassBuild will encompass a full day of hands-on testing, including curtain wall, storefront, layout, weather sealing, structural sealing and safety.

Why certify

Per AGMT, certification provides a competitive advantage for glaziers and their employers. It allows contractors to: differentiate themselves from the competition; demonstrate a commitment to

quality and a commitment to continuing education; and elevate customer and supplier confidence of installation.

Who should apply

Glaziers must have at least 7,500 hours of work experience and a minimum of OSHA 10 Certification to qualify. Only glaziers who have pre-registered and passed the prerequisite written knowledge-based test in advance will be eligible to test during GlassBuild.

How to apply

Learn more and apply for AGMT testing at GlassBuild at agmtprogram.com, or by emailing skennett@amscert.com. Space is limited to be part of the first AGMT Testing event at GlassBuild America. The deadline to register is August 30. ■

NGA NAMED BEST NONPROFIT FOR SECOND YEAR

For a second consecutive year, the National Glass Association was named one of the Best Nonprofits to Work For in 2024, by the NonProfit Times. The awards program identifies, recognizes and honors the best employers in the nonprofit industry. NGA ranked second out of 50 total organizations, and first in the small employer category.

NGA staff noted the organization's focus on work-life balance and well-being, and leadership that fosters a caring and collaborative team culture. ■

TAYLOR ANDERSON JOINS NGA BOARD



Filling a glazing contractor seat, Taylor Anderson, vice president of business development and marketing for Anderson

Aluminum Corp., joined the NGA Board of Directors.

"I look forward to working with the board of directors and the dedicated NGA team, while representing the glazing subcontractor," says Anderson. "Over the next few years, I hope to build great relationships and help move initiatives forward that will positively impact the glazing industry." ■

ADDRESSING LABOR SHORTAGES THROUGH OUTREACH

The lack of skilled labor continues to be one of our industry's greatest challenges. High school career fairs are a great way for companies to talk with students about post-graduation career paths. Jodi Martinez, vice president of AllStar Glass, and Jenni Chase, NGA vice president of workforce development, shared how to make the most of career and trades events during NGA's Recruitment Resources for Installers webinar. The full Thirsty Thursday is available online. ■



Watch the webinar



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GLASS ADVOCATE



Glass industry stakeholders and NGA staff gathered in Washington, D.C., for the third Glass & Glazing Advocacy Days.

NGA ADVOCATES FOR THE INDUSTRY

NGA hosted members, stakeholders from government agencies, and congressional members in Washington, D.C., May 14-15, to discuss top policy priorities and to showcase how the industry contributes to the economy, the workforce and human health.

In 41 meetings with Congressional representatives, industry members made the case for glass and fenestration systems as sustainable, eco-friendly building products that can provide needed security, and need to be manufactured and installed by a well-trained workforce.

“We offer so much value in our products and services that benefit energy efficiency, decarbonization, sustainability, safety, resiliency, skilled trade job creation, and specialty benefits like bird safe glazing,” said NGA Glass & Glazing Advocacy Days participant Kyle Sword, R&D director North America, NSG Pilkington. “Sharing our story and educating representatives on the issues we face will help us make a broader impact.”

Updates on policy priorities

1. WORKFORCE DEVELOPMENT.

Advocacy Day participants met with Senator Bernie Sanders’ office, as Sanders chairs the Senate Committee on Health, Education, Labor and Pensions (HELP). Jenni Chase, vice president of workforce development at NGA, made the case with Sanders’ office staff to encourage the passing of a Senate bill similar to H.R. 6655: A Stronger Workforce for America Act, which increases funding to train and upskill workers (the bill passed in the House of Representatives). Chase underlined the importance for the legislation’s creation of individual training accounts, which allow individual workers to pay for education.

“We need to give potential employees access to tools to get trained,” said Advocacy Days participant Rick Locke, who is also chair-elect of NGA and owner/president of Montana Sash & Door.

2. SCHOOL SECURITY.

Securing schools from forced entry remains a major issue in the U.S. Advocacy Day participants made the case that glazing products can help harden school buildings and delay entry of an attacker,

buying crucial time to allow first responders to arrive.

Advocacy Day participants spoke with the office of Senator Marsha Blackburn, who introduced Senate Bill 1107: Securing Aid for Every School Act, which allocates funds for school safety and security. Katie Lane, Blackburn’s chief counsel, said the bill is a “bipartisan solution to harden schools, and can save children’s lives.”

3. HIGH-PERFORMANCE GLAZING.

Advocacy Day participants also made the case to extend the Section 48 tax credit of the Internal Revenue Code that incentivizes the use of electrochromic glass, and also expand the definition of the section to include other of the many high-performance glazing options.

Speaking to Senator Mitt Romney’s office, Advocacy Days participant Helen Sanders, general manager of Technoform Glass, explained that heat pumps—which receive more incentives than fenestration—require high-performance glazing to effectively reduce heating and cooling loads of buildings, underlining the need to incentivize the use of high-performance glazing to achieve energy-efficient buildings.

4. BIRD-FRIENDLY GLAZING.

Advocacy Day participants spoke with the office of Representative Morgan Griffith, who introduced the Federal Bird Safe Buildings Act in 2023. Advocacy Day participant Lori Ann Benish, general manager of Enclosures Unlimited, said that industry members are ultimately looking for a “more unified code” regarding bird-friendly glazing, so that these products can become “more affordable and readily available.” ■



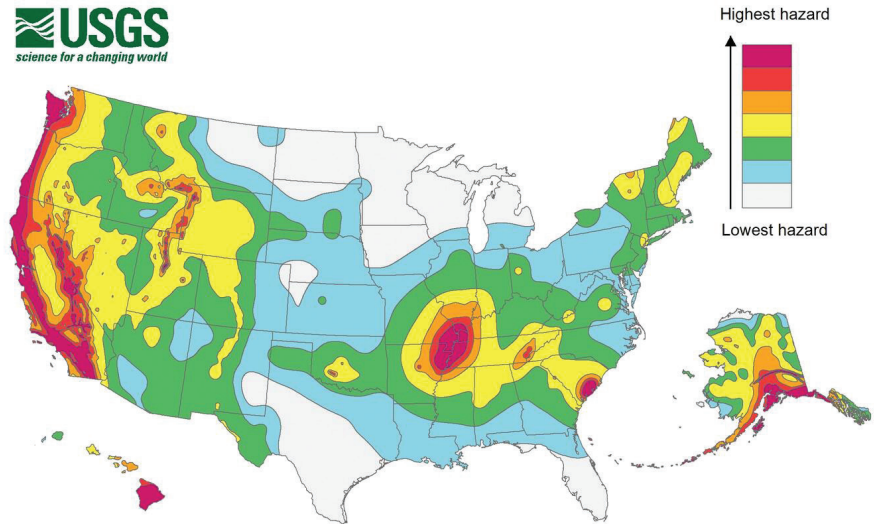
GLASS INFORMATIONAL BULLETIN

GLAZING FOR SEISMIC EVENTS

Shaking and twisting buildings, uplifting of the earth, people running and trying to avoid falling debris—this can be a typical scene during a damaging earthquake. Significant research has been done about the causes of earthquakes and on how to keep buildings intact and functioning during these events. Engineers and architects follow code requirements for the structural performance of buildings in seismic zones. Glass and glazing can be designed as non-structural components installed in buildings in seismic-prone areas.

What is an earthquake?

An earthquake is a rupture in the earth's lithosphere or crust. Typically starting deep in the Earth's mantle, convection currents can build pressure over time under the tectonic plates. When the plates can no longer contain the pressure, a rupture occurs as a mechanism to release the pressure. This causes the crust to move and slip, shaking the ground for several miles from the earthquake's epicenter.



Earthquake hazard map showing peak ground accelerations having a 2% probability of being exceeded in 50 years, for a firm rock site. Locally, the hazard may be greater than shown because site geology may amplify ground motions.



This excerpt is from a technical document developed by member volunteers and subject matter experts from the National Glass Association, available for free download.

According to the United States Geological Survey, there are over 500,000 detectable earthquakes in the world every year. Of those, one-fifth can be felt and only a small number cause damage. An earthquake will typically occur along a fault line where edges of tectonic plates intersect. There are three major fault lines in North America: the New Madrid, San Andreas and Denali fault lines; however, an earthquake can occur anywhere.

Earthquakes are rated on two

scales—the Richter Magnitude Scale and the Modified Mercalli Scale. The Richter Magnitude Scale rates the magnitude of the earthquake; the higher the number, the more severe the earthquake. The rating does not relate to how far the earthquake reaches from its epicenter. The largest recorded earthquake in the world occurred in Chile in 1960 and was a 9.5 on the Richter Magnitude Scale. The Modified Mercalli Scale rates the level of damage to an area.



GLASS INFORMATIONAL BULLETIN — GLAZING FOR SEISMIC EVENTS

ALTHOUGH GLASS TENDS TO HAVE GOOD IN-PLANE AND OUT-OF-PLANE STRENGTH, ONCE A CRACK OCCURS, THE GLAZING CAN BE COMPROMISED.

How glazing systems handle seismic events

During an earthquake, a building will sway laterally and rack out of plane. In and out racking perpendicular to the plane of the wall or window is generally not harmful to most glazing systems. But any racking movement parallel to the face of the wall, to the left or right of nominal, can be much more damaging, forcing a normally perpendicular grid system to try to contort into parallelograms. The glass will follow the framing of the former, usually moving in unison with the framing, but may move differentially from the framing in lateral racking.

The building code establishes the amount of allowable movement of the building structural frame. The project structural engineer establishes lateral displacement criteria specific to each project. The engineer responsible for preparing the curtain wall or window calculations then uses that criteria to determine whether the proposed glazing system can retain the glass in the event of an earthquake of that magnitude.

Glass specification

Although glass tends to have good in-plane and out-of-plane strength, once a crack occurs, the glazing can be compromised. The main cause for glass breakage is damaging contact between the glass edges and rigid framing materials.

Once a crack in the glass occurs, the continued movement of the building

can cause the glass to fracture and fall out of the opening unless the glass is laminated, or a film has been applied to its surface. Laminated annealed or heat-strengthened glass has better retention in the frame structure than fully tempered laminated glass due to the associated break patterns.

Research has also shown that the proper placement of anti-walk blocks in captured systems placed along both the horizontal and vertical edges of the glass, and/or rounding of the corners of the glass lite aid in reducing the potential for the glass to contact the edges of the frame and break.

Other glazing systems, such as structural silicone glazing, may have different means of supporting the glass and must be examined on a case-by-case basis to determine whether the amount of racking or building movement can put undue stress on the glass or cause the glass to come in contact with framing members. The façade engineer may need to determine that the structural silicone is not overstressed and will allow some movement to meet the performance criteria or code.

Glass panel heights are critical to seismic performance. Obviously, dividing a glass opening height into smaller units has an aesthetic impact on the project and potentially affects material and labor costs for the system and design being proposed. While shorter-height glass lites will experience less seis-

mic movement, given the ratio of their individual heights to the floor-to-floor height, taller lites require more room for movement within a given system, and may disqualify some systems for a specific project. Designers may need to reconfigure elevations to allow a desired system to work for the application.

Test standards and guidelines

According to provisions found in American Society of Civil Engineers (ASCE) 7 Section 13.5.9.1 that are referenced in Chapter 24 of the International Building Code, seismic testing of glazing units is not required provided:

- Fully tempered glass is used in openings at no more than 10 feet (3 meters) above a walking surface;
- Adequate clearance is provided around the glass so that it does not contact the frame during the calculated movement from a seismic event; and
- Annealed or heat-strengthened laminated glass is captured in a glazing pocket and its perimeter is secured to the frame by an appropriate structural sealant.

The Fenestration & Glazing Industry Alliance developed two test methods for assessing seismic performance of glazing. These are:

- AAMA 501.4—Recommended Static Test Method for Evaluating Window Wall, Curtain Wall and Storefront Systems Subjected to Seismic and Wind-Induced Inter-Story Drift
- AAMA 501.6—Recommended Dynamic Test Method for Determining the Seismic Drift Causing Glass Fallout from Window Wall, Curtain Wall and Storefront Systems ■



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Quanex Building Products to Acquire Tyman, Close Kentucky Plant

Quanex Building Products Corp. reached an agreement with Tyman on the terms of a recommended cash and share offer, under which Quanex will acquire the entire issued and to be issued share capital of Tyman for approximately \$1.1 billion in enterprise value. Tyman's subsidiaries include AmesburyTruth, Lawrence and Bilco. This acquisition aligns with Quanex's "BIGGER" strategic roadmap for growth and value creation.

According to a WARN Act notice, Quanex Building Products Corp. is closing its Mikron brand plant. Mikron is a manufacturer of vinyl and composite window and door components and portfolio brands. The plant is located at 100 Mikron Way, Richmond, Kentucky. This closure is expected to happen on or around August 6, 2024, and almost all positions will be impacted. The plant closure will be conducted in a phased approach.

Vitro Closes Oregon Plant

After almost three decades in business, a Vitro Architectural Glass plant in Salem, Oregon, will close this summer and lay off 37 workers. The plant will end production due to lower demand for its products, according to Bill Haley, vice president of U.S. operations.

The plant is a glass-coating facility, applying energy-efficient coatings to window glass used in building construction. The facility produced more than 50 million square feet of glass per year.

Employees were informed of the closure on April 29. Some are being considered for open jobs at other Vitro facilities, and Vitro is working with other

local companies and the state employment department to help others find jobs.

Quaker to Expand Missouri Facility in \$30 Million Investment

Quaker has plans to expand its Eldon, Missouri, manufacturing facility, investing more than \$30 million and creating 220 new jobs. This expansion will also increase its manufacturing capacity, adding 300,000 square feet to its existing 450,000-square-foot campus. Quaker's new facilities, expected to be complete by the fall of 2025, are designed to accommodate future growth.

NA Holding Acquires Architectural Glass & Aluminum

N.A. Holding Corp., a diversified holding company owned by Matt Wojewuczki and Doyle McCauley, announced the acquisition of Architectural Glass & Aluminum, an aluminum and glass fabricator in Columbia City, Indiana.

N.A. Holding has a portfolio of small industrial businesses and investments that include Microtech Welding Corp. in Fort Wayne and Warsaw, and Shar Systems and Deister Concentrator, both of Fort Wayne.

Masonite Announces Sale of Architectural Business Segment

Masonite entered into a definitive agreement for the sale of all assets associated with its architectural business segment to subsidiaries of IBP Solutions Inc., a newly formed portfolio company of Industrial Opportunity Partners. The transaction is expected to close in the second quarter of 2024, subject to customary closing conditions.

AGC Successful in Demonstration Test of Solar Panel Cover Glass Recycling

AGC succeeded for the first time in Japan in a demonstration test to recycle cover glass for solar panels into float glass. With the success of this test, following the test for recycling into figured glass announced in November 2023, AGC expects that cover glass can be used to make float glass, which has been considered technically difficult to achieve.

The test was conducted at the AGC Kashima Plant's float glass production furnace. Approximately 5 tons of cover glass used in this test was refined and supplied using the low-temperature thermal decomposition technology of Tokuyama Corp.

PGT Custom Windows and Doors Announces Partnership with HGTV Designers

PGT Custom Windows and Doors by Miter Brands announced a partnership with Brian and Mika Kleinschmidt, custom home designers featured on popular HGTV shows, including 100 Day Dream Home and Rock the Block. The partnership provides the Kleinschmidts access to the full suite of PGT window and door products, which they recommend as their preferred window manufacturer for all new construction projects. For 2024, the couple have 35 new home builds and remodel projects scheduled, as well as a boutique hotel makeover. Many of the building projects will be featured in the upcoming season of HGTV's 100 Day Dream Home and a new series on the network.



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NEWS TO KNOW

Advanced Glazings and WinTech Partner on New Products

Advanced Glazings Ltd., based in Sydney, Nova Scotia, and WinTech, out of Monett, Missouri, have joined forces to create sustainable metal building products. The partnering of products is based on a shared commitment to achieve a balance between value, energy efficiency and employee well-being.

Dow Announces New Collaborations

Dow Chemical International Private Limited (Dow India) and Glass Wall Systems India signed an agreement for Dow to supply DOWSIL Facade Sealants from Dow's Decarbica portfolio of reduced-carbon solutions for Glass Wall System's curtain wall system.

This collaboration demonstrates a dedication from organizations in the building and infrastructure industry to reduce embodied carbon in building materials. Dow's carbon-neutral silicone sealants for building façades have a lower embodied-carbon footprint due to Dow's investments in the decarbonization of its silicon metal assets in Brazil.

Dow also announced a capacity expansion from its minority equity investment in SAS Chemicals GmbH, a German-based specialty chemical producer of sealants and components used in insulating glass manufacturing, to create a more holistic façade offering.

With the capacity expansion at SAS Chemicals, Dow aims to have a broader range and capacity of high-performance adhesives and sealants solutions for insulating glass manufacturers.

Tecglass Opens North American Facility

Tecglass announced the opening of its newest business unit in the United States. This expansion hopes to meet the increasing demand for its U.S. and Canadian markets. The new business unit, located at the premises of Fenzi AGT USA LLC at 498 Acorn Lane, Downingtown, Pennsylvania, is now fully operational. Its mission is the supply and service of the entire range of Jetver ceramic inks, consumables and spare parts.

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JDC Aluminum Unveils New Facility

JDC Aluminum Systems Inc. of Tampa revealed its first-ever location, a 60,000-square-foot facility located at 4166 Rice Road in Plant City, Florida. The new facility will offer a full range of services, including stock and custom storefront materials, multi-point fabrication, and specialized expertise in protective glazing. The company says this new establishment is the inauguration of the first in a series of

planned locations across North America and beyond.

Crystal Expands Operations at Pennsylvania Facility

Crystal Window & Door Systems expanded operations at its Northeast Pennsylvania facility outside of Scranton with the addition of several Crystal products to the lineup of products fabricated there.

Crystal Windows' new construction Series 300 and Series 400 vinyl windows and the Series 1500 and Series 1600 vinyl sliding patio doors are all now fully assembled at the factory. Crystal has also expanded its insulating glass unit fabrication capabilities.

Crystal plans to add more new equipment this year, including vinyl saws, welders and corner cleaners with associated tooling to handle additional Crystal products. Building improvements, a new rooftop sign and enhancements to employee break areas are also in the works.

YKK AP America Opens Doors to Los Angeles Sales and Manufacturing Center

YKK AP America opened its doors to a new sales and manufacturing center in Rancho Cucamonga, California. The facility, which will be dedicated to sales, production, distribution and logistics, aims to enhance the customer experience in the Western region.

The new sales and manufacturing center offers more than 80,000 square feet of space designed to establish local production capabilities and allow for finished goods inventory. It will serve as a key U.S. sales and distribution center for customers in California, Arizona, Nevada and New Mexico.

Frameless Hardware Company Opens New Dallas Service Center

Frameless Hardware Company has opened its doors to a new Dallas area service center. The new facility includes 50,000 square feet of warehouse, will call and a showroom to help bring local inventories and expedited lead times to the market. Branch Manager Zeke Gonzales and Office Manager Megan Gordy oversee day-to-day operations, while local customers will be serviced by George Heflin, vice president of sales for the Southwest Texas Region, and outside sales representative John Mattie.

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


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CoolVu Celebrates Expansion to 100 Franchise Territories

CoolVu Glass & Surface Solutions announced it's expanding its franchise network to 100 territories in operation across the U.S.

CoolVu provides window film, graphics and architectural surface solutions. CoolVu's franchisees offer a range of solutions tailored to meet the needs of residential, retail and commercial clients.

From eco-friendly products, CoolVu franchisees provide solutions that focus on comfort, sustainability and energy efficiency.

Greco Offers New Course for Architects

Greco Architectural Metal Products has a new continuing education course for architects on glass railings for commercial and multifamily projects for interior

and exterior applications. It has been approved by the American Institute of Architects, offering one Learning Unit for Health, Safety and Welfare. This new course marks the fifth installment in its continuing education series.

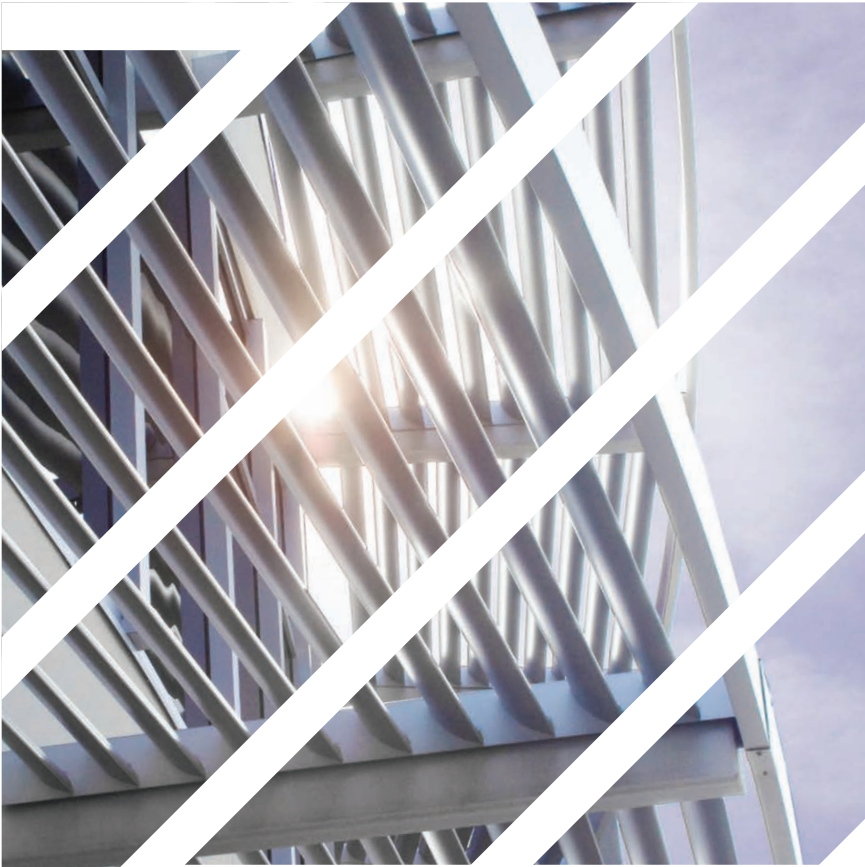
The glass railings course provides an overview of glass guardrails and handrails, providing design insight, best practices, related building codes and more. Upon completion, architects will have acquired knowledge about integrating glass railings into modern architectural designs.

The commercial glass railings course can be accessed on Greco's website at grecorailings.com/continuing-education.

ES Enters the Vinyl Window Market

ES, a company within the Tecnoglass group, has entered the vinyl window market. With ongoing projects in both the Southeast and Northeast markets of the U.S., this expansion aims to broaden the company's market reach. ES has signed a long-term supply agreement to procure vinyl profiles from a global manufacturer. This move aligns with the Tecnoglass group's strategy to penetrate new markets and enhance its product lineup.

Adhering to its strategy for a vertically integrated platform, ES will customize these profiles to specific product specifications. Utilizing glass produced within the Tecnoglass group along with newly installed vinyl assembly lines, ES plans to manufacture and distribute vinyl windows to both new and existing customers.



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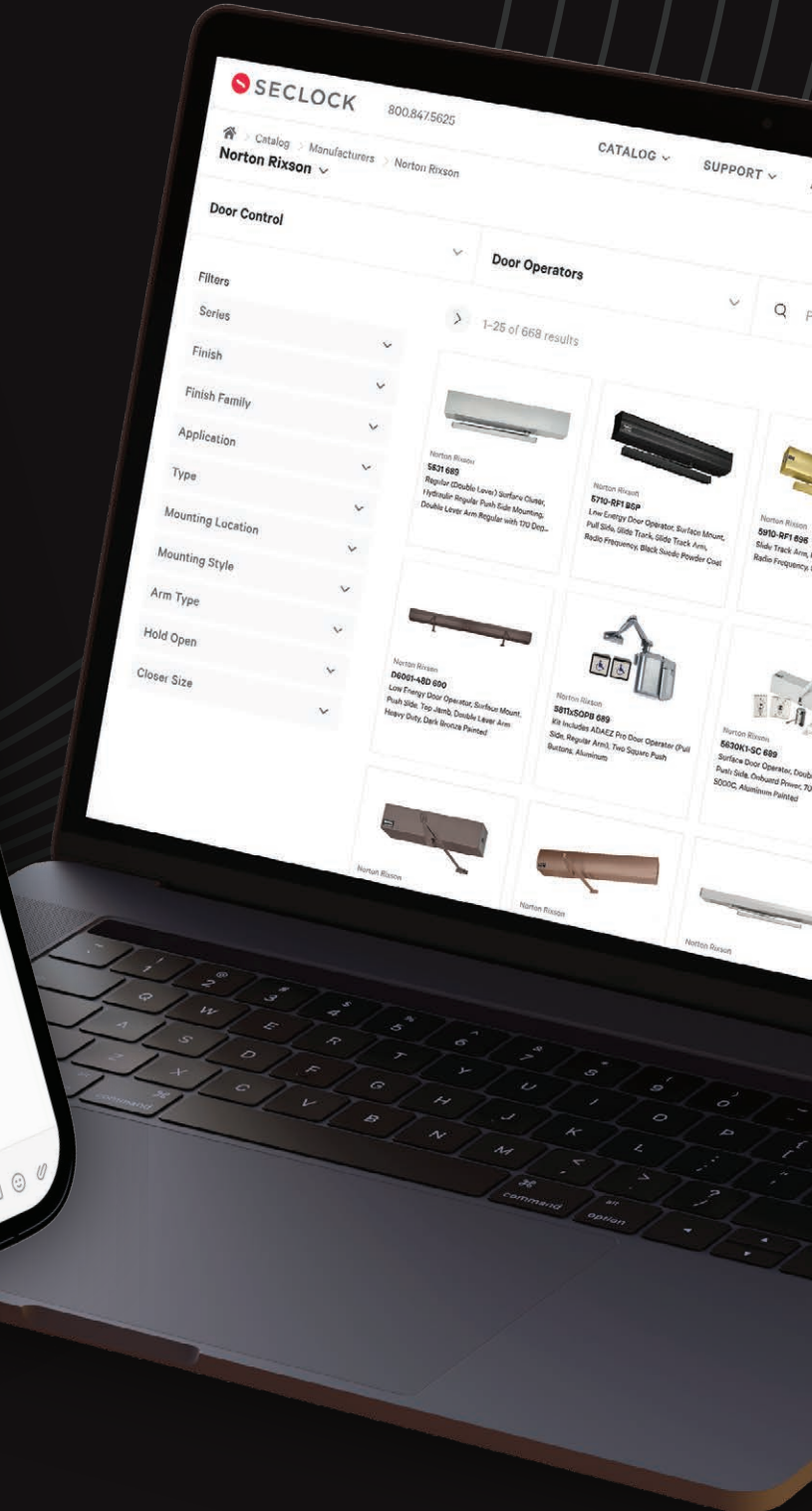
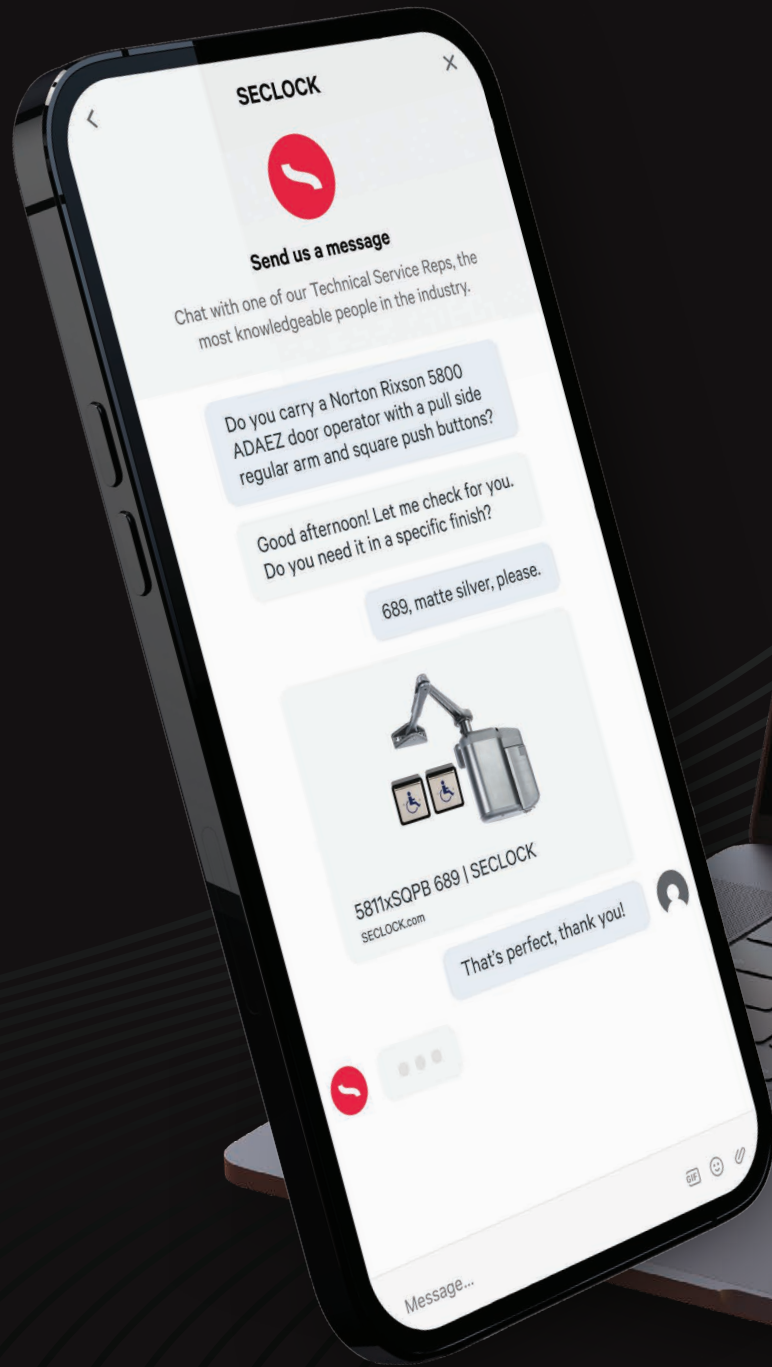
Hartung Glass

Industries announced the appointment of *Bob Cummings* as vice president of sales. This role marks Cummings' return to Hartung, where he previously served from 2014 to 2018 as vice president of sales for the Southwest region.

Cummings brings 41 years of experience within the glass industry, having held

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leadership roles, including CEO, COO, president, vice president, director and general manager.



Kuusela

Glaston Corp.

announced that *Kimmo Kuusela* has been appointed senior vice president of sales and service for Asia-Pacific. He is based in Glaston's office in Singapore to oversee the sales and service operations of Glaston products in the Asia-Pacific region. Kuusela started at Glaston in 2005 and has been working throughout the company in many different roles.



MacDonald

Sightline Commercial Solutions

has appointed *Bill MacDonald* as its new senior preconstruction manager. Bringing over a decade of

industry knowledge and project planning expertise, MacDonald will

lead the company's railing project, from preconstruction through final bidding and contracting, overseeing plans, budgets and schedules before construction begins.



Grubbs

Cyncly announced the appointments of *Wynn Grubbs* as general manager for Cyncly's flooring, kitchen, bathroom and furniture for retail solutions and *Mark Lukianchuk* as general manager for Cyncly flooring solutions. Grubbs brings over two



Lukianchuk

decades of experience in high-growth SaaS companies to this role. Most recently, he held multiple general manager roles and CRO organization leadership positions at PTC.

Lukianchuk brings a strong track record as a general manager who has scaled multiple B2B software companies, as well as experience serving retail customers,

including both enterprise and SMB customers, and product experience across multiple markets.



Boyer

IGE Glass Technologies

added *Charles Boyer* to its sales and technical team. Boyer joins IGE with an extensive record in the glass fabrication space, extensive research and development experience, along with a decades-long career in the glass fabrication business.



Schulz

IGE also announced the addition of industry veteran *Todd Schulz* to the sales team. Schulz brings decades of experience in the flat glass industry to IGE. His past includes general management of glass fabrication facilities and extensive experience in sales.



Fischer

Pulp Studio announced a partnership with *Bethany Fischer* of Preservation & Protection Systems Inc. Fischer has over 15 years of

experience running PPSI's interior finish product package with a specialization in technical customizable materials. Fischer will be responsible for overseeing sales in Washington, D.C., Maryland and Virginia.



Robinson

The **National Glass Association** introduced *Holly Robinson* as its new senior media consultant, covering the Western United States. Alongside

Chris Hodges and Tristan Scoffield, Robinson will sell print and digital advertising for NGA's two publications, Glass Magazine and Window + Door, as well as sponsorship opportunities for NGA's annual events in keeping with customer requests for all-encompassing marketing and promotional packages. ■

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CLOSER LOOK

WESTERN EUROPEAN GLASS SECTOR REEMERGES

FLAT GLASS SECTOR FACES LINGERING PANDEMIC AND ENERGY SHORTAGE ISSUES
BY EUGENE GERDEN



THE BOTTOM LINE: The flat glass industry in Western Europe is seeing a resurgence of growth following pandemic challenges and the shock to energy costs caused by the ending of Russian gas supply to the region. While some countries are now reporting pre-pandemic metrics of growth, concerns remain about energy costs, and high costs in general.

The glass sector of the Western European region—which consists of the most economically developed countries of the region, including France, Germany and the U.K.—has returned to, or even surpassed, pre-pandemic metrics for growth. Nevertheless, the sector’s recovery, and continued growth, continues to be affected by energy costs.

Delayed recovery, rising energy costs

The beginning of the Russian-Ukrainian war led to an unprecedented crisis in the Western European glass

sector, as most Western European states were forced to suspend most of their supplies of cheap Russian gas—the main energy source of the industry for over 30 years.

Of the Western European states, Germany and its glassmaking sector was the most affected by the end of Russian gas supply, due to the country’s traditional dependence on Russian energy sources. The suspension of Russian gas supply was a shock to the energy-intensive glass sector of most Western European states and even threatened to bankrupt some regional glassmakers.

Despite the ability of German authorities to restrict the sharp growth of energy prices in the industry, prices (primarily for electricity) still put serious pressure on the German glassmaking sector and its major players, preventing their more active growth.

Despite numerous calls by leading German glassmakers and the industry’s association on the federal government to provide more serious support to the industry to deal with the ongoing growth of electricity prices, the problem has not yet been resolved.

Like other Western European glass manufacturers, French glassmakers are currently prioritizing the reduction of energy bills, as well as meeting local demand for glass. For this purpose, many French glass manufacturers in recent years have announced plans for

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modernization of existing sites, and construction of new furnaces.

Industry grows beyond pre-pandemic metrics

According to statistics published by regional glass associations, such as the German Federal Association of the Glass Industry (BV Glas), the Western European glass industry has almost returned to pre-pandemic key figures of performance, reflected by a significant increase of sales and local demand for glass.

That has allowed the industry to achieve generally good growth rates in recent months.

For example, currently the annual output of Germany’s glassmaking sector is valued at \$11.9 billion in value and 7.86 million tons produced. In terms of market structure, container glass accounted for 4.7-4.8 million tons and flat glass for 2.4-2.5 million tons. Due to the industry’s need for wood as

fuel, the centers of the German glass industry have always been the wooded low mountain ranges, especially the villages and towns in the Bavarian and Thuringian Forests.

According to an earlier report by the Statista analyst agency, in 2022 the German industry achieved overall sales figures of \$13.6 billion, the highest result since 2018. While the official results for 2023 have not yet been published, most Statista analysts expect sales figures to approach \$14.8 billion. Flat glass remains the largest segment in sales terms, with the construction sector being the largest consumer.

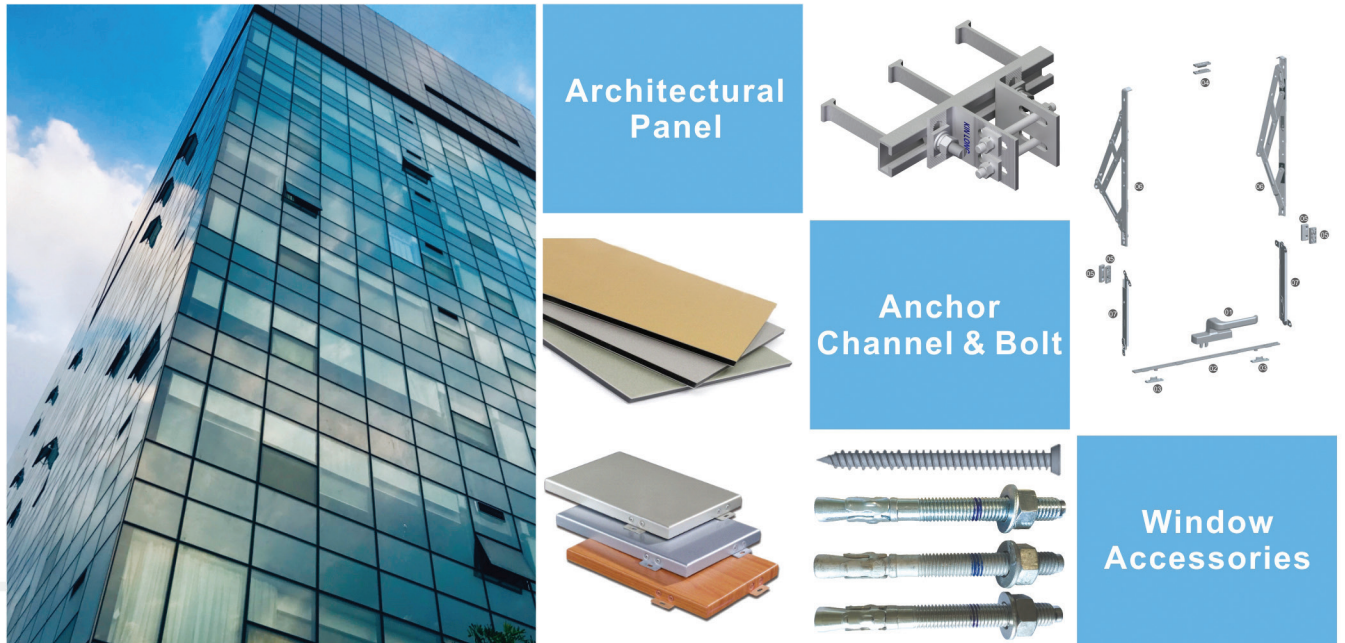
Like Germany, the U.K. flat glass industry has seen post-pandemic growth and is a major contributor to the country’s economy, representing 24,000 direct jobs across the whole supply chain. At present, the largest manufacturing category within the sector is container glass, which totals

2.5 metric tons of glass for eight billion container products. The segment, as well as the entire market, will further grow this year, mainly driven by high demand for U.K. glass in foreign markets, particularly Asia.

France’s glass industry has also recovered to pre-pandemic levels, and is currently growing, according to Jacques Bordat, president of the French Federation of Trade Union Chambers of the Glass Industry.

Most French glassmakers are fully operational and working at full capacity, planning their further expansion into neighboring markets in years to come.

Currently, Germany remains a leading producer of glass and glassware in the EU, ahead of France and Italy, and it is expected that its leadership will be further strengthened in years to come. France currently remains the most important customer of German glass,



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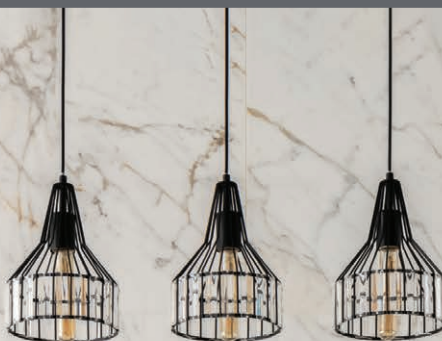
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accounting for the bulk of its exports. In general, according to BV Glas, German supplies its glass to more than 200 countries worldwide.

According to Germany's BV Glas Association and independent analysts, the German glass sector will continue to grow in 2024, mostly driven by product innovation and the overall modernization and sophistication of manufacturing processes, that will contribute to the overall rise of efficiency of the sector.

Growth challenges remain

While energy costs continue to be an issue in many Western European countries, other headwinds such as high costs, unstable demand and sustainability requirements are also affecting the sector's glass industries.

Representatives for British Glass, the trade association of the U.K., has said that industry problems continue

to prevent further growth, despite the industry's ability to recover from the pandemic and to progress in recent years. Headwinds for the industry include higher manufacturing costs, unfair trade practices, and a reactive and costly trade remedy system, which affects the industry through existing duties on imports of British glass.

In 2024 and 2025, the major goals for the U.K. glass sector will be further environmental improvement, energy saving, as well as more active switching to biofuels to replace fossil fuels.

British Glass is also working to attract foreign interest in the industry's imports, which is already high in Asian markets.

France's industry has generally stabilized in recent months after a sharp rise in demand starting in 2022, which led to a shortage of certain glass products in the domestic market, such as wine bottles.

The Western European glass sector

is dominated by global players in the flat glass market, including NSG Group. In recent years, NSG has significantly strengthened its regional business by expanding production capacities, along with their restructuring and modernization.

Nevertheless, NSG Group leadership anticipates declining demand for 2024. "Due to the overall very challenging economic situation in the EU, and in the Western European countries (France, Germany and the UK) in particular, we anticipate a further decline in glass consumption in 2024, impacting both the construction industry as well as the automotive industry," says Dr. Christian Quenett, head of Architectural Glass Europe, NSG Group. ■

Eugene Gerden is an international freelance writer, who specializes in covering the global glass sector.

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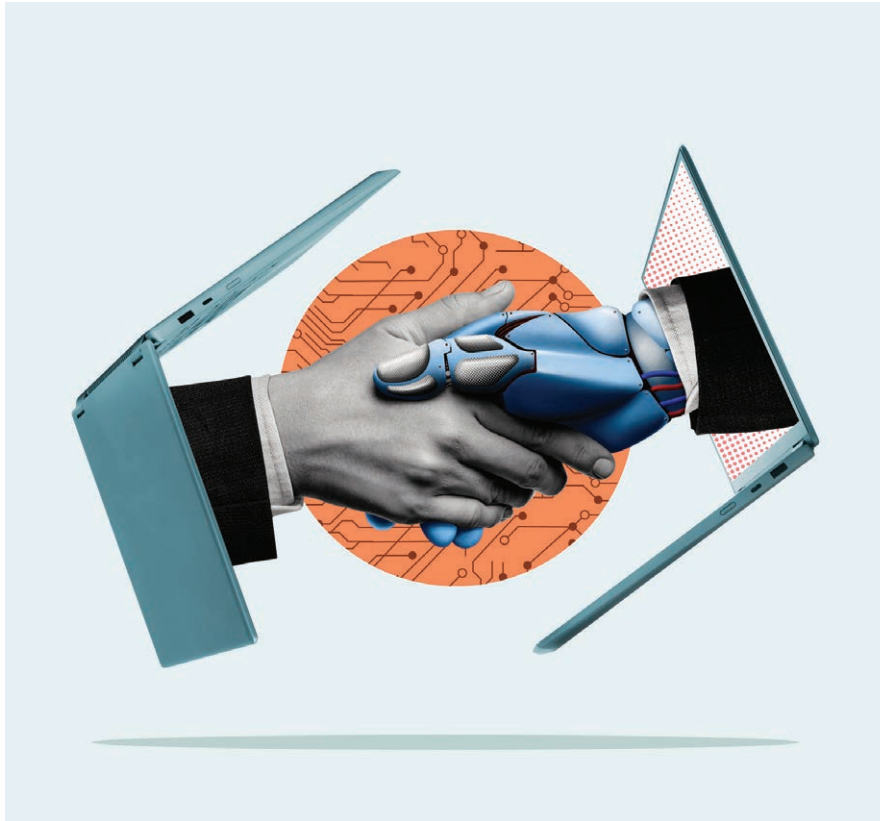


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HEAVILY PROMOTED AS AN EFFECTIVE WAY TO IMPROVE BUSINESS EFFICIENCY, GENERATIVE AI STRATEGIES CAN AID YOUR COMPANY **BY MARCO TERRY**



THE BOTTOM LINE: We've all heard the claims in the news about how generative AI will change business. What is the best strategy to handle this emerging technology?

The past year has been marked by contradictory claims about the benefits and risks of using generative artificial intelligence at work. These claims get daily news coverage that often includes exaggerated headlines. Understandably, business owners are uncertain about handling this new technology.

Let's first put these headlines in the proper context. Many inflated claims come from company founders who have much to gain if they are right. I consider those claims to be biased. Expert forecasts should also be suspect. Historically, they are seldom accurate about the speed, magnitude or direction of new technologies. Why should this time be any different?

AI challenges

Despite their impressive performances and hyped-up claims, generative AI systems face serious challenges. Let's focus on two of these challenges that could affect business users.

01. Errors and fabrications

Answers from generative AI systems can contain factual errors and outright fabrications. The fabrications are called "hallucinations" and are estimated to happen 5% to 27% of the time. The problem is that AI can present inaccuracies and hallucinations confidently and articulately. Consequently, a human reviewer may not always catch them.

Consider the following scenario. An executive asks an AI chatbot to summarize a complex technical report. How confident can the executive be that this report is accurate? Would you feel comfortable relying on it?

Let's take this example a step further. Consider a support chatbot that interacts with customers. How confident can you be that its information will be presented correctly?

02. Legal issues

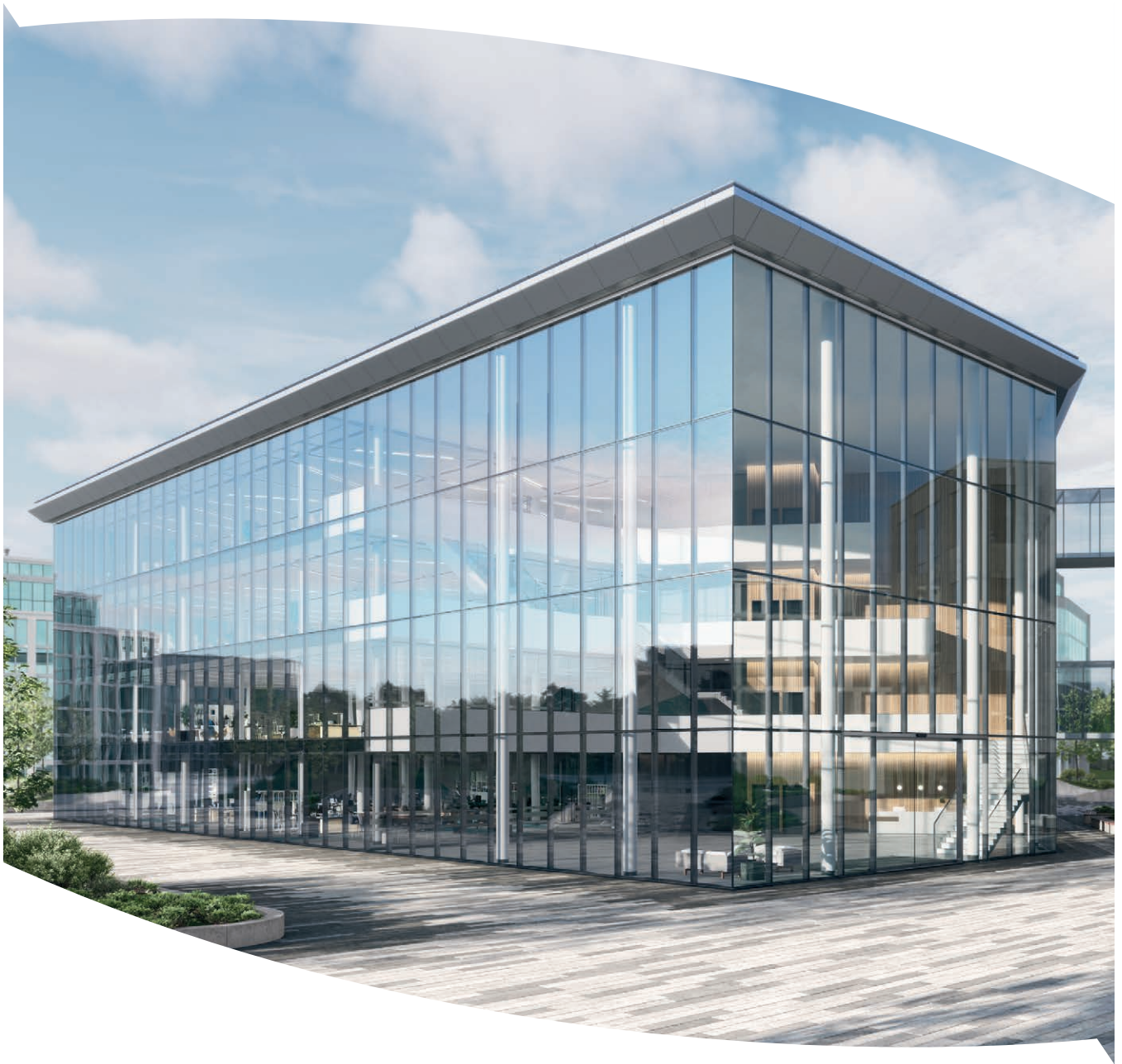
Some generative AI systems can create output that potentially infringes on copyrighted materials. Consequently, a company could inadvertently deploy copyrighted materials and face infringement claims.

Consider the following scenario. Your company uses a generative AI system to create marketing copy for your website, images and customer documents. The AI system, trained on data available on the internet, inadvertently includes copyrighted material it found online. Your company could face legal consequences.

AI hallucinations could also create legal problems. Consider a chatbot interacting with a potential customer and providing fabricated information. Do you have to honor the commitments? I found at least one case of a judge ruling in favor of a customer.

Is generative AI useful?

Harvard University and the Boston Consulting Group did a study about the usefulness of AI, which found that AI improved the quality and productivity of most workers. Most of the gains, however, favored employees with the least experience.



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On the other hand, the reviews of Microsoft’s AI Copilot tool were lukewarm. The tool often got things wrong and needed substantial editing. This situation will surely improve as the technology develops.

Undoubtedly, the capabilities of generative AI are impressive. But are they valuable to most small and midsize companies? The results appear to be a mixed bag with no convincing case.

A careful strategy

Many companies have publicly deployed generative AI in customer support and other areas.

An approach should be cautious, evaluating the technology internally and taking deliberate steps to become proficient.

01. Learning basic prompt engineering

The quality of the prompts you provide an AI system affects the output quality.

“Prompt engineering” is not difficult and you can find tutorials on YouTube.

02. Improving writing skills

AI can be useful when trying to simplify complex paragraphs. We often ask the system to simplify paragraphs and generate several alternatives. These alternatives help us rewrite the paragraphs more clearly and concisely.

03. Transcribing online meetings

Generative AI systems can be useful tools for summarizing and transcribing online meetings. This use is valuable if a key member misses a meeting and needs to catch up.

04. Summarizing documents

We are evaluating AI’s capabilities to summarize internal documents. Since we know the information well, we can catch hallucinations and inaccuracies more effectively.

05. Avoiding direct client-facing uses

We do not use AI-generated content in any client-facing capacity. This includes client-support chatbots, written materials or images. The legal risks remain unknown, and we prefer to avoid the exposure.

06. Taking a wait-and-see approach

Perhaps the most important question is whether your company needs to use generative AI to remain competitive. Will your competitors have an insurmountable advantage if they use AI and you don’t? If you run a small to midsize glass company, you can probably afford to wait and see how things play out before jumping in. ■

Marco Terry is managing director of Commercial Capital LLC, a factoring company and provider of invoice financing to companies in the glass industry.

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BY DEVIN BOWMAN



THE BOTTOM LINE: Understanding various security ratings—where they fit in safer school design and how they interact with other specialty glazing—can help building professionals plan protections for areas where multiple life safety and security threats overlap, both now and in the future.

Designing safer schools is no easy task. Architects are often asked to balance code-driven, free-egress requirements and recommended access control for safer and more secure schools. It is also important to create interiors that support students' educational and psychological needs.

Glazing is central to these considerations. It can allow daylight to illuminate interiors and provide visual connections between adjacent spaces—both inside and outside the built environment. Aesthetically, visual connection grounds occupants within the surrounding landscape; it also supports crime prevention through environmental design. Glass, however, can also be seen as a weak point in doors and along the building envelope.

But it does not have to be. Transparent, protective glazing can be a viable option for hardening schools on both the exterior and interior layers. To use such glazing effectively, it is important

to understand current ratings, how they achieve code compliance and where they fit within security best-practice recommendations.

Meeting security best practices

Security guidelines from the Partner Alliance for Safer Schools recommend using a multilayered approach for school security. These layers place several obstacles between assailants and occupants to delay intruders and fortify shelter-in-place locations to allow occupants more time to alert first responders and take appropriate action.

Forced-entry-rated glazing systems support both goals. Tested to the ASTM F3561 standard, forced-entry-rated glazing helps defend against physical attack to slow the ingress of a violent attacker. The intention is to buy occupants more time to enact district and campus security protocols—an example of multiple security layers reinforcing one another.

Another type of protective glass is ballistic-rated glazing. These systems are tested to UL 752 standards and receive a rating based on the number of shots and what caliber of round they can stop. This glazing places a transparent barrier between an armed attacker and occupants.

While it may be tempting to see one rating type as more or less secure than the other, both ratings have different uses and applications. For example, forced-entry glazing can be placed in

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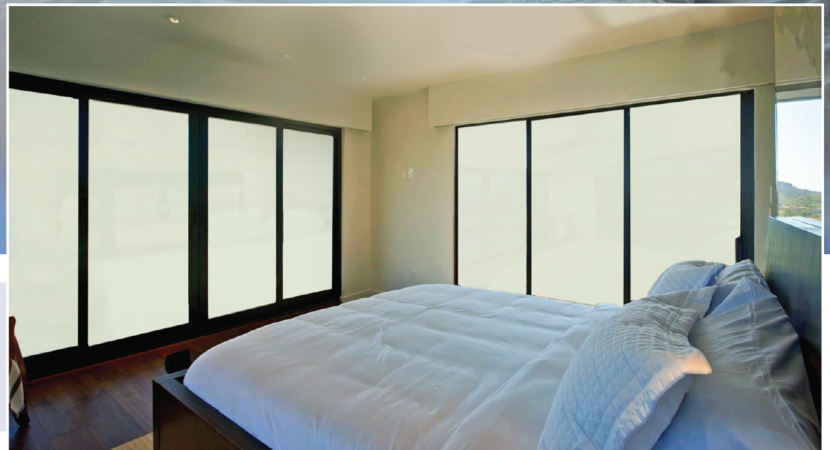
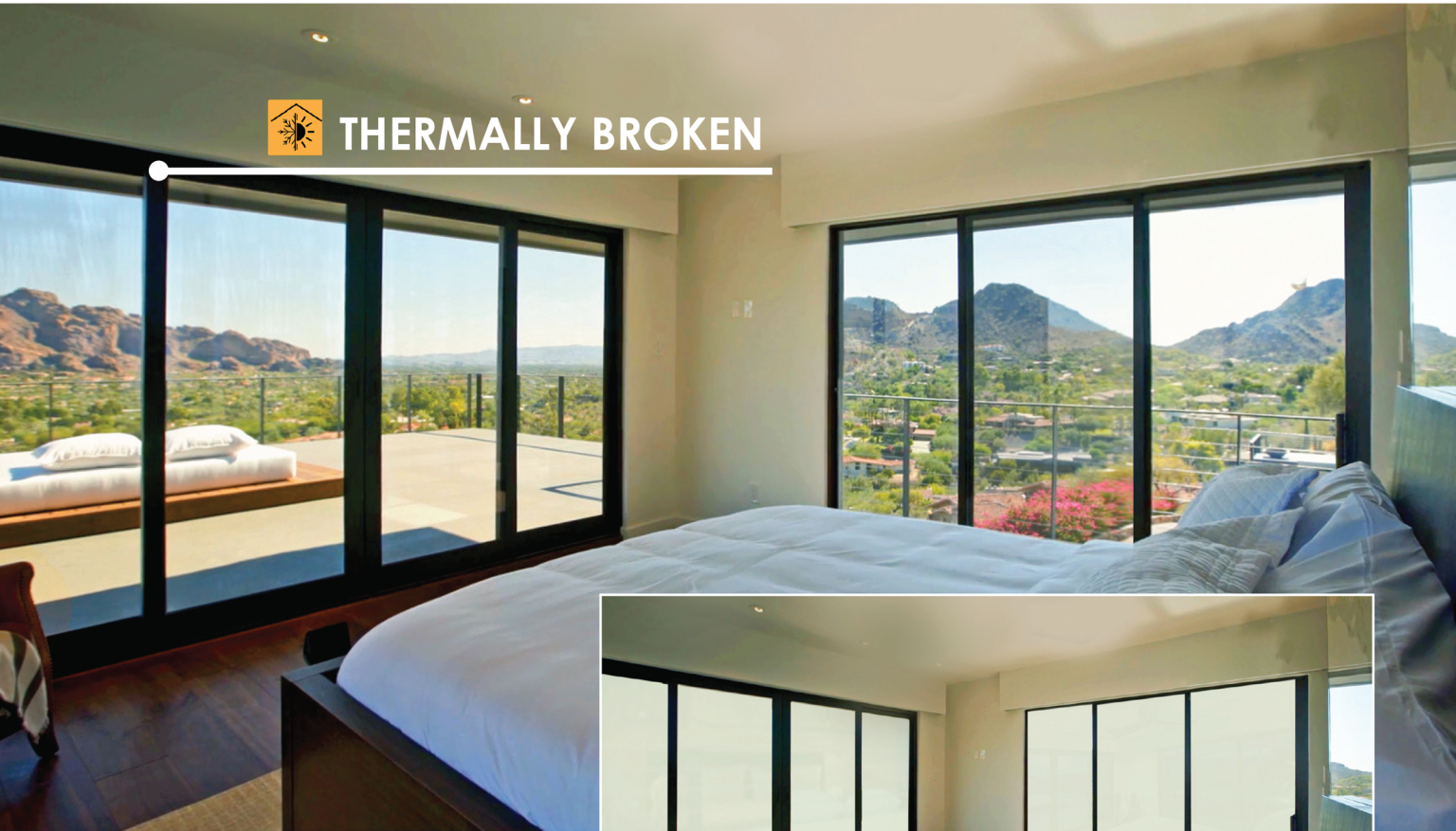
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entryways to delay intruders while ballistic-rated assemblies can fortify shelter-in-place locations. As such, glaziers and specifiers are encouraged to work with security professionals to assess which glazing type is more suitable for an application.

Maintaining free egress

While conversations around safer school design and protective glazing often focus on security-rated glass, this approach to construction also encompasses other life safety threats, including fire. According to the National Fire Protection Association, there are over 7,000 fires on school campuses each year, and nearly two-thirds occur during school hours.

Transparent, fire-rated glazing has been around for decades. It allows architects to meet current egress codes without sacrificing light-filled and visually connected interiors. Despite the added emphasis on school security,

however, there has been little discussion about how security ratings impact fire-rated glass.

Security-rated components are often plastic-based and burn at rates and intensities that exceed current fire test parameters. This may reduce or entirely negate a system’s fire rating. Building professionals can plan for enhanced security without compromising fire and life safety by using components that are known to be compatible. They can also specify multifunctional, fire-rated glazing assemblies that have been tested as a complete system. Doing so will ensure protective glazing will perform as intended in applications where security goals and fire- and life-safety codes intersect.

Updating building codes

The need to anticipate component compatibility can be seen as symptomatic of a larger issue within the design and glazing communities. Because specifying

incompatible components can potentially put lives at risk, it is important that model building codes address safety and security as well as egress and ingress. This will help establish a baseline of security and give architects a reference point for planning safer schools.

Although these updates may feel distant, understanding various security ratings, where they fit in safer school design and how they interact with other specialty glazing can help building professionals plan protections for areas where multiple life safety and security threats overlap—both now and in the future. ■

Devin Bowman is general manager of Technical Glass Products and AD Systems. With over 20 years of industry experience, Bowman is actively involved in advancing fire- and life-safety codes and sits on the Glazing Industry Code Committee.

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Photo courtesy of CRL.

knowledgeable staff that can estimate and quote sophisticated or large jobs.

It's no easy task. Staffing issues have besieged many industries since the pandemic. It's an ongoing challenge for glaziers, yet construction continues, and clients demand the work gets done.

Start with processes

Identifying opportunities to increase efficiencies starts with an unbiased look at the business' core competencies—estimating, invoicing, processing, delivery, installation and support. Where is there waste? Where can improvements be made? What communication, investments and training are needed to achieve the desired goals? An accurate analysis—followed by a clear plan, complete with action items and milestones—is the first step on the journey of achieving greater efficiencies.

Leverage technology

Technology remains an excellent avenue for finding ways to improve performance across teams, save time, streamline processes, eliminate paperwork and more. When employees understand how digital solutions can help them perform their duties more effectively, and are supported with proper training, they typically become enthusiastic about putting new software tools to use.

With options including online estimating, quoting and ordering software, there are multiple opportunities to save time, money and labor. Once you identify business areas in which to leverage specific technologies, consider starting small then expanding to the full staff over a predetermined timeframe. Be sure to identify internal champions to advise on deployment and advocate among team members throughout the implementation process.

Explore new products

Manufacturers continue to improve their products in two distinct ways: first, the overall performance and/or aesthetics of the product that provides advantages to building owners, and second, new

NEW EFFICIENCIES TO CULTIVATE SUCCESS

IT'S CRITICAL TO CONSTANTLY ASSESS ALL ASPECTS OF THE OPERATION TO KEEP GLAZING BUSINESSES COMPETITIVE AND THRIVING **BY MARK SUEHIRO**



The glazing community is one of the most resilient professional groups out there. As markets evolve and economic issues trouble the industry, glazing contractors have marched forward and gotten the job done.

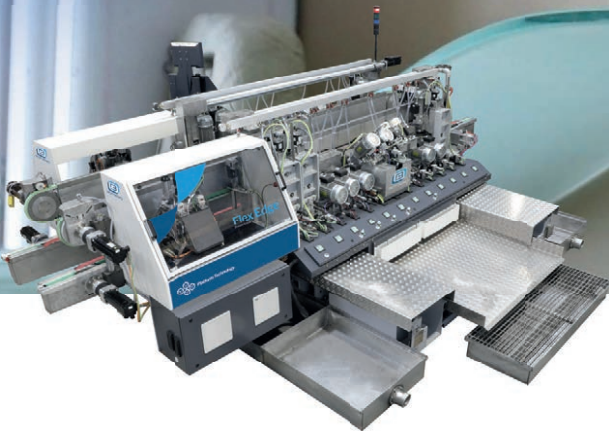
But for businesses, both big and small, it's critical to constantly assess all aspects of the operation—revenues and expenditures, core processes that impact ordering and delivery, installation, and customer service commitments. This never-ending quest to do things smarter, better and more efficiently keeps glazing businesses competitive and capable of thriving in a changing marketplace.

Labor still a challenge

Staffing issues have impacted the glazing industry for years. The issue is two-fold: being able to bring on capable employees that can competently perform installation tasks, and identifying

THE BOTTOM LINE: By keeping an open mind to all areas where performance advantages can be gained, opportunities to improve efficiencies will become apparent and forward-thinking glazing businesses will prosper.

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approaches that save glaziers time and effort during the installation processes. It is the latter advantage that will address the glazing contractor's need to circumvent the labor shortage.

Innovations like modular door rail systems give glaziers greater control over when, where and how door rails are installed, adjusted and updated. Unlike standard door rails, modular door rails feature independent side covers and end caps that can be easily installed or replaced without having to remove the door from the pivot. Rail bodies can also be moved along the glass to accommodate standard or custom door lengths. This empowers glaziers to complete jobs more quickly by virtually eliminating lead times on custom glass doors because modular door rail parts can be stocked and assembled at will.

When projects allow it, leveraging unitized systems is an extremely efficient way to streamline the installation process and save money. For example, unitized glass railing systems feature base shoe units that are glazed in a manufacturer's facility, then shipped to the jobsite, ready to install. The glass arrives perfectly plum and leveled within the base shoe unit to provide precise sightlines, saving glaziers time and labor.

Improve installation tools

Field installation tools can also make glazing teams more productive and safer. Electric vacuum pumps and one-man glass-lifting levers are two

recently introduced tools.

Electric vacuum pumps work on both glass and non-porous surfaces. One push of a button delivers suction to efficiently move heavy panes to installation sites, allowing for a safe installation that is faster and less strenuous.

New glass lifting levers are designed for precision positioning of large-format glass. They can be used with standard glass vacuum cups to precisely position glass for final install, allowing for faster and safer installations with smaller crews.

Conclusion

Constantly striving for efficiency is a mindset that must dominate all business sectors, including the glazing industry. The need to identify ways to do things better, faster and with fewer staff, all the while maintaining the highest quality and safety standards, is the industry's goal.

Luckily, glaziers are a resourceful community, capable of evaluating their businesses and their processes, then quickly adapting. It's not always easy, but by keeping an open mind to all of the areas where performance advantages can be gained—back-office processes, install procedures, tools and technology—opportunities to improve efficiencies will become apparent and forward-thinking glazing businesses will prosper. ■

Mark Suehiro is director of architectural hardware and entrances for C.R. Laurence Co.



GREAT GLAZING: CME CENTER

THE BASICS

The CME Center is a renowned office skyscraper in Chicago's West Loop that spans 2.3 million square feet. The building has proven pivotal to the city's bustling business landscape. In addition to office space, the building provides a wide range of amenities, including state-of-the-art lounges, fitness facilities, restaurants, retail and more.

However, the lobby needed a reimagined look that would be inviting for guests while also meeting today's modern design standards.

THE DESIGN

The reimagined first-floor lobbies and retail corridor were wrapped in a 24-foot-high curved glass curtainwall, and the project team needed doors that could be customized to fit the unique curvature of the wall. Typical doors that lay at a flat 180 degrees were not an option. Therefore, Door Service Inc. selected Ellison Bronze for its ability to custom craft a series of balanced doors to fit the precise curvatures of the CME Center's new glass curtainwall.

THE MATERIALS

Ellison provided 16 custom-crafted, curved, stainless-steel, narrow stile, balanced doors for the project. The stainless steel lends a modern appearance to the otherwise all-glass ground floor lobby space. The glass infills in the stainless-steel door frames provide additional transparency into the space as pedestrians approach the entrances.

Learn more at ellisonbronze.com, 800/665-6445. ■

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St. Petersburg, Florida is renowned for its vibrant art scene, featuring over 600 street murals. GGI contributed to this artistic landscape by fabricating 32 custom glass panels for a new public art display for the SunRunner Bus Rapid Transit system. As part of a \$44 million project to enhance the city, nationally recognized artist Catherine Woods was commissioned to design 16 art installments to be placed in bus shelters across a 10-mile corridor, capturing the essence of the surrounding neighborhoods. **Having worked with GGI on past projects, Woods knew GGI could bring her visions to life with Alice® Direct to Glass Printing.**

SunRunner Bus Rapid Transit Stations

Artwork by
Catherine Woods

Commissioned by
Pinellas Suncoast
Transit Authority
and the City of
St. Petersburg, Florida

Photography courtesy
of Catherine Woods

800-431-2042 sales@generalglass.com www.generalglass.com

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The 50 Fifty building in Denver features curtain wall designed, manufactured and installed by Harmon, and high-performance glass from Viracon.



APOGEE CELEBRATES 75 YEARS IN GLASS

CEO TY SILBERHORN EYES GROWTH, INNOVATION AND EVOLUTION FOR THE BUILDING PRODUCTS LEADER **BY KATY DEVLIN**

Apogee was founded as Harmon Glass Co. in July 1949, as an auto glass replacement shop in Minneapolis. Today, it is a leading provider of high-performance glass, and architectural building enclosure products and services. It is a publicly traded company with over 4,000 employees and several leading brands, including glass fabricator Viracon; framing systems brands EFCO, Linetec, Tubelite and Alumicor; and, of course Harmon, which is no longer in the auto glass replacement industry, but is a leading North American contract glazier.

This year, Apogee, which posted full year net sales topping \$1.42 billion in its 2024 fiscal year, celebrates 75 years in business. In late April, I sat down with CEO Ty Silberhorn to discuss the company's long history, its people, and Apogee's next chapter. Silberhorn joined Apogee in January 2021 following more than 20 years at 3M, serving most recently as senior vice president of transformation, technologies and services.

As you reflect on Apogee's 75th anniversary, what stands out to you about the company's history?

Apogee started in the auto replacement glass business, from a small shop in downtown Minneapolis. I love that story, because it points to the fact that over our 75 years this company has transformed itself a number of times. It reinvented itself. Throughout our history, company leaders have known what Apogee's strengths and weaknesses are. They have been able to adapt to shifts in the marketplace, while still finding ways to create value for our customers and thrive in business.

What were some major moments of change that helped make Apogee what it is today?

An important point in the company's history was when leadership recognized that we weren't going to deliver the best value to customers and get decent returns for shareholders in the

auto replacement glass business. So, they began leveraging our capabilities into other markets, starting with glass fabrication. They started to develop and innovate new coatings to apply to that glass with the Viracon brand, which led us into architectural glass. It was a completely different market segment, but it allowed us to leverage process know-how, capabilities, and understanding of glass and substrates to move into totally different markets.

We probably wouldn't be celebrating 75 years if leaders hadn't decided to move away from auto glass and double down on the architectural glass business, really broadening from an architectural products standpoint, both organically and through acquisitions.

What do you see for Apogee's next chapter in the coming three to five years?

When you look at what we've done in the last few years, we've really strengthened our foundation. We've worked to get back on solid financial footing. Our focus is not just to be a more profitable company so we can invest back into the business, but also to understand creating value for the customer. We are committed to continuing to drive value for our customers.

Even with some softness in the market-place, now it's time to focus on driving growth. And the way we are going to grow is by bringing value to the customer. If we do that, the customer is going to allow us to keep some of that value, and we'll be able to invest that back in the company and in our people.

We are making investments in the business. Last year, we invested in facilities and equipment to improve service capabilities, quality levels, and productivity so we can stay competitive in the market.

Over our 75-year history, we've transformed the company with acquisitions. And acquisitions will be a lever that we will pull to really accelerate and provide a catalyst to our growth story.

What are your customers focused on now and how are you helping them address their challenges?

The industry as a whole has had to deal with higher material costs, higher labor cost, and labor constraints. And then interest rates, which are increasing the cost of investment to do larger development projects.

Our focus has to be on how we can address these challenges. We're bringing solutions that help customers either deliver a better total cost, or that allow them to deliver a bigger value impact. For example, there is a lot more discussion about energy efficiency and discussion about the longevity of these projects over time—and wanting to have more quality materials going into the building. Customers can't afford to work with partners who can't supply the right product at the right time. There is a flight to quality. The cheapest, lowest price isn't going to work all the time. Customers want to make sure they're getting the best value for what they're able to pay to make a project move forward.

Throughout its history, Apogee has benefitted from talented employees and leaders. How are you thinking about developing the next generation of talent?

If you read some of the history of the company, there was belief in investing in employees going all the way back to our beginning. That's something that still resonates with our company today. We have over 4,000 employees, and the majority are on the production floor or on jobsites installing curtainwall. Our ability to attract and retain those employees is vital. If you have significant turnover, especially in a tight labor market, that creates challenges for us.

Part of our employee attraction and retention is to demonstrate that we are going to invest in our employees and help them be successful in their careers. And while we are a large company with \$1.4 billion in revenue, we're also

small because of how we structure the company. There is still an entrepreneurial spirit and feel in our brands.

As I talk to employees, I say that we are a larger company, with the resources made available by being part of a larger organization. But you can really get the small company feel. If you want an up and rising career trajectory, we can make that happen for you. If you're looking for the right spot and right fit in the right place, we can make that work for you as well.

After joining Apogee from outside the glass and glazing industry, what has surprised you about the industry?

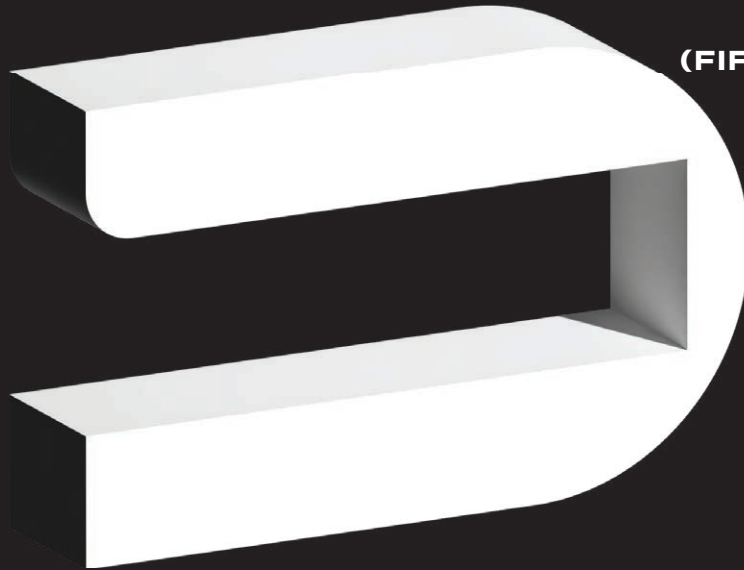
I knew a little bit about nonresidential construction from my 3M days. And as I looked at this industry and had conversations with people, there was a sense that the construction industry is stuck in old ways. But, I found that not to be true. Since the pandemic, it seems the industry really opened up with how it looks at itself. It started to adopt technologies and other ways of doing things.

I see more innovation in the industry. More ways to look at and experiment with innovation. There are a ton of opportunities for our industry as whole to get more efficient. Additionally, I think there is a lot of collaboration that occurs, whether from the architect, developer, glazier, material supplier. Obviously, there can be tension points. But we really have that collective group saying: 'Let's not only get the project greenlighted, but I want to build this green building. I want to build something we can be proud of.' There's that determination and committed spirit to create something that's going to stand the test of time. ■

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THE TOP



(FIFTY)



THE LIST

PP. 48

**SALES +
GROWTH**

PP. 60

**MARKET +
SERVICES**

PP. 62

**LABOR +
HEADWINDS**

PP. 66





GLAZIERS

LEADING
GLAZIERS
ACHIEVE
HEALTHY
SALES,
BUT COSTS
CONTINUE
TO STYMIE
GROWTH FOR
SOME

BY NORAH DICK

G

lazing contractor sales continue to grow, based on the Top 50 Glaziers featured in this year's report. The top 50 companies, leading glazing contractors by sales volume working in the North American market, reported total gross sales of \$4.17 billion, up from last year's \$4.07 billion and approaching the highest peak of recent history, 2017's \$4.3 billion.

But, as we've seen in recent years, higher sales volumes do not mean an easy market.

Leading glaziers report continued challenges with project financing, as inflation, interest rates and requirements for higher-performance glazing combine to create challenges. These accumulating market challenges could suppress building activity going forward.

"The continued rise in inflation and [Federal Reserve] holding off interest rate cuts will continue to make developers and owners hesitant to get new projects off the ground in certain regions, as the economics of private work may not pencil out a return on investment as it has in the previous decade," says Tyler Kuenzi, project executive, Mission Glass. "Changes in the energy code are also adding costs to the project as a whole, driving up the overall value of projects, which is a hurdle to getting them off the ground and out of just concept stages."

Finding labor remains widespread, and a check on growth for some leading glaziers. "We make sure that we sell enough to grow, but not so fast that we can still get the help we need to expand," says Craig Carson, vice president, 8G Solutions.

For an in-depth exploration of the headwinds coming in 2024 for contract glaziers, see pages 66-67. For a breakdown of sales and growth indicators from 2023, including bid levels, profit margins and regional growth, go to pages 60-61. For a snapshot of the commercial and institutional market segments, as well as the types of products being installed on those projects, see pages 62-64.

To see the Top 50 Glaziers industry ranking, go to pages 48-58.

Visit glassmagazine.com to see additional standout projects from Top 50 Glaziers and to download the in-depth Top 50 Market Report.

50

THE

LIST



Top 50 Glazier Ranger Specialized
Glass contributed glazing services to
the Allen Tower in Houston.

T

THE TOP 50 GLAZIERS are ranked by reported gross sales for the North American market. Any sales not submitted by glaziers were estimated using the previous year's information. Celebrating 32 years, the Top 50 Glaziers ranking is the longest-running glass industry ranking. Glass Magazine's editorial staff cannot compile an accurate ranking without the full

cooperation of the industry. If you think your company belongs on the list, please contact Norah Dick, senior editor, Glass Magazine.

*Sales were not confirmed by the company.^^

\$300+ MILLION

01

Harmon Inc.

harmoninc.com
Bloomington, Minn.
19 additional locations
Full-time employees: 900
Total employees: 1,000

\$200-300 MILLION

02

New Hudson Facades

newhudsonfacades.com
Linwood, Pa.
5 additional locations
Full-time and total employees:
400

03

Crown Corr Inc.

crowncorr.com
Gary, Ind.
6 additional locations
Full-time employees: 100
Total employees: 511

04

Enclos Corp.

enclos.com
Eagan, Minn.
15 additional locations
Full-time and total employees:
400

05

Benson/MItek*

bensonglobal.com
Portland, Ore.
9 additional locations
Full-time employees: 500
Total employees: 650

\$100-200 MILLION

06

W&W Glass LLC

wwglass.com
Nanuet, N.Y.
1 additional location
Full-time and total employees:
230

07

Permasteelisa

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

08

Flynn Group of Companies

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

09

Binswanger Glass

binswangerglass.com
Memphis, Tenn.
42 additional locations
Full-time and total employees:
600

10

Architectural Glass and Aluminum Co.

aga-ca.com
Livermore, Calif.
4 additional locations
Full-time and total employees: 76

11

Massey's Plate Glass & Aluminum Inc.

masseysglass.com
Branford, Conn.
3 additional locations
Full-time employees: 225
Total employees: 250

12

GM&P Consulting and Glazing Contractors Inc.

gmpglazing.com
Miami, Fla.
2 additional locations
Full-time and total employees:
85

13

Dynamic Glass

dynamicglass.com
Houston, Texas
3 additional locations
Full-time employees: 400
Total employees: 405

14

Karas & Karas Glass Co.

karasglass.com
Boston, Mass.
1 additional location
Full-time and total employees:
128

Three Light Luxury Apartment Buildings, Kansas City, Missouri, features work from Top 50 Glazier Momentum Glass. Photo by Bob Greenspan.



\$50-100 MILLION

15

Giroux Glass Inc.
 girouxglass.com
 Los Angeles, Calif.
 5 additional locations
 Full-time and total employees:
 272

16

Above All Storefronts
 aboveallstorefronts.com
 Hauppauge, N.Y.
 3 additional locations
 Full-time and total employees:
 195

17

SPS Corp.
 spscorporation.com
 Apex, N.C.
 2 additional locations
 Full-time and total employees:
 80

18

Pioneer Cladding & Glazing Systems Inc.
 pioneerglazing.com
 Mason, Ohio
 4 additional locations
 Full-time employees: 201
 Total employees: 250

19/20

Yuanda USA Corp.
 yuandacn.com
 Chicago, Ill.
 3 additional locations
 Full-time and total employees:
 15

19/20

Eastern Glass & Aluminum
 buildega.com/ega
 Norcross, Ga.
 3 additional locations
 Full-time and total employees:
 125

21

Momentum Glass
 momentum-glass.com
 Spring, Texas
 5 additional locations
 Full-time and total employees:
 264

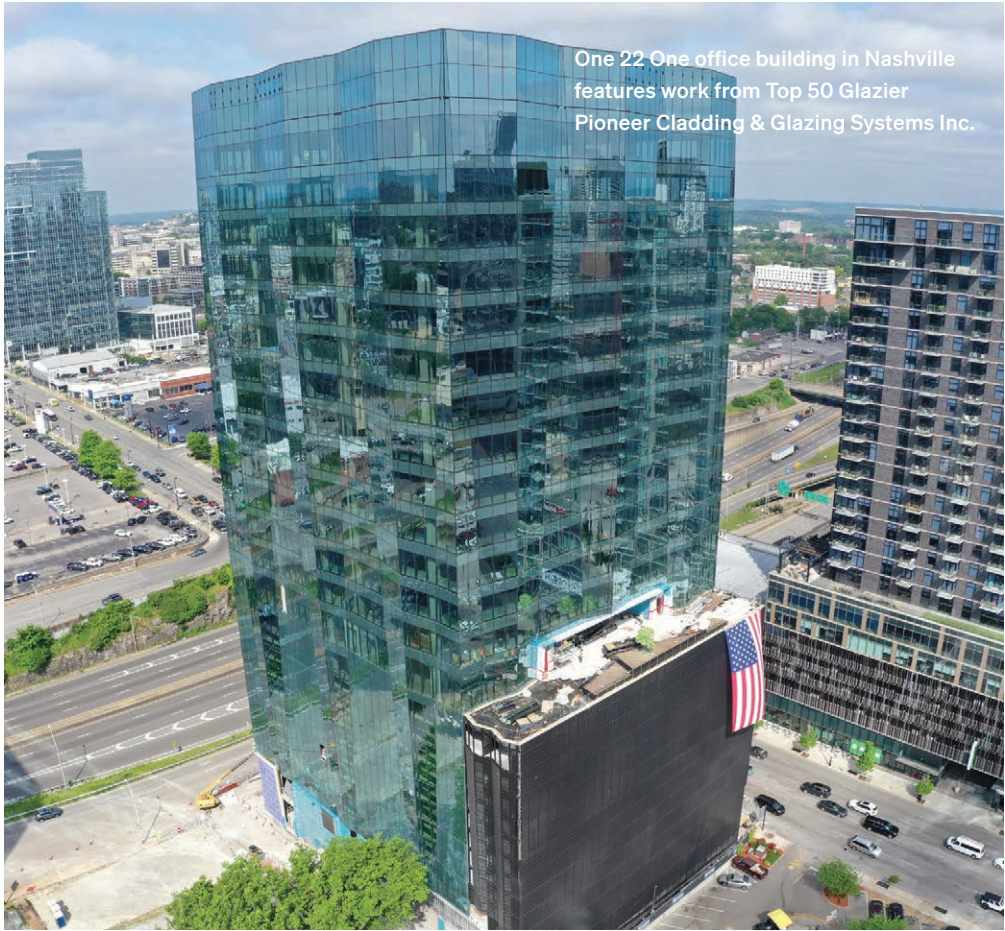
UNCONVENTIONAL THINKING THAT REDEFINES CONVENTIONAL GLASS.



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#THISCHANGSEVERYTHING

VIRACON PLUS
AND **HALIO**
A PARTNERSHIP IN INNOVATION



One 22 One office building in Nashville features work from Top 50 Glazier Pioneer Cladding & Glazing Systems Inc.

\$30 - 50 MILLION

27

National Enclosure Co.
 nationalenclosure.com
 Ypsilanti, Mich.
 2 additional locations
 Full-time employees: 42
 Total employees: 90

28

Architectural Wall Systems
 archwall.com
 Grimes, Iowa
 1 additional location
 Full-time and total employees: 110

22

seele Inc.
 seele.com
 Long Island City, N.Y.
 Full-time employees: 14
 Total employees: 50

24

1st Choice Glass Inc.
 glass1st.net
 Charleston, S.C.
 3 additional locations
 Full-time and total employees: 62

26

8G Solutions
 8g-solutions.com
 Englewood, Colo.
 2 additional locations
 Full-time employees: 120
 Total employees: 150

29

Alexander Metals Inc.
 alexandermetalsinc.com
 Nashville, Tenn.
 1 additional location
 Full-time and total employees: 80

23

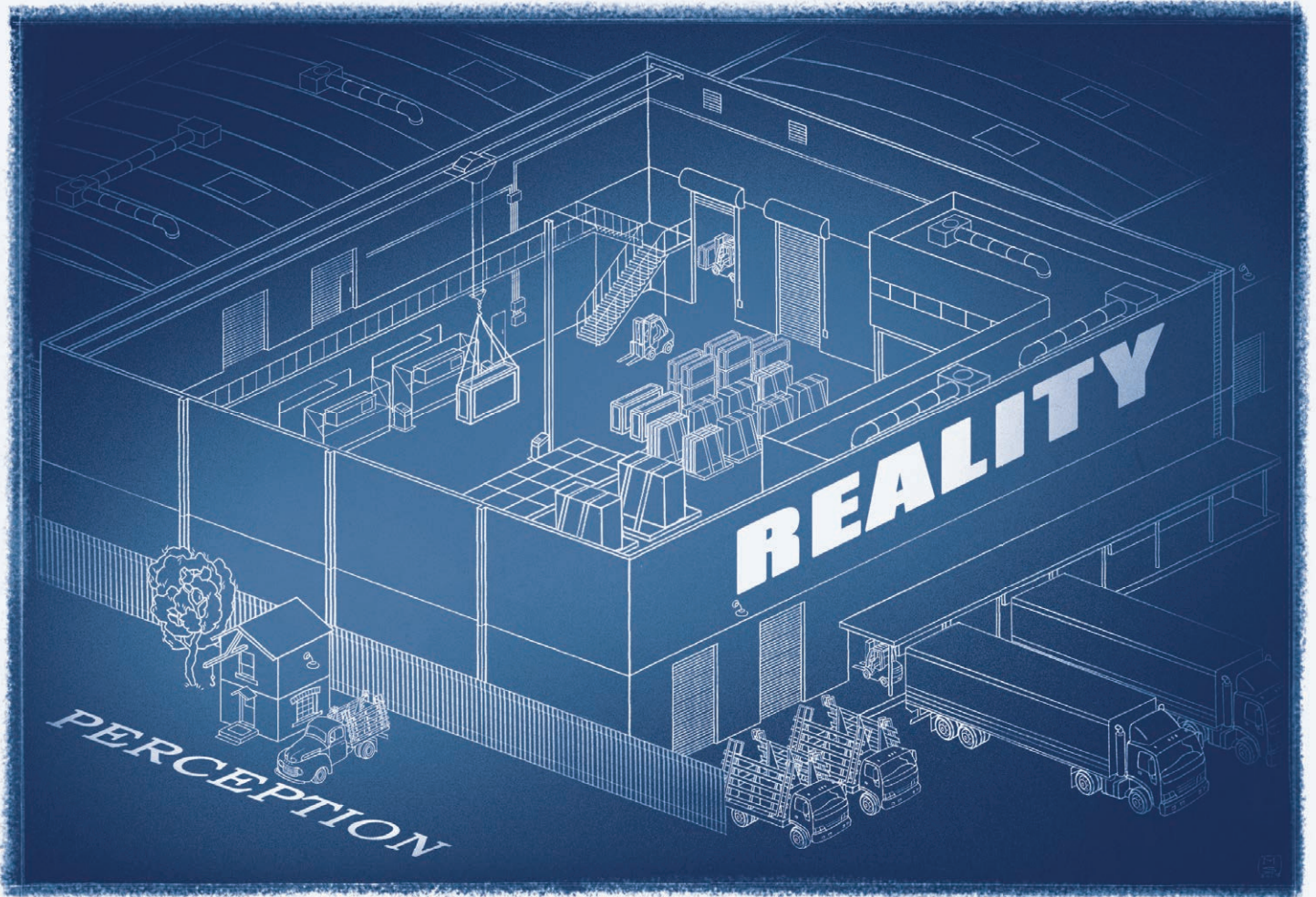
**Roschmann Steel & Glass
 Constructions Inc.**
 roschmann.group/en
 New Haven, Conn.
 3 additional locations
 Full-time employees: 30
 Total employees: 40

25

Glass Systems Inc.
 glasssystems.biz
 Stonecrest, Ga.
 2 additional locations
 Full-time employees: 96
 Total employees: 132

30

TSI Corp.
 tsicorporations.com
 Upper Marlboro, Md.
 1 additional location
 Full-time and total employees: 115



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Email: sales@pulpstudio.com

Harwood No. 14 in Dallas, with custom curtain wall and other systems from No. 1 Top 50 Glazier Harmon Inc.



31

Glass Solutions Inc.
 gsichicago.com
 Itasca, Ill.
 1 additional location
 Full-time employees: 35
 Total employees: 100

32/33

Ranger Specialized Glass Inc.
 rangerglass.com
 Houston, Texas
 3 additional locations
 Full-time and total employees:
 140

32/33

Haley Greer Inc.
 haleysgreer.com
 Dallas, Texas
 2 additional locations
 Full-time and total employees:
 100

34

Alphacladding LLC
 alphacladding.com
 Doral, Fla.
 Full-time and total employees:
 60

35

Aurora Glazing Solutions Ltd.
 auroraglazing.com
 Vancouver, British Columbia,
 Canada
 1 additional location
 Full-time and total employees:
 102

Fire-rated glass that's checked, and **double checked.**

Engineered to endure intense heat and rigorously tested to meet stringent commercial and residential fire safety regulations, SCHOTT PYRAN® Platinum provides exceptional fire protection. PYRAN® glass-ceramic also offers superior optical clarity, so your projects don't have to compromise on looks or safety.



SCHOTT

36

Brin Glass Co.
bringlass.com
Minneapolis, Minn.
4 additional locations
Full-time and total employees:
200

38

Key Glass Inc.
keyglass.com
Bradenton, Fla.
1 additional location
Full-time and total employees:
68

40

Horizon Glass & Glazing
horizonglass.net
Denver, Colo.
1 additional location
Full-time employees: 40
Total employees: 150

41/42

Crawford Tracey Corp.
crawfordtracey.com
Deerfield Beach, Fla.
1 additional location
Full-time and total employees:
105

37

AAC Glass Inc.
aacglassincsf.com
Hayward, Calif.
1 additional location
Full-time and total employees:
50

39

Aragon Construction Inc.
aragonconstruction.com
Montclair, Calif.
1 additional location
Full-time employees: 27
Total employees: 80-90

\$20 - 30 MILLION

41/42

Mission Glass
mission-glass.com
Tumwater, Wash.
1 additional location
Full-time and total employ-
ees: 85

43

Pacific Glazing Contractors
pacificglazing.com
Hollister, Calif.
2 additional locations
Full-time and total employees:
57

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- Offers potential for more work from bids requiring AGMT.

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44

Dallas Glass
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 Salem, Ore.
 1 additional location
 Full-time and total employees:
 87

45-49

Anderson Aluminum Corp.
 andersoncompanies.com
 Columbus, Ohio
 1 additional location
 Full-time employees: 82
 Total employees: 87

45-49

Helou & Sons Corp.
 helouconstruction.com
 Los Angeles, Calif.
 1 additional location
 Full-time employees: 10
 Total employees: 60

50

H.J. Martin and Son
 hjmartin.com
 Green Bay, Wis.
 1 additional location
 Full-time and total employees:
 480

45-49

Progress Glass Co.
 progressglass.com
 San Francisco, Calif.
 2 additional locations
 Full-time employees: 75
 Total employees: 78

45-49

U.S. Glass & Aluminum Inc.
 us-glass.com
 Pittsburgh, Pa.
 3 additional locations
 Full-time and total employees:
 55

45-49

Herzog Glass
 herzogglass.com
 Seattle, Wash.
 1 additional location
 Full-time employees: 91
 Total employees: 93

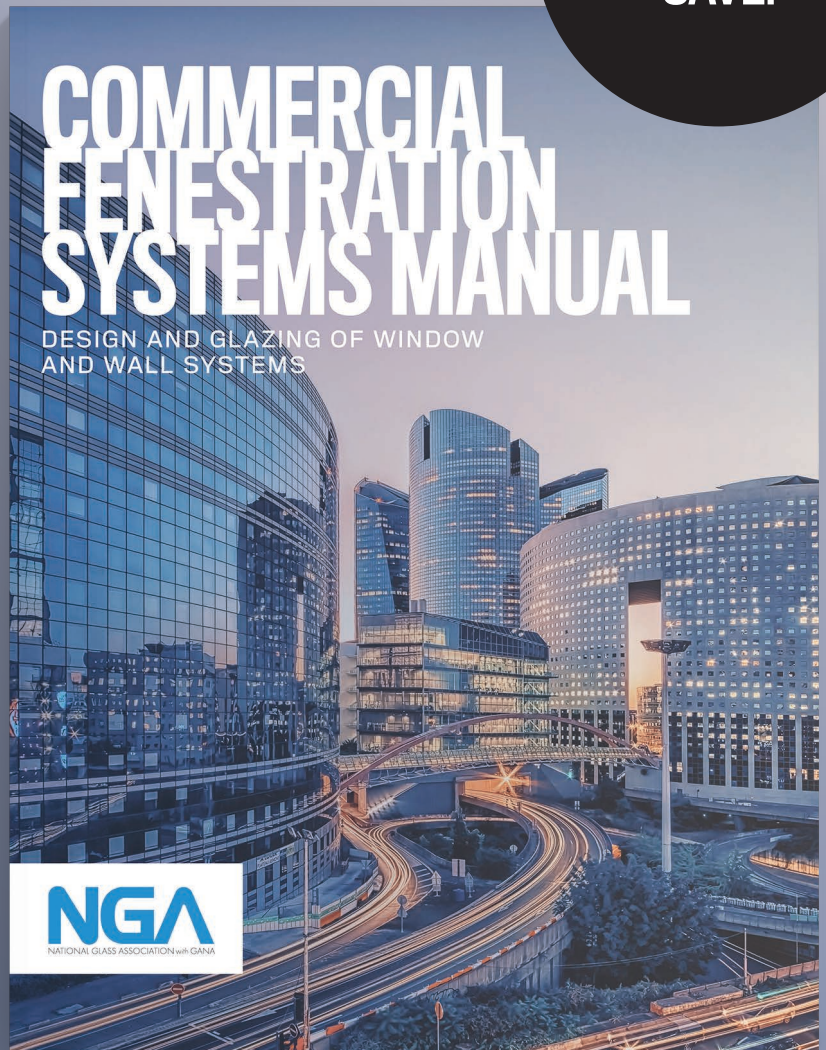
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SALES + GRC

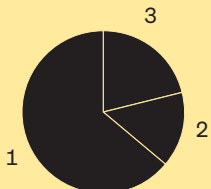
SALES AND MARKET INDICATORS

SALES CONTINUE TO RISE

in millions

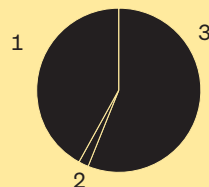
2013		\$2.142
2014		\$2.142
2015		\$3.125
2016		\$3.744
2017		\$4.300
2018		\$3.765
2019		\$3.799
2020		\$3.088
2021		\$3.800
2022		\$4.065
2023		\$4.170

GROSS SALES IN 2023



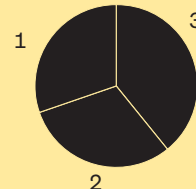
- 1. Higher **64%**
- 2. Lower **15%**
- 3. Same **21%**

COMPETITION FOR PROJECTS



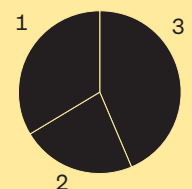
- 1. Higher **42%**
- 2. Lower **2%**
- 3. Same **56%**

PROFIT MARGINS



- 1. Higher **30.5%**
- 2. Lower **30.5%**
- 3. Same **39%**

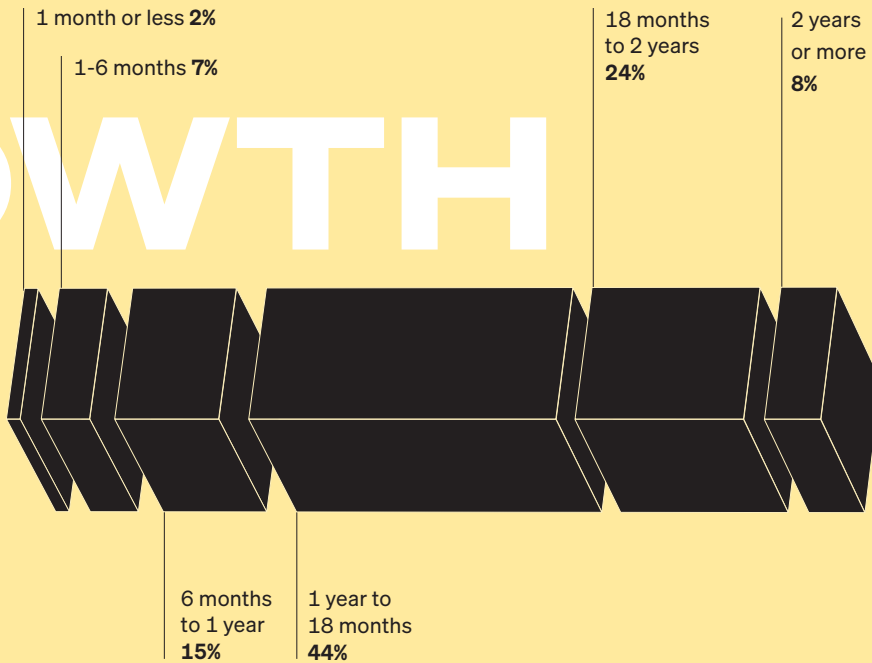
BID LEVELS



- 1. Higher **32%**
- 2. Lower **23%**
- 3. Same **44%**

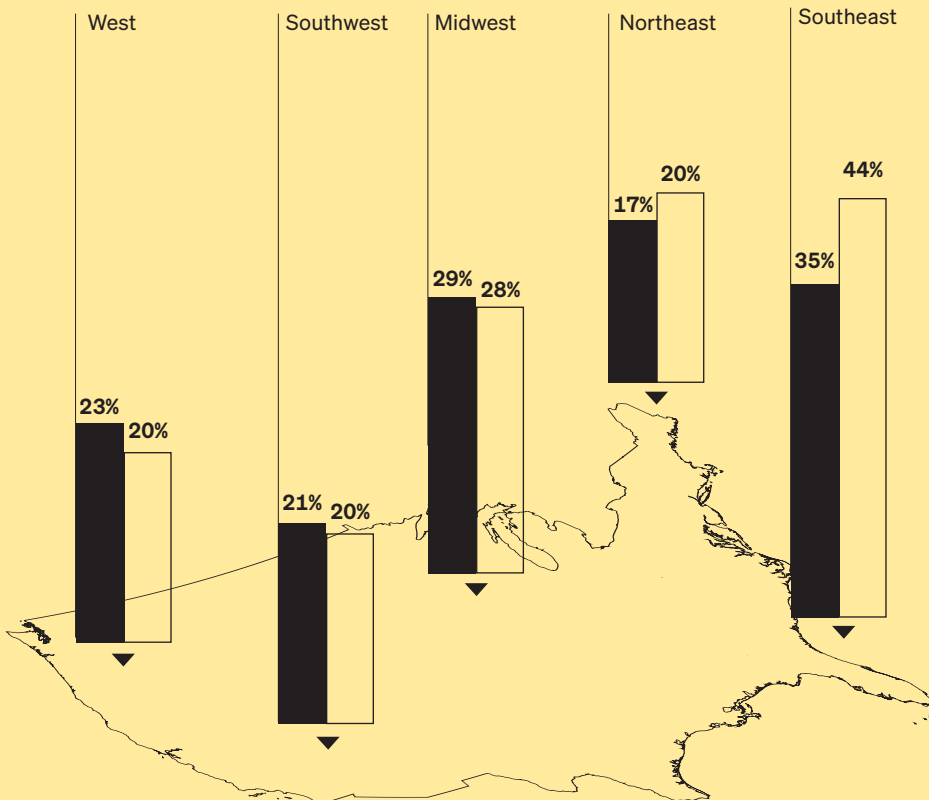
GROWTH

BACKLOGS REMAIN STRONG



REGIONAL GROWTH IN THE U.S.

■ 2023
□ 2024



A significant majority of Top 50 Glazier survey respondents again reported higher sales in 2023 compared to the previous year. Fewer respondents reported decreased sales for 2023— 15% compared to last year’s 21% of respondents. Other indicators also suggest growth and stability, including backlog. More companies overall reported a backlog of over one year compared with last year’s report.

Other sales indicators were mixed. The number of respondents reporting higher competition for projects increased by 10 points for 2023. Respondents reporting higher profit margins remained fairly flat, though those reporting lower profit margins, 30.5% of respondents, increased by about five points. More respondents, 23%, report lower bid levels in this year’s report, compared to last year’s 17% of responding companies.

Southeast continues to dominate construction growth due to tech industry expansion

Last year’s report predicted the Southeast as the region to have the most building growth, which was confirmed by this year’s responding companies. Thirty-five percent said the region grew in 2023, and responding companies named several factors, including expansion of the tech industry, and the resulting investment in surrounding infrastructure for population growth.

“A steady increase in construction permits for both residential and commercial projects post-pandemic has been the result of increased manufacturing jobs, investment in infrastructure at state and local government levels, improved accessibility to ports and highways, and increased population growth,” says David Cannon, estimator, Key Glass.

The Southeast is again slated to lead regions in growth in 2024, according to respondents. Respondents also marked the Midwest as a growing region, largely due to data centers and IT industry construction, including a new facility for Intel in New Albany, Ohio

MARKETS + SERVICES

MARKET SEGMENTS

Commercial

Office buildings	18%
Retail	6%
Hotels	4%

Institutional

Education	17%
Healthcare	16%
Government	6%

Other

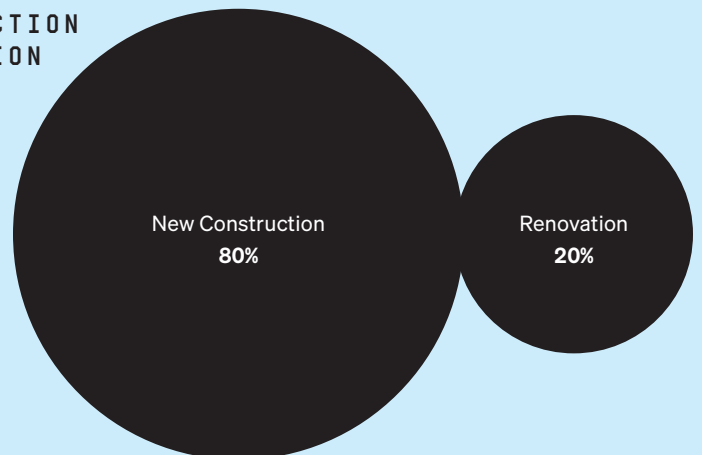
Multifamily housing (high-rise apartments, condos)	17%
Transportation	7%
Residential (single-family homes)	2%
Other (market segments not covered above)*	8%



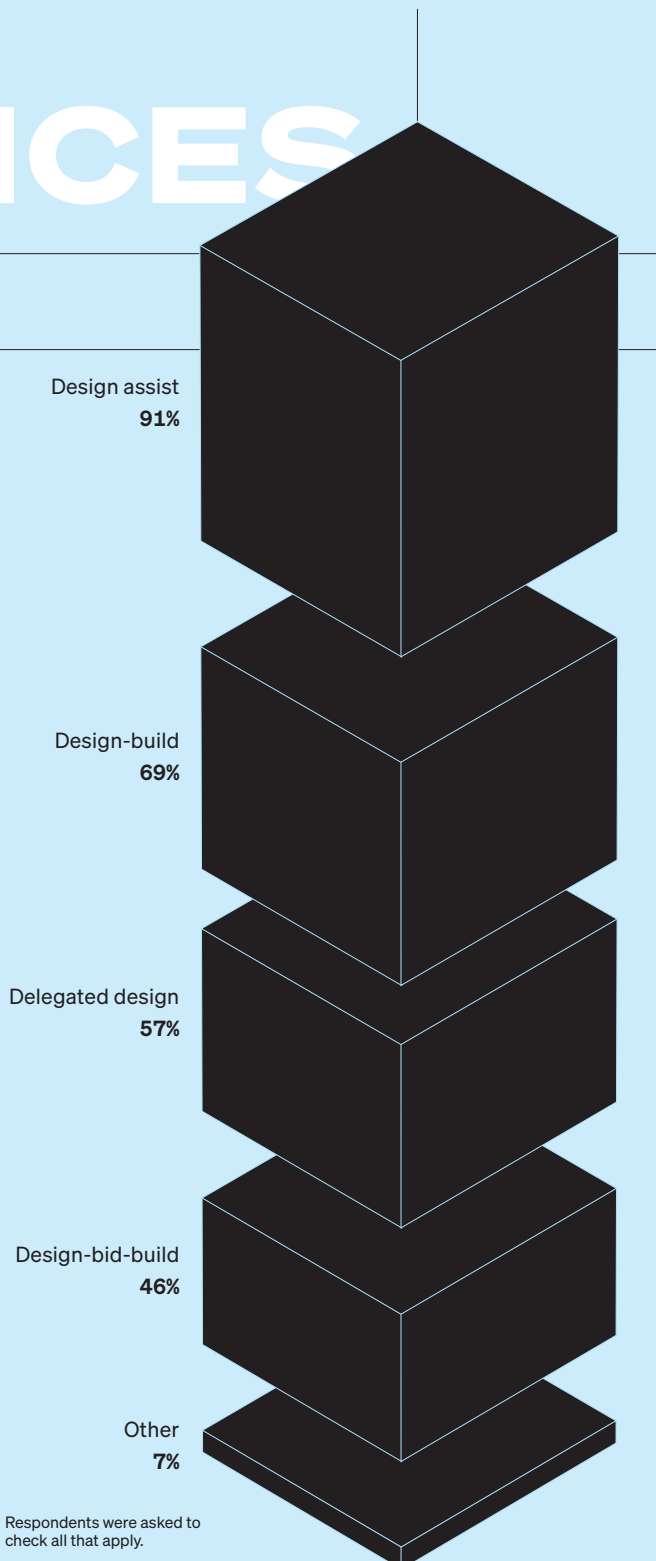
[WE'RE SEEING A SHIFT FROM] OFFICE TO RESIDENTIAL AND HOSPITALITY OR HEALTH CARE.



NEW CONSTRUCTION VS. RENOVATION



PROJECT DELIVERY METHODS IN 2023



Commercial construction market contracts again, and health care poised to “surge”

The commercial office construction market continues to contract, according to survey respondents. Office construction comprises an average of 18% of responding glaziers’ work, compared to 25% in last year’s report.

While not reflected in the data for 2023, respondents also pointed to health care as a market segment that will “surge” in 2024. “The need for medical and treatment facilities has seen a boom, bringing in both new construction and renovation of existing facilities to serve the health care sector on the community level,” says Tyler Kuenzi, project executive, Mission Glass.

“[We’re seeing a shift from] office to residential and hospitality or health care,” says Scott Swanson, director of curtain wall sales, Crown Corr Inc. “There’s office vacancy rates, creating difficulty for developers to invest in projects with a low volume of tenants.”

The number of respondents reporting in-house curtain wall fabrication decreased in 2023—47% fabricate curtain wall in-house, down from 54% in last year’s report. Responding glaziers cited a few challenges with pre-fabricated systems, including facility space, qualified labor to construct systems, and remaining volatility in supply chain systems, which increases lead times on system materials, especially those sourced internationally.

Glaziers see more fire-rated and bird-friendly products used, but companies’ capital investments decrease year-over-year

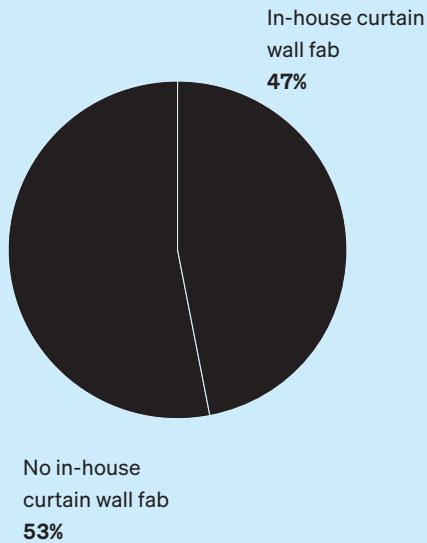
Glaziers continue to install a wide range of specialty glazing. This year, 86% of respondents said they had encountered or installed fire-rated glass on a project, a significant majority. Use of bird-friendly glass continues to expand, based on glazier responses, as well as mirror and curved or bent glass.

Perhaps due to inflation and interest rates, capital investments ticked downward across the board in 2023. While an average of 65% of respondents bought some kind of equipment in 2022, 55% report doing so in 2023. Fabrication equipment was the most popular capital investment made by responding companies, compared to trucks in last year’s report.

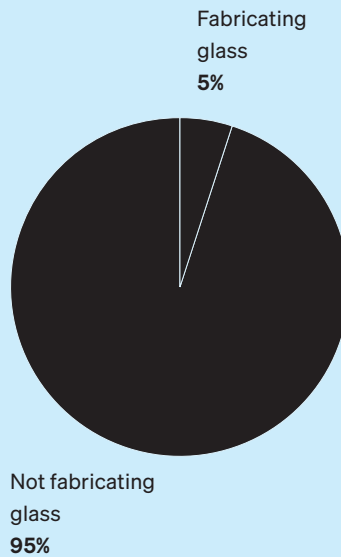
Project delivery methods continue to present challenges for glaziers in terms of communication, expectations and timelines. “Design-build and design-assist projects are interesting from our perspective, as we have much more control over the final detailing,” says Jeff Lorentz, president, Aurora Glazing Solutions Ltd. “We have been challenged in this delivery method with clients being indecisive and changing designs frequently, which can cause the preconstruction phase to extend beyond reasonable timelines.”

PRODUCT MIX

FEWER GLAZIERS FABRICATE CURTAIN WALL IN-HOUSE...

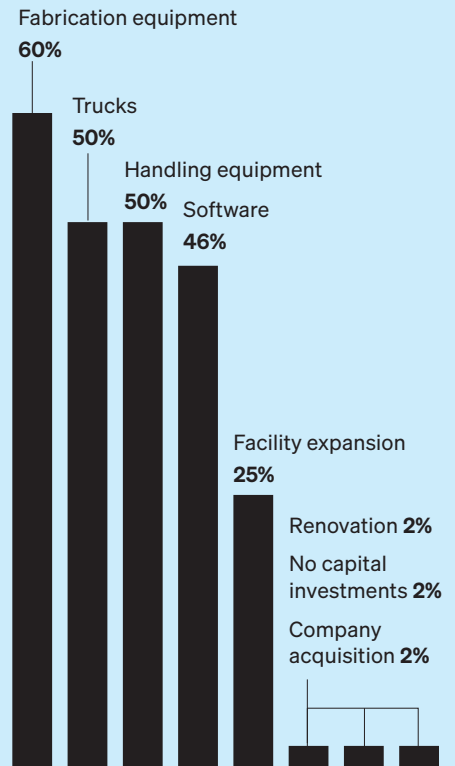


...AND FEWER FABRICATE GLASS.



INVESTMENT

CAPITAL ACQUISITIONS SLOW, BUT GLAZIERS STILL INVEST IN EQUIPMENT.

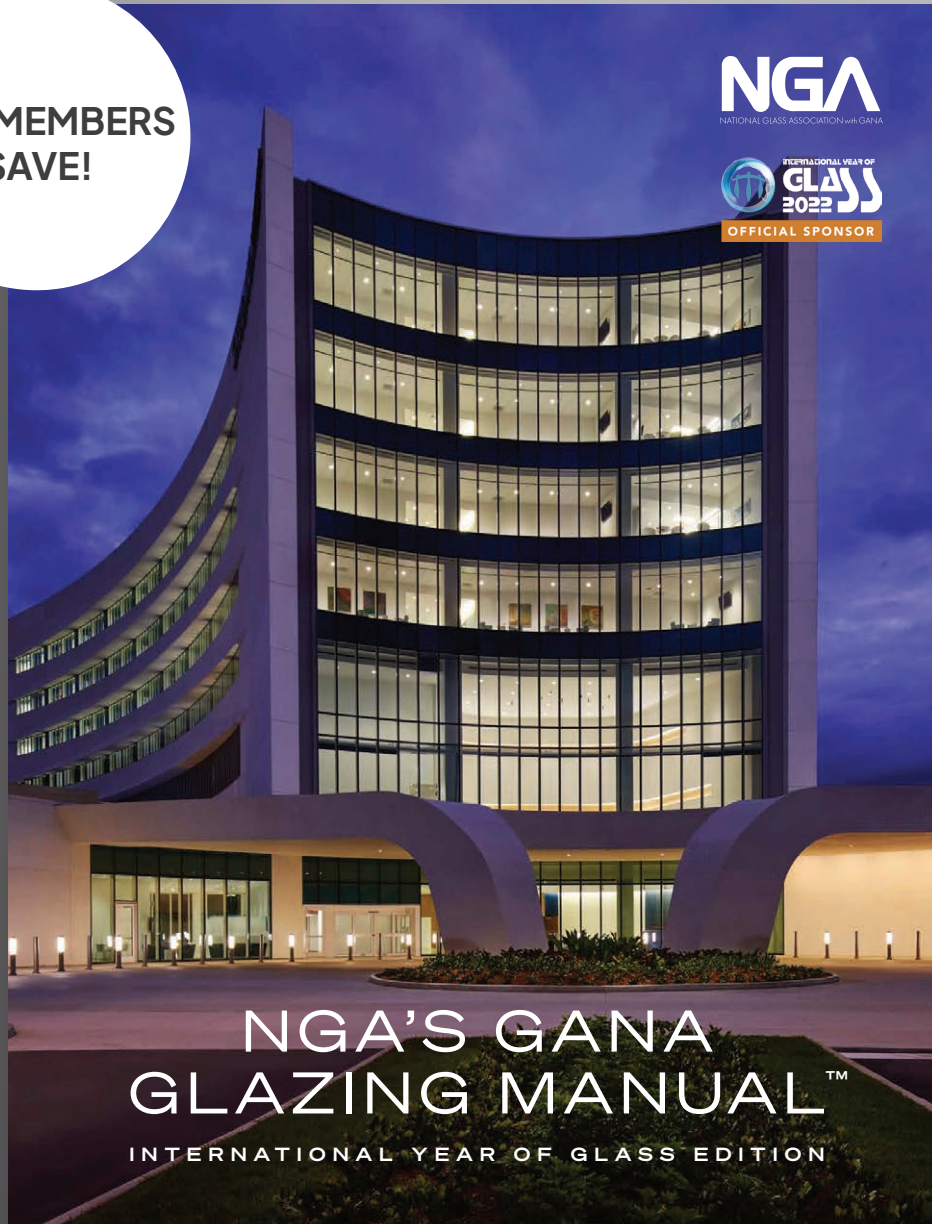


FIRE-RATED TOPS LIST OF SPECIALTY GLAZING ON PROJECTS.

Fire-rated	86%
Ballistic or bullet-resistant glazing	73%
Jumbo glass	66%
Curved or bent glass	66%
Bird-friendly glass	64%
Mirror	64%
Electrochromics	41%
Glass stair treads or floors	20%
BIPV	12%
Other (Laminated, insulating, kiln-formed, back painted)	8%
VIG	7%

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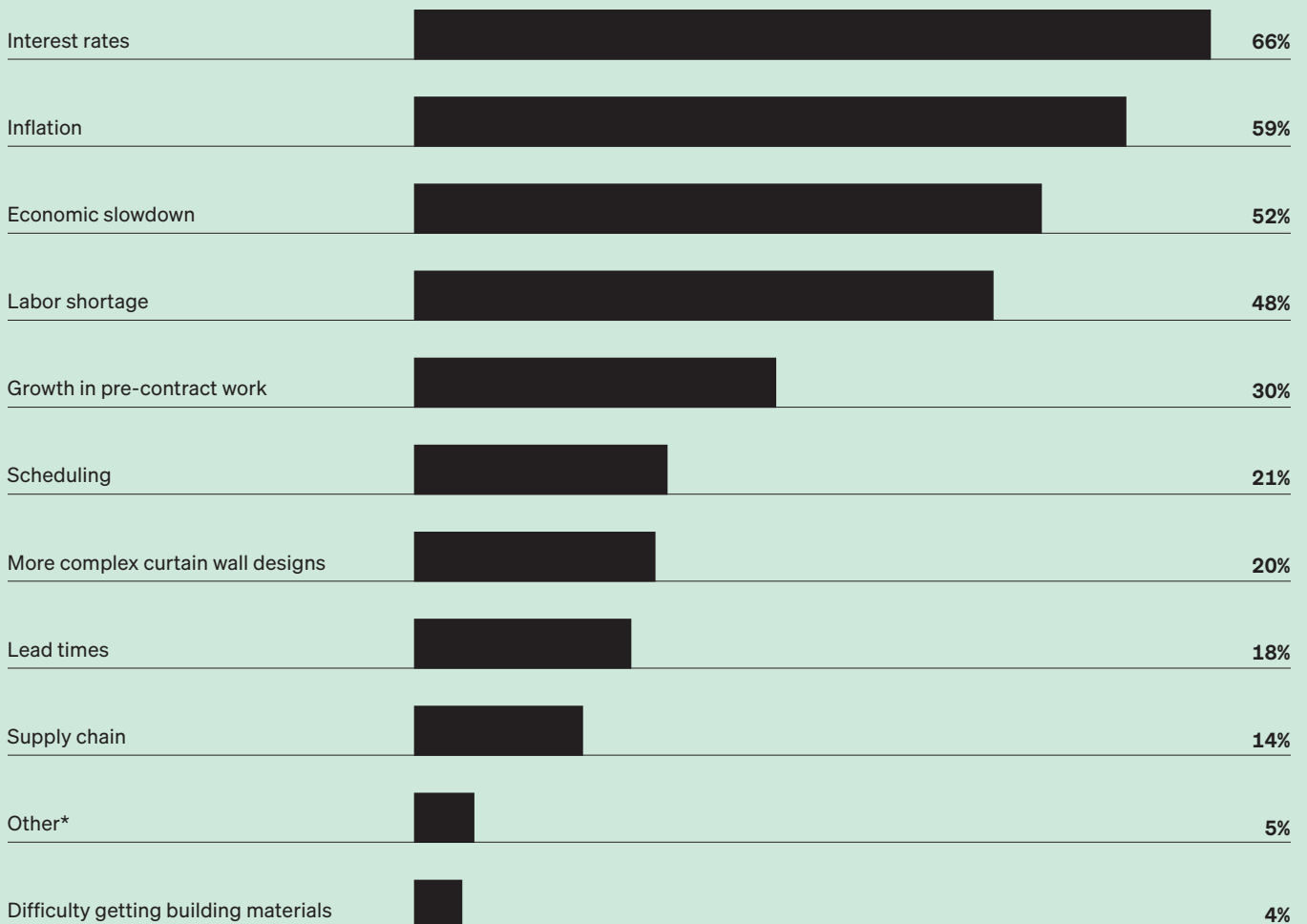
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LABOR + HEADWINDS

HEADWINDS

INTEREST RATES TOPS LIST OF MAJOR 2024 CHALLENGES AHEAD

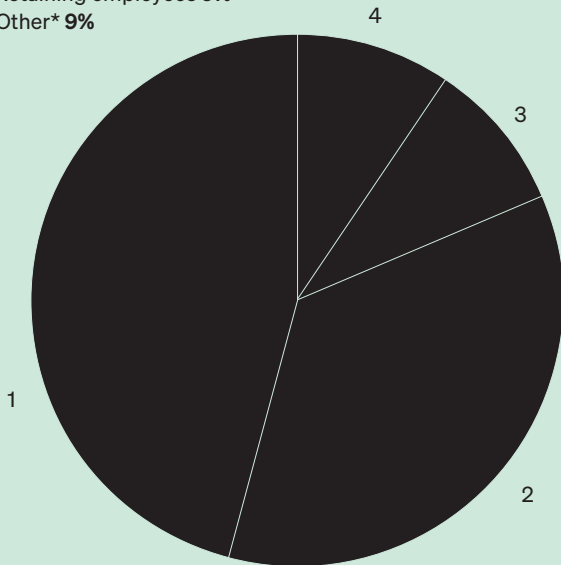


*2024 election year, wage increases, lack of glazier education

WORKFORCE

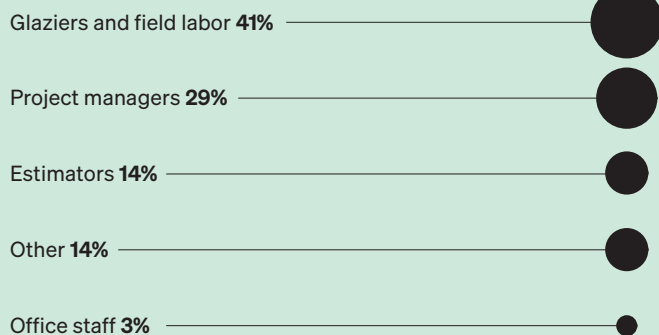
BIGGEST LABOR CHALLENGE

- 1. Recruitment **45%**
- 2. Training **35%**
- 3. Retaining employees **9%**
- 4. Other* **9%**



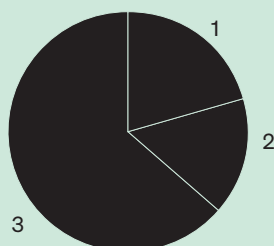
*Leadership development, finding people, growing pains, inflation

POSITIONS THAT WERE DIFFICULT TO FILL



AVAILABILITY OF LABOR IN 2023

- 1. Better than previous year **21%**
- 2. Worse previous year **16%**
- 3. About the Same **64%**



Glaziers face a plurality of challenges moving into 2024, with interest rates being the most impactful, according to survey respondents. Sixty-six percent of respondents marked it as a major headwind for the year ahead. Inflation, which topped the list of challenges last year, remains a top-three challenge, followed by the potential for economic slowdown.

“We continue to see a pause in project starts related to financing concerns with developers,” says Brock West, president, Glass Systems Inc. “I also feel that the upcoming presidential elections are giving an ‘excuse’ to some to hold and see what happens.”

Responding glaziers said the uncertainty about interest rates make it difficult to plan ahead. “If interest rates do not drop, there will still be very few projects and high demand to fill backlog, causing severe price competition and desperation,” says Thomas Cornellier, CEO, TSI Corp. “If interest rates do drop, there will be a significant amount of new projects that hit the market at a time when suppliers are facing labor shortages and raw material suppliers have adjusted capacity for a smaller market, making it more difficult to execute work.”

Glaziers invest in employee well-being as skilled labor shortage remains

Significantly more glaziers marked the growth in pre-contract work, as well as dealing with complex curtain wall, as likely to be challenges.

“Our major projects in 2024 involve long preconstruction phases with significant amounts of design work,” says Jeff Lorentz, president, Aurora Glazing Solutions Ltd. “As the preconstruction work grows, along with the complexity of the projects in general, material lead times increase, which presents issues for scheduling.”

Labor, and lack thereof, remains an entrenched difficulty for glaziers. “We continue to struggle with recruiting capable estimators and onboarding talented glaziers,” says Glass Systems Inc.’s West. “We are focusing on education, training and culture but still find it difficult to recruit.”

While recruitment remains a top challenge, responding companies are investing in employee well-being. When asked about workplace wellness programs, a significant majority said they offer several opportunities, including financial management education, financial assistance, counseling and mental health services, and addiction recovery. ■

BLAZING



Photo courtesy of Vetrotech Saint-Gobain North America.



THE SURGING DEMAND FOR FIRE- RATED GLASS

BY TARA
LUKASIK

I

n recent years, the design community has driven the evolution of fire-rated glass and glazing technology from a code-required architectural product to a multifunctional solution—with unprecedented glass sizes, superior optical clarity and multifunctional capabilities such as blast, hurricane, ballistic, detention, thermal and decorative, among others, in addition to being fire-rated. Allowing designs that would have been nearly impossible decades ago, fire-rated glass is finding use in many of today's design-forward architectural elements, including curtain walls, full wall panels, stairwell enclosures, floors and doors, and more. ▶

TRENDS



PROGRESSIVE EXPANSION THANKS TO RISING TRENDS

Poised to grow 10% and reach \$16.26 billion by 2033, according to market research firm Fact.MR, the fire-rated glass market is being propelled by various industry trends, including improved aesthetics and design options, and advancements in manufacturing technologies and techniques. Urbanization growth and increasingly stringent building codes and standards are inducing designers to implement proactive measures to mitigate damage and protect occupants, while meeting increasingly ambitious aesthetic and performance goals, especially in educational, health-care and governmental settings.

“Fire-rated glass stands poised to deliver unprecedented versatility in achieving building owners’ expectations for multifunctional glass solutions,” says Michael Miller, sales manager, Vetrotech Saint-Gobain North America.

“For years, the glass industry has responded to architects’ requests for multifunctional products. Building owners want glass in more places to maximize the use of natural daylight while minimizing heat gain. The goals are often to open up sightlines for greater security and connection to exterior views while also protecting against a growing range of potential threats. Glass manufacturers have innovated to meet these needs with ever-thinner products, allowing architects greater design flexibility.”

And the increased demand for products that offer energy efficiency and sustainability, or contribute to net-zero architecture goals, are a primary focus for building owners and architects.

“Sustainability is a big conversation point, and we’re mindful of it, just like other manufacturers in our space,”

THE STEADILY RISING NUMBER OF FIRE-RELATED ACCIDENTS IN NON-RESIDENTIAL BUILDINGS IS ALSO DRIVING DEMAND FOR MULTIFUNCTIONAL FIRE-RATED GLASS.

20% INCREASE BETWEEN 2012-2021

70% INCREASE IN DEATHS

21% INCREASE IN DOLLAR LOSS

Source: USFA



From left: Fire tests were conducted to ensure that the Contraflam One product can withstand extreme heat and force. Photo courtesy of Vetrotech Saint-Gobain North America.

Narrow-profile frames give multifunctional fire-rated door assemblies a close visual match to adjacent assemblies. Photo courtesy of Technical Glass Products.

Aluminum pivot fire doors by Glassopolis with a pivot on the top and bottom in the middle of the door. Photo by Tecfire U.S.

The PYRAN DH30 fire-resistant curved glass cantonment screen integrated with office railing. Photo courtesy of Schott North America.

says Devin Bowman, general manager, Technical Glass Products. “There are some challenges as many of the materials we use are unique, required for the specialty nature of our products.”

“Beyond fire-rated glass’ primary purpose, we’re being asked to meet sound transmission, forced-entry, energy-efficiency and environmental sustainability requirements. All the while, seamlessly integrating into the overall design,” says Jerry Cucchi, sales, Aluflam North America.

“Multifunctional performance features aren’t always about [addressing] a threat. In many cases, it could be sound attenuation requirements, enhanced thermal codes or strictly aesthetic features that are crucial to the architect’s design, and ultimately, the functionality of the space for the occupant,” says Tim Nass, vice president of sales, Safti First.

CREATING CLARITY AMID INDUSTRY CHALLENGES

Balancing safety, aesthetics and functionality remains a central challenge in fire-rated glass production. The inclusion of fire-rated materials is increasingly becoming a standard requirement in building design and construction. As products and testing constantly evolve, ensuring that fire-rated glass meets specific fire safety standards and regulations requires rigorous testing and certification.

“The regulatory framework is both a blessing and a curse. It ensures that new products are properly tested and certified, which is required for fire-rated glass, but that in itself slows down the process of innovation and adds cost,” says Rob Botman, general manager, Glassopolis.

“When it comes to a life-safety solution like fire-rated glass, considerable research, development, testing and adjustment is essential for third-party



Two-hour fire-resistive, hurricane-rated curtain wall at Orlando VA Medical Center in Orlando, Florida. Photo by Safti First.



certification and ensuring stakeholder trust,” says Miller.

“It’s important to be mindful of design shifts in other life-safety requirements, and balancing design trends with code requirements. We see building owners taking a proactive approach about [scenarios] not outlined in the building code,” adds Bowman. “Ensuring that solutions work because they’ve been tested in different types of scenarios and to hurricane, fire-rated and ballistic glass standards just like anything else that’s in the building code.”

Limited awareness and education also play a big part. Many potential customers might be unaware of the safety advantages of fire-rated glass, leading them to opt for less expensive alternatives without considering the potential risks.

“The greatest challenge to adoption certainly isn’t related to codes or the architectural community, but the mentality that we have to build buildings as cheaply as possible,” says Nass. “As a specialty manufacturer, we are often overlooked in the design phase, and teams will make decisions based on preconceived notions about fire-rated assemblies. We invest largely in providing pre-construction services—product recommendation, code interpretation, detail development and budgeting—because we get calls

for non-rated applications with unique performance features.”

“Price and availability are the biggest challenges in the current marketplace and will continue impacting our operations in the future,” adds Dan Poling, sales manager, Schott Pyran. “There is also a real lack of understanding and misconceptions surrounding the benefits and capabilities of fire-rated glass. We have to educate the market on fire safety importance, regulatory requirements and promoting value proposition of fire-rated glass-ceramic to address these issues and instill confidence in its usage.” ■

NGA RESOURCES



Fire-Rated Glazing 101 GTP (FB76-23)



NGA's GANA Glazing Manual—IYOG edition



Thirsty Thursday: Where in the World Is Wired Glass



Thirsty Thursday: Fire-rated Building Code Questions Answered

Counter-clockwise:

Vantage Data Centers' VA12 facility in Northern Virginia. Photo by Business Wire.

The Hillsboro 4 data center in Portland, Oregon. Photo by Flexential.

The Equinix DA1 data center in Dallas, Texas, is one of the largest data centers in the country and the nexus of the Interconnection marketplace for the entire South-Central U.S. Photo by Andrew Nyr, courtesy Wikimedia Commons.



RISE OF GLASS IN DATA CENTERS

IMPLICATIONS FOR FIRE-SAFETY GLASS MANUFACTURERS

As AI and other digital technologies surge, so has the demand for data centers to power digital transformation. With new facility developments announced almost weekly, CBRE Group Inc. projects that North American construction will rise 19.2% year-over-year.

In addition to design challenges addressing infrastructure threats and sustainability, data center developers are increasingly consulting architects to ensure new centers fit local aesthetics, balancing security and visual appeal. Traditionally designed

as large, unattractive, windowless concrete boxes, as data centers increase across many markets, developers are looking to beautify these buildings—which generally look to stay out of the public gaze—and make them less dystopian in appearance.

This has led to the growing trend of adding glass facades to make data centers look more office-like in appearance and visually appealing, according to Data Center Dynamics. Multifunctional glass is gaining traction as it addresses the security

element needed for these new and converted structures. This design shift presents new opportunities for fire-safety glass manufacturers to meet emerging demands for visually appealing and secure data center construction, especially as developers consider multi-tenant or colocation data centers to help address demand.

“[Codes and standards] organizations mandate the use of fire-rated materials, including glass, in specified areas of data centers to mitigate fire risks and ensure compliance with

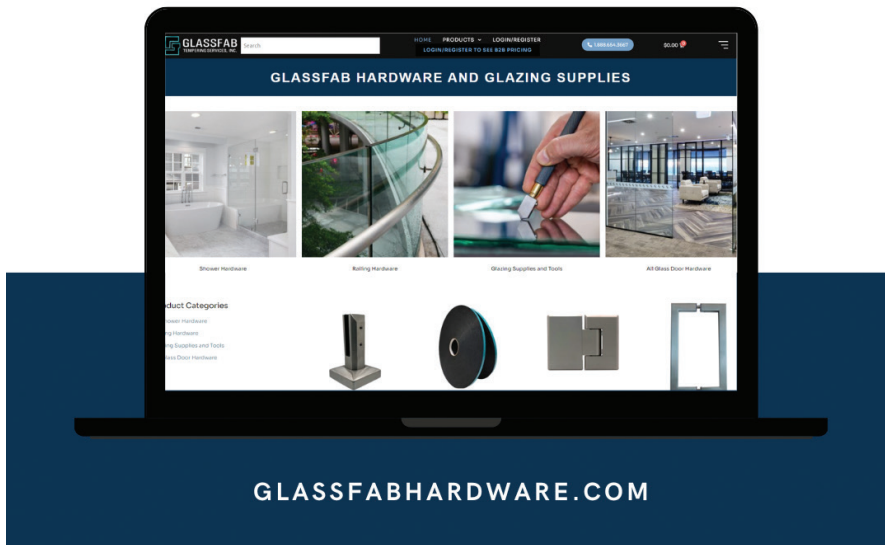
building codes. It is possible that as the number of data center construction projects continues to rise, [so will] the demand for fire-rated glass solutions that adhere to regulatory standards,” says Poling.

“Much will depend on the occupancy levels of these spaces,” adds Cucchi.

“One [client] was looking to incorporate switch vision into the fire-rated assembly, perhaps to conceal assets on the other side of the window or the wall,” says Bowman. “We know there has been an increase in demand in these types of building projects.”

PRODUCTS

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ALL GLASS DOOR
HARDWARE

GLAZING SUPPLIES &
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03

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02. Fire-rated glass

Vetrotech Saint-Gobain's Contraflam One glass has a light transmission of up to 90%, up to 35% less embodied carbon than conventional multi-chamber products and is lightweight, which allows for faster installation. Contraflam One also has a single-chamber foaming interlayer for all fire-resistance ratings, called HybridCore Technology.

+{33} 1885-4000-0 | SAINT-GOBAIN.COM

03. Etched glass

3form's etched glass collection features textural, patterned glass in six new patterns. The etched glass collection is available in monolithic or laminated glass specified with low-iron or clear-float and comes in a maximum panel size of 5 feet by 10 feet with $\frac{3}{16}$ -inch, $\frac{1}{4}$ -inch, $\frac{3}{8}$ -inch and $\frac{1}{2}$ -inch gauges. The shutter design option is only available as a monolithic low-iron lite and comes in $\frac{3}{16}$ -inch and $\frac{1}{2}$ -inch gauges.

800/726-0126 | 3-FORM.COM

02



01



03

01. Decorative glass

Bendheim’s line of 10-millimeter textured EcoGlass are decorative glass patterns that contain 40% to 50% recycled glass. EcoGlass has daylighting qualities and is available in 10 textures. The glass can be supplied in combination with custom color interlayers, color coatings or digital printing. It can also be tempered and is suited for both framed and frameless glass. Patterns range from linear to organic, providing a variety of choices when determining the level of privacy. 800/221-7379 | BENDHEIM.COM

02. Bullet-resistant glass

Designed to replace traditional entrance glazing materials, DefenseLite AccessShield and AccessShield BR integrates with existing doors of all types and materials, offering a barrier that deters and prevents unlawful access. DefenseLite AccessShield is designed to be cost-effective and easy to install, making it an accessible option for a range of retail businesses, say officials. 888/689-5502 | DEFENSELITE.COM

03. Railing system

CRL’s Adjustable Standoff Railing System allows up to a ½-inch of glass projection adjustment for glass alignment when substrates are uneven. Once a glass pane is leveled and aligned with the surrounding panes, the assembly can be tightened, securing the railing in place. Featuring a low-profile design with a 2-inch face diameter, the system produces an all-glass look in guardrail applications. It is available in three finishes: matte black, brushed stainless steel and polished stainless steel. 800/421-6144 | CRLAURENCE.COM

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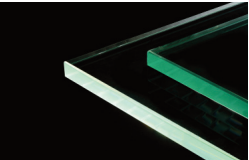
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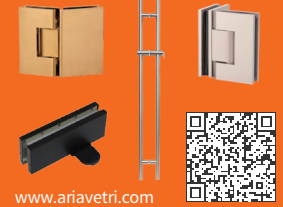
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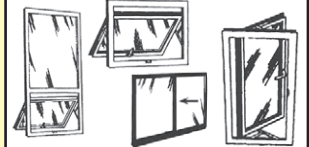
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Glass & Glazing Advocacy Days by the Numbers

- 41 meetings with Congressional representatives
- Industry members representing 20 states

NGA hosted members, stakeholders from government agencies, and congressional members in DC, May 14-15, to discuss top policy priorities and to showcase how the industry contributes to the economy, the workforce and human health.

Keep the Conversation Going!

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A WORLD OF INNOVATION, ON DISPLAY IN GERMANY

AN INTERVIEW WITH LARS WISMER, DIRECTOR OF GLASSTEC
BY KATY DEVLIN

From Oct. 22-25, *glasstec*, the leading international trade fair for the glass sector, returns to Düsseldorf, Germany, where it will host about 1,000 exhibitors in all segments of the industry, from glass manufacturing to processing to façade systems to tools, technology and more. During the recent BEC Conference in Nashville, I sat down with Lars Wismer, the new director of *glasstec*, to discuss his impressions of the glass industry and the highlights of the 2024 edition of the expo.

glasstec is organized by Messe Düsseldorf, and Wismer's new role at the show marks his return to the organization, where he worked for 16 years as senior project manager. In 2016, Wismer joined a sporting, concert and events firm in Düsseldorf before returning to Messe Düsseldorf in 2022 to serve as director of *glasstec*.

New look at a dynamic industry

The 2022 *glasstec*, which took place

prior to Wismer's official return to Messe Düsseldorf, was his first introduction to the glass industry. "It was quite impressive. ... It's an industry show, a machinery show. You have the heavy machinery working. It's loud, and I love it," he describes. "Basically every day, I learn something new about glass. ... There are so many developments and technological advancements. It's wonderful to get the first impression [of the industry] at *glasstec*."

During our conversation, I asked Wismer what he would like to bring from his experience in sports and entertainment to *glasstec* 2024. "These are totally different approaches," he says. "A fair has so much more to offer than a concert. ... However, what I'd like to do—

what we need to do—is add value. Part of that is entertainment. It's not only about making business but enjoying yourself."

Technology and sustainability

The 2024 *glasstec* features three "Hot Topics:" decarbonization, digitalization and circular economy. Wismer and his organizing team are working to bring those themes not just to the conference program, but to the exhibition hall as well. "It's important that these topics can be found on the show floor, not just on the website. Maybe not complete solutions, but you'll be able to get ideas and inspiration," he says.

The themes will also come to play in the expo's glass technology live innovation center, on the show floor. A new element of glass technology live will be "CircuClarity One," an initiative featuring displays, conference programming and other features focused on product reuse and recycling.

Serving a new generation

The audience for trade shows is changing, with organizers now serving everyone from Gen Z to Baby Boomers. "The trade fair industry has to evolve," says Wismer. One element of that evolution is technology, he says. "Digital has to play more of a part in trade shows. We have to find ways of combining face-to-face interactions with digital technologies."

However, Wismer notes that face-to-face networking and community building continue to be top priority for exhibitors and visitors. "If you want to buy a piece of machinery, you can get all the specs online, or in PDF, or in [virtual reality]. But seeing the machine running, talking face to face, sealing the deal with a handshake. That is building trust," he says. ■



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