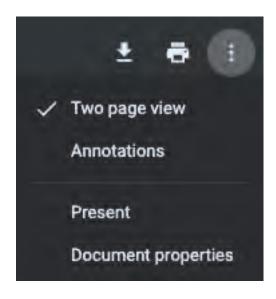


Welcome to the digital edition of Glass Magazine!

To view the issue in a two-page format using Google Chrome, click the triple dots in the upper right corner and select "Two-page view" from the drop-down menu.



THE GLASS AND GLAZING AUTHORITY APRIL 2025

TOP GLASS

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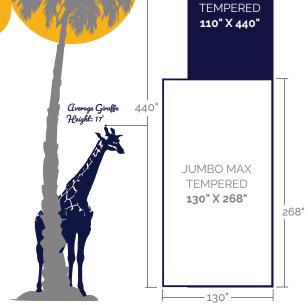


BY GLASSWERKS

Glasswerks is the largest fabricator of architectural glass in Southern California. Our state-of-the-art facility is equipped with brand new equipment that can handle the largest sizes available in North America and is staffed by experienced professionals. Our Jumbo Glass facility can produce oversized annealed and tempered monolithic glass, annealed and tempered laminated glass, jumbo I.G. units featuring our G3® non-metallic spacer, and low-e soft coat insulating units.

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JUMBO MAX

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ON THE COVER: A Yorglass employee inspects glass. Find Top Glass Fabricator Yorglass on the industry ranking on page 38, and find the market report on page 52.

WHY SHOULD YOU AUTOMATE?



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WORKFORCE DEVELOPMENT

NGA celebrates 2024 as a year of new initiatives, resources

and commitments

EDUCATION

NGA Glass Conference: Carlsbad tackles industry challenges and opportunities

WEBINAR

New MyGlassClass helps strengthen and build company training programs

GLASSBLOG



OUTLOOK

New Year, New Beginning

By David Vermeulen, Technical Glass Products



News & Nuggets By Max Perilstein, Sole Source Consultants



2025 Finish **Forecast**

By Tammy Schroeder, Linetec, Tubelite and Alumicor

PROJECT SHOWCASE



The new Watershed building, located in the Fremont neighborhood of Seattle, is a glass-forward office and retail mixeduse property. One of the first commercial projects developed and certified to Seattle's Living Building Pilot Program, and in alignment with the International Living Future Institute Living Building Challenge, the project underlines glass's centrality to sustainability. Technoform partnered with Northwestern Industries and Oldcastle BuildingEnvelope to create a complete and thermally efficient architectural glazing solution for the exterior.

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Retirement Celebration



Let's celebrate the outstanding career of James "Doc" Dachenhaus as he embarks on a well-earned retirement! James has been the driving force behind the success of our Shower Door Department, leading it to record-breaking achievements and setting new standards for our organization. .

His expertise, leadership, and dedication have not only shaped an incredible department but also left a lasting impact on Glassfab and the customers we serve. As we honor his remarkable contributions, we extend our deepest gratitude and best wishes for a fulfilling and rewarding retirement. Here's to James and his exceptional legacy!

Fabricator Flashback



NORAH DICK

started as an assistant editor for Glass Magazine in 2017. Given that the magazine is celebrating its 75th anniversary this year, and that this April issue features the long-running Top Glass Fabricators report, I thought it might be appropriate to look back at the first Top Glass Fabricators report I worked on in 2018.

Reading through that magazine feature from seven years ago, I was not surprised to see some throughlines in the challenges that continue to face leading industry fabricators today. Here is a sample of the leading reported challenges that year:

- Expanding investments in automation due to a low labor supply.
- The struggle to meet increasingly complex design requirements for higher-performing glass.
- Increased demand from customers for higher quality.
- A need for larger fabrication machinery to keep up with increasing glass sizes.

Does any of this sound familiar? The answer is likely, yes. Based on responses for this year's Top Glass Fabricators report, companies continue to have difficulty finding labor, while nevertheless continuing to work hard to provide the built environment with glass that can keep up with increasing demands for aesthetics, performance, larger sizes, and now, sustainability requirements.

While some challenges remain, others have changed. 2018's leading fabricators were stretched due to high demand and a stronger market, whereas this year's fabricators face a softening market. Seventy-one percent of 2018 fabricators reported higher year-over-year gross sales, compared to only 32% of respondents in this year's report.

Fabricators in 2018 were also dealing with a glass shortage due to the unexpected idling of U.S. float lines. While there's not the same concern for this year's fabricators, they report that costs for raw glass—and everything else—have risen in the last year as inflation remains a concern. Fabricators in this year's report also expressed concern related to competition and lingering issues with the supply chain.

But, like the companies included in the 2018 report, current fabricators continue to invest in their business, and in future growth—whether that means investing in capital equipment, adding new locations and facilities, innovating new products, or creating a training program for employees.

Because this is the 75th anniversary of Glass Magazine, we also asked companies to tell us if they're 75 years (or older). An amazing 11 reporting companies told us they were 75 years or older, and two are in fact 100 years or older. While this certainly doesn't mean that the industry's current challenges don't matter, it does speak to the resilience of fabricators and their ability to overcome the many headwinds of recent decades to continue to meet industry demands.

Look for interviews with some of those older fabricating companies online at GlassMagazine. com. And to check out the Top Glass Fabricators industry ranking and market report, see pages 34-58. ■





A New Era of Shower Hinges is Here

The groundbreaking **Zero Hinge** embodies true innovation. Its superior strength can secure glass doors over **50% heavier and 15% wider** than standard hinges. In addition, the Zero Hinge can be completely installed from outside the shower enclosure to simplify and expedite installation.

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NEED-TO-KNOW INFORMATION FROM THE NGA

NGA PRESENTS 2024 ANNUAL REPORT

The National Glass Association celebrates 2024 as a year of new initiatives, resources and commitments to the glass and fenestration industries. In this past year, the association started, and continued, several initiatives to fulfill its strategic goals and serve its membership. From amplifying its message at the largest GlassBuild America in 16 years in Dallas, to rolling out an enhanced online learning experience on the updated MyGlassClass.com platform and being selected by the Environmental Protection Agency to receive a \$2.1 million federal grant, NGA is raising the bar on its commitment to help members succeed.

"This annual report captures highlights

of those positive impacts from the past year," says Nicole Harris, president & CEO of NGA. "You will see the ways NGA continues to help its members and the industry grow and succeed, organized by our four strategic goals: Advocate, Educate, Workforce Development and Promote."



View the 2024 report

NGA ANNOUNCES NGA GLASS CONFERENCE: ANN ARBOR

The next NGA Glass Conference: Ann Arbor will take place from Sept. 29 to Oct. 2 in Ann Arbor, Michigan, at the Ann Arbor Marriott Ypsilanti at Eagle Crest. Attendees can look forward to touring a local manufacturing plant, and the conference offers valuable education and networking, plus meetings of the NGA Forming, Fabricating and Advocacy Committees to discuss open work items, new resource development, and trends and issues facing the industry.

"The new fall timeframe—a result of member preference feedback—will incorporate a glass factory tour as our summer conferences always have," says Karen Wegert, NGA director, technical services, and staff conference lead. "We will also include a single-focus workshop, based on the very successful turnout we experienced at NGA Glass Conference: Carlsbad."

FOUR NEW COURSES OFFERED FREE FOR NGA MEMBERS

MyGlassClass.com now offers four expert-developed courses on shower enclosure design and installation, created to give new glaziers the confidence and skills to master the art of shower enclosure installations and become an asset to your glass company. The new courses include Frameless Shower Enclosure Basics, Frameless Shower Enclosure Design, Frameless Shower Enclosure Measurements, and Frameless Shower Enclosure Enclosure Installation.

These courses complement NGA's Frameless Shower Enclosure Design & Installation Manual, providing step-by-step guidance to enhance practical skills. NGA members get free access to all four courses and the manual, in addition to the rest of MyGlassClass.com's catalog. ■

ROB CARLSON OF TRISTAR NAMED NGA VOLUNTEER OF THE YEAR

NGA honored the many volunteers dedicating their time to industry advancement during the Volunteer Celebration Dinner, Feb. 4, at NGA Glass Conference: Carlsbad. Honorees included Aaron Thompson, Viracon; Rob Carlson, Tristar; Julia Schimmelpenningh, Eastman; Kayla Natividad, Pilkington Architectural Glass; Vaughn Schauss, Kuraray America Inc.; Michael Saroka, Goldray Glass; Bobby Chestnut, Walker Glass Co.; and Jon Griggs, Guardian Glass North America.

NGA named Rob Carlson, Tristar Glass Products, the 2025 Volunteer of the Year, recognizing his dedication to many industry causes. In accepting the award, Carlson emphasized the value of active participation in industry task groups, encouraging others to get involved at any level to help shape the future of the glass industry.

"I think that being involved in task groups, being a part of the glass association, it's such a wonderful opportunity to control your own destiny. You get to be someone who makes a change for something that impacts your business and your industry. You get to be involved," says Carlson.

"Thank you to all of our volunteers.
We truly couldn't do any of this really important work without you," says Aaron Thompson, principal research engineer at Viracon. ■

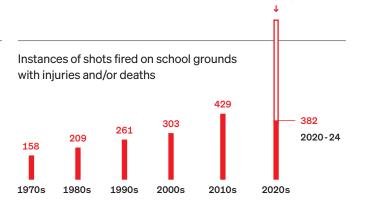


Windows and doors respond first.

Security glazing resistant to forced entry can be used to slow down an active shooter, allowing more time for schools to enact emergency plans and for first responders to arrive. The NGA is prioritizing making schools safer with forced-entry-resistant, security, and ballistic windows and doors. Join us.



Learn more and get involved.



Projection if nothing is done.



GLASS ADVOCATE

Closing the Skills Gap

TRAINING FOR GLASS FABRICATION PERSONNEL NOW AVAILABLE VIA MYGLASSFAB BY JENNI CHASE

The manufacturing industry is facing a skills gap. Industry growth is driving the need for more workers of every type, according to the 2024 Deloitte and Manufacturing Institute Talent Study. This is not news to the glass industry, where the skills gap reveals itself as a lack of industry experience among new hires. Glass fabricators report this is true at all levels of employment, but particularly among entry-level production personnel, who often come onboard with little to no glass experience. To help close that gap, the National Glass Association has launched MyGlassFAB.

Addressing the skills gap

MyGlassFAB is designed for entry-level production personnel. Available on the MyGlassClass.com online learning platform, MyGlassFAB allows new personnel to take training courses on their phones. The interactive courses range in length from five to 15 minutes, with the initial training focusing on safety, glass quality inspection, how to measure glass and basic math. Courses are available in English and Spanish, and as the course catalog grows, NGA will add training on tempering, laminating, decorative glass and insulating glass production.

Tristar Glass uses MyGlassFAB to



onboard new employees. As part of their orientation process, new hires take MyGlassFAB courses on their phones, alongside an instructor. "The training provided through MvGlassFAB has streamlined Tristar's onboarding process by providing clear, accessible learning tools for new employees," says Jon Kelley, production manager for the fabricator's plant in Tulsa. Oklahoma. "The user-friendly platform allows new hires to quickly grasp the essentials of glass fabrication, helping them contribute effectively from day one. The content is relevant, useful and has integrated seamlessly with our existing training program."

MyGlassFAB also allows companies to monitor training compliance:
Supervisors can track employees' training activity and test scores using the MyGlassClass.com Team Manager functionality. Companies can customize their Team Manager to monitor and

conduct training for different lines, under different line leaders. While all employees may be required to take safety courses, for example, only a few may need glass measurement and math training. The Team Manager function allows companies to customize training for different employee groups, as well as run comprehensive reports on individuals or all employees.

The applicant gap

When it comes to job applicants, Top Glass Fabricators consistently report that finding labor remains difficult. However, it no longer tops the list of manufacturer challenges. While attracting and retaining a quality workforce was the top challenge for four years straight, it fell to fourth on the list in the fourth quarter of 2024, according to the National Association of Manufacturers outlook survey.

To view the MyGlassFAB course catalog, visit myglassfab.com. ■



GLASS INFORMATIONAL BULLETIN



Determining an Acceptable Color Variance for Decorative Glass

There are variances in all production processes. Manufacturers minimize variance to an acceptable limit with process and quality control. Decorative glazing is not exempt from variance; the overall color of the decorative glazing is the result of the compounding factors of the decorative components and the processes used to make them. This Glass Technical Paper establishes a voluntary

measurable industry acceptable color variance for decorative glazing products that could be used as a baseline for specification. This document is not meant to replace or supersede job requirements or override specific vendor specifications.

Scope

This document covers measuring color tolerances, both reflected and transmitted, of decorative glazing with solid uniform color applied as a pigmented coating or interlayer.

Decorative glazing with solid patterns or graphics may not be measurable with the methods covered in this document and, therefore, is outside of its scope.

Excerpted from NGA Glass Technical Paper FB77-24 Determining an Acceptable Color Variance for Decorative Glass. For full details, download the complete document free at glass.org/store.

Scenarios for defining color tolerance

When measuring a color difference between two materials, one being the control specimen and the other the trial sample, it is important to recognize that this measurement can only be made between two similar materials. The control specimen is the agreed-upon color, whereas the trial sample is the specimen being compared to the control. Measuring a glazing sample against any dissimilar material, such as a paint color chip, is challenging and may not yield appropriate data as the two materials behave differently in the measurement device and may give different readings.

Accepted target to final goods—The

accepted target (sample/target/mockup) is compared to final goods (the product in question). Because of the extended length of time between sampling and construction, there may be variation in color as raw materials may have changed from the time of sample manufacture to the time of final production within the tolerance of the raw materials being used. For example: glass, interlayer, film and inks all have independent variances and add complexity from the compound impact of these material differences on each other.

Batch to batch—Materials for larger projects may be made in multiple



GLASS INFORMATIONAL BULLETIN—DETERMINING AN ACCEPTABLE COLOR VARIANCE FOR DECORATIVE GLASS

production batches. Batch color should be compared to the original approved sample. Differences in batches can be mitigated through planning materials and installation schedules to install pieces from common batches together. Replacement glass would not be considered an additional batch but would require a new sample for approval.

Internal batch tolerances—When items are made at the same time with controlled raw materials, the color tolerance from one piece to the other has a closer expected color tolerance than the previous situations. Batch color should be compared to the manufacturer's internal production target.

Equipment to measure glass color

A handheld spectrophotometer can be used to measure reflected color, is designed to be portable, and is therefore suitable for use in a glass fabricating factory or at the building site before or after installation. The near normal reflected color of the glazing is measured and converted into a numerical value. The instrument must have an integrating sphere and measure color with the specular component included from the built-in light source. The instrument has color data storage and a small display of the actual color measurements. A software package is typically supplied to manipulate the data, calculate Delta ECMC values (difference in color between two measurements), and graphically display the color data.

A second option is a benchtop spectrophotometer, which could measure both reflected and transmitted color. However, this can only be done on small sample sizes because the glass is staged in a closed chamber to block out all external light. These instruments are

NGA thanks our task group volunteers for developing this resource: Michael Saroka, Goldrav Glass-chair; Dan Laporte, Mativ; Paul DiCesare, Vitro Architectural Glass; Jeff Nicholson, ICD High Performance Coatings: Kayla Natividad. Pilkington North America: Julia Schimmelpenningh, Eastman; Randy Reynolds, Glass Coatings and Concepts; Vaughn Schauss, Kuraray America; Marc Deschamps, Walker Glass; Jon Griggs, Guardian Glass; Nicholas Karpa, Glass Coatings and Concepts; Aaron Thompson, Viracon: Jim Gulnick, McGrory Glass: Jason Fisher, Oldcastle BuildingEnvelope; Thomas Woitowicz, Viracon: James Wright, Thompson Innovative Glass; Bobby Chestnut; Michael Morrissey; Kevin Ramus; and Rick Wright.

much larger than handheld instruments and more suitable for a lab environment. Because benchtop spectrophotometers are considered more accurate and precise than handheld devices, they are often used to establish the standard color targets and samples to which the handheld devices can be compared.

Suggested Color Tolerances

For the purposes of this document and setting a quantifiable measurement for quality control, the Color Measurement Committee calculation is recommended as it has been adopted as the calculation of choice for many other materials for Delta ECMC between 0 and 5. This will allow decorative glazing to be consistent with other materials in the design world.

A consideration for determining color tolerances in a product is the ability to control the color of the raw materials. There is always some tolerance in raw materials, which varies by material type. This includes glass, interlayers, decorative coatings and pigments. Refer to Table 1 for suggested color tolerances according to base substrate.

Table 1: Suggested Color Tolerances, Delta $\mathbf{E}_{\mathtt{cmc}}^{\phantom{\mathtt{cmc}}*}$

BASE SUBSTRATE	Accepted Target to Final Goods	Batch to Batch	Internal Batch Tolerance
Monolithic Low-Iron Glass	2	1	0.5
Monolithic Clear and Tinted Glass	5	2	0.5
Laminated Low-Iron Glass	10	2	1
Laminated Clear and Tinted Glass	10	2	1

^{*}Note: these numbers are applicable only to the individual component as listed in the table. Values are expressed as Delta E_{CMC}. Categories "Accepted Target to Final Goods," "Batch to Batch" and "Internal Batch Tolerance" are defined above in Scenarios for Defining Color Tolerance.



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Ukraine Plans High-Tech Flat Glass Production Plant

Ukraine is set to build its first flat glass manufacturing plant in the Kyiv region by 2028. The new plant will create jobs and attract investments into Ukraine's industrial sector.

The plant will have one production line to meet domestic demand for glass, with the option to add a second line. Major consumers will include window and façade manufacturers. Leading global manufacturers from Germany will participate in the construction, providing equipment and advanced technologies that will foster innovative industrial transformation and integrate Ukraine's economy into the European market.

NovaSklo and UkraineInvest signed a memorandum of cooperation, which includes legal, advisory and analytical support to the investor and aims to grant the project special status, enabling it to qualify for tax and customs benefits, as well as reimbursement of expenses for infrastructure development.

AGC and Saint-Gobain Open Volta Production Line

AGC and Saint-Gobain have officially inaugurated Volta production. At the AGC Barevka plant in Teplice, Czech Republic, Volta is a pilot project aiming to significantly reduce carbon dioxide emissions and support the transition to sustainable flat glass production.

The Volta R&D project, supported by the EU Innovation Fund, includes reconstructing the production line in Dubí, Czech Republic. The line will be 50% electrified and 50% fired by a combination of oxygen and gas, significantly reducing direct carbon emissions. The new technology also focuses on circularity as the Volta hybrid melting furnace will operate at a higher ratio of recycled materials, much higher than current industry standards.

Saint-Gobain Manufactures Flat Glass with Bioliquid

Saint-Gobain Glass France carried out a successful trial at its Aniche plant, integrating a bioliquid from the wood industry as an alternative energy source to manufacture flat glass for the building sector. The three-day trial provided an opportunity to substitute 30% of conventional energy sources with this bioliquid, leading to a significant reduction of over 80% in carbon dioxide emissions compared with the usual use of natural gas.

Vitro Investing in Patterned Solar Glass Production

Vitro Architectural Glass initiated an investment plan to expand its Wichita Falls, Texas, location to allow for the annual production of up to 25 million patterned solar glass lites upon completion. A \$67.6 million investment tax credit allocation from the Internal Revenue Service will enable this investment. The Wichita Falls expansion will establish a new patterned solar glass facility, including a new furnace, a roll-forming chamber, and a cooling and production line.

Voilàp Glass Acquires Majority Stake in Mappi

Voilàp Glass completed its acquisition of a 51% majority stake in Mappi

International. Mappi designs and manufactures equipment for glass tempering and laminating. The remaining 49% of Mappi's shares will remain with Nancy Mammaro, who, along with Ermanno Petitti, will continue to lead the company as president and CEO. This acquisition aims to further consolidate Voilàp Group's presence in the glass-processing machinery sector, complementing its investment in Keraglass.

Orgadata Acquired by Forterro

Software company Forterro acquired Orgadata. Under Forterro's umbrella, Orgadata will form a new division, Forterro Windows & Doors, headquartered in Leer, Germany. With its size, expertise and established processes, Forterro is positioned to complement Orgadata's strengths and drive innovation. At the same time, Orgadata provides Forterro with a gateway into the windows, doors and curtain wall sector, expanding Forterro's portfolio beyond ERP and production solutions.

Orchard Lock Distributors Acquired by Lockmasters

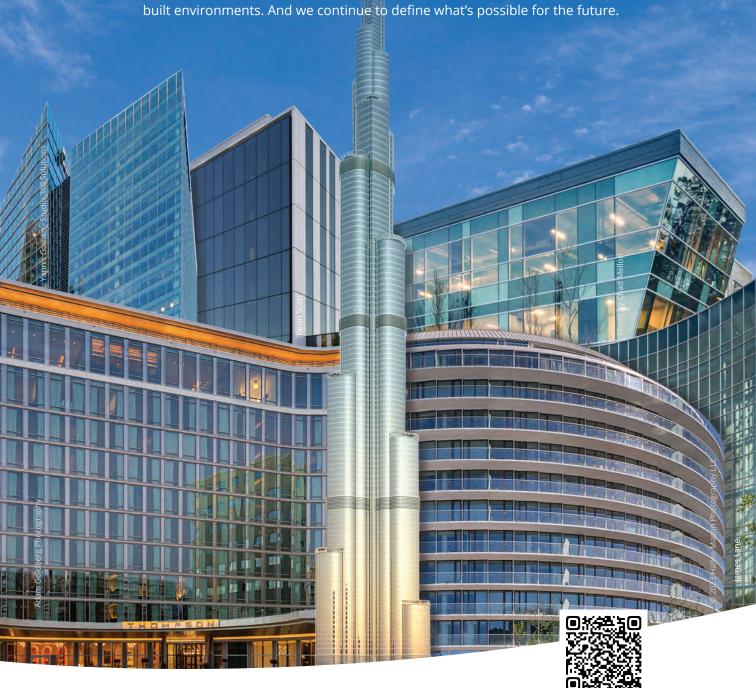
Orchard Lock Distributors recently joined the Lockmasters Inc. family under the JLM Wholesale Division. This new union allows Lockmasters to continue expanding its glass and glazing business and give it a location in the Northeast.

For over 50 years, Connecticut—based Orchard Lock has been a full-line wholesale distributor of architectural and commercial door hardware and security products. JLM Wholesale, with locations in Michigan, North Carolina

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Maryland, is a multifaceted organization
that provides the commercial and
government sectors with solutions,
products and technical support through
education, tool and product innovation,
and multiple distribution centers.

Victory Body Truck Expands with New Facility

To support the growth of the MyGlassTruck division, Victory Truck Body Inc., formerly Demountable Concepts, is building a new 65,000-square-foot manufacturing facility in Glassboro, New Jersey. This addition, located alongside its current 50,000-square-foot facility, more than doubles the company's total manufacturing space to 115,000 square feet. The company plans to move into the completed facility by June 2025.

This building will increase MyGlassTruck's efficiency by consolidating its assembly processes into manufacturing cells focused solely on each division and function. The facility will include a multi-truck-sized downdraft paint booth and overhead cranes, complementing the robotic and human welding capabilities, CNC laser cutter and advanced aluminum fabrication and assembly techniques utilized in the current building.

Great Lakes Lifting Solutions Opens Woods Powr-Grip Repair Center

Great Lakes Lifting Solutions announced the launch of its newest division: the Woods Powr-Grip Repair Center, the only authorized repair facility outside of WPG's headquarters in Montana.

This expansion aims to enhance GLLS's commitment to the commercial glazing and glass fabrication industries, providing a repair service for vacuum lifters while reducing costs and turnaround times for customers. Since adding the Woods Powr-Grip product line, Great Lakes Lifting says it has built a strong relationship with the Woods family and their team. Recognizing a growing market need, GLLS is investing in a fully equipped repair center at its Peotone, Il-

linois, facility, capable of servicing 40-50 lifters per month. The goal is to provide customers, particularly in the Midwest and East Coast, with a faster, more cost-effective alternative to shipping equipment long distances for repairs.

PEOPLE



Stattler

Bendheim announced Peter Stattler as director of sales for Bendheim Wall Systems Inc. With Stattler on its team, Bendheim continues

expanding its wall systems portfolio and presence. Stattler brings 25 years of experience and leadership in the glass industry, including serving as vice president of sales and marketing for a New York-based insulating glass manufacturer and as manager of sales and market development for a German-based glass company.



Yee

Infinite Recycled
Technologies welcomed
Stanley Yee as its new
vice president for
sustainability and
technical Initiatives.

In his new role, Yee will lead technical initiatives to advance high-performance glass and glazing systems, reduce construction waste, and improve the built environment. Yee brings extensive experience as a curtain wall contractor, façade consultant and material science scientist.



Alpen High
Performance Products
added fenestration
industry innovation
specialist James
Satterwhite as its new

vice president and general manager of AlpenGlass. Satterwhite will help lead the company's insulating, thin-glass-focused manufacturing processes after spending nearly a decade serving as the CEO of Advanced Glazings Ltd., a Canadian company creating light-diffusion glass products. ■

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INSIGHTS

20. YOUR PROFITS: FINANCE 26. YOUR PROFITS: MARKETING 30. FACTORY FLOOR

YOUR PROFITS: FINANCE

MANAGING YOUR BUSINESS **FOR LONG-TERM** FIVE BUSINESS INSIGHTS, BASED ON COMMON SENSE, WITH NO EXPIRATION DATE BY MARCO TERRY

want to share five business insights that made an important difference in the trajectory of my business career. These lessons are based on common sense. They apply to most areas of your business life and have no expiration date. They will be as valuable in 20 years as they are today.

01

The five P's

If you remember one thing about this article, it should be the five P's: "Proper Preparation Prevents Poor Performance." It took me a long time to learn this rule's true value, and I paid dearly for it. Having outstanding performance is never easy. We may think that "great performers" simply have natural ability. Some do, but the majority are just like the rest of us. The main difference is that they spend time preparing. In fact, they are so well prepared that their performance looks effortless.

ACTION ITEM: There is no secret or shortcut here; just hard work. Encourage your team to develop the habit of preparing for everything—meetings, presentations, customer jobs, boss's assignments, etc. You will get the best results by cultivating this approach as part of your team culture. It will take effort, but it will pay off. In my experience, the best way to accomplish this is through encouragement and example.



TRANSFORMING SPACES WITH ARTISTIC GLASS SOLUTIONS

GGI's expertise in direct-to-glass printing brought artist Julie Richey's project design to life in this distinctive and functional custom shower enclosure. Utilizing Alice® GEN 3.0 Direct-to-Glass Printing, the design perfectly balances privacy and visual impact through a precisely calibrated opacity level. The Aspen Burn artwork was digitally applied to 10mm Diamant® low-iron glass and accented with polished stainless steel hardware. The interplay of winter snow and charred trees forms a bold, abstract composition, transforming the space into a work of art. This project highlights the depth of GGI's craftsmanship, where innovation and artistry converge seamlessly. Built on Legacy. Driven by Innovation.



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Aspen Burn Residential Bath Design

PROJECT DESIGN & ARTIST Julie Richey Mosaics

FINE ART PHOTOGRAPHY Jeff Baker

GLAZING CONTRACTOR Villatoro Glass

LOCATION Dallas, TX

PHOTOGRAPHY Hunter Collins



02

Recessions happen regularly and are largely unpredictable

The possibility of a downturn or even a full-fledged recession is an ever-present concern for companies. Experience shows that recessions occur regularly and are unpredictable. Otherwise, the government would always take steps to prevent them. No one knows when a recession will occur, what will cause it, or how long it will last. The only thing we know for sure is that a recession will happen sooner or later. By the time it's on the papers, it's too late to prepare.

ACTION ITEM: The best option is always to be prepared. Keep an adequate cash reserve and manage costs carefully. For example, my company's cash reserve is substantially larger than what is recommended. Having a large cash reserve decreases short-term

opportunities but increases our chances of surviving a recession.

03

Do the boring work consistently and well

Even the most interesting job comes with many boring tasks that we must do. Team members often perform these tasks grudgingly. This so-called mundane work doesn't bring praise from managers. However, it is essential to the success of your company. Examples include preparing reports, managing schedules, collecting invoices, scheduling projects, paying suppliers, running payroll, etc.

ACTION ITEM: Your team members must understand that this work is important and fundamental to the company's operations. Additionally, I take the extra step of praising

employees who do routine but essential work for the company. They are often the backbone that keeps things running smoothly. Everyone must find a way to handle tedious, routine tasks. My approach is to spread routine tasks throughout the day. Mixing tedious stuff and interesting work allows me to keep my focus sharp.

04

Beware of the (expensive) sunk cost fallacy

Recently, a sales team member was trying to land a major client. This account showed great potential. However, there was a catch. Sometimes the prospective client was very eager and acted quickly. At other times, they delayed decisions and did not return phone calls. A few months went by without completing the transaction.





I knew where this was going. I told the salesperson that it was time to drop the effort. Understandably, the salesperson complained, "Why waste all the effort? I have worked so much and for so long on this account."

This situation is a classic example of the sunk cost fallacy. The salesperson evaluated whether to continue the transaction based on how much effort they had already spent. However, the time spent in the past is a "sunk cost" that cannot be recovered. The better approach is to ask if it is worth spending additional resources to continue pursuing this prospective client. The answer was evident in this case. Any further effort made no sense, and it was time for the salesperson to move on to newer transactions.

ACTION ITEM: Employees and companies often waste substantial resources on projects that should be

canceled. There is no easy way to catch this problem since every situation differs. However, any project that does not yield results but is kept going "because we have already spent so much getting here" should be considered a strong candidate for cancellation.

05

Avoid unproductive meetings

Early in my management career, I spent five to six hours daily in meetings and calls. This left me only with a few hours per day to do actual work. Many colleagues have complained of the same problem. In hindsight, many of those calls and meetings were not needed. They could have been resolved more effectively by email or other means. Accordingly, I changed my approach to meetings. This simple step

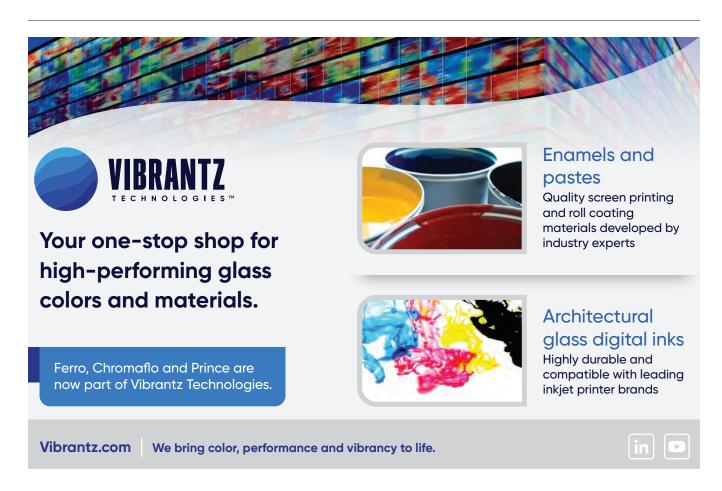
allowed me to reclaim a large part of my schedule and freed my time to focus on productive work.

ACTION ITEM: Anyone requesting a meeting or Zoom call has to send a summary (e.g., one paragraph) of what they want to discuss and accomplish. The obvious benefit of this step is that you can determine if the meeting is needed. Oftentimes, the issue can be resolved via email or a quick chat. In cases where you must meet, the information allows everyone to prepare for the meeting. Consequently, meetings are short and productive. ■



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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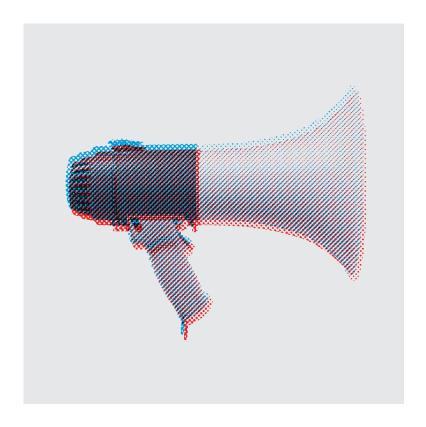
- Project Specific Building Integration Details
- 3rd Party Product Testing
- FEA Component Analysis
- Miami Dade NOA Certification
- ICC Report

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STANDING OUT IN THE MARKET

BRAND DIFFERENTIATION AND MARKETING TIPS FOR GLASS **FABRICATORS** BY STEFANIE COUCH

n today's competitive glass industry, being just another fabricator isn't going to cut it anymore. Let's get real about making your company the one everyone's talking about.

Make your company unforgettable

Stop playing it safe What makes your company incredible? Maybe you've got cutting-edge technology that leaves competitors in the dust. Or perhaps your team pulls off the impossible projects that others won't touch. Whatever it is, own it. Make it your battle cry. Your unique selling proposition isn't just a marketing term—it's your ticket to standing out in a crowded marketplace.

Know your audience...and rock their world

Different customers need different things from you. Architects want innovation. Show them how your glass can make their wildest designs come alive. Don't just tell them—blow their minds with possibilities they haven't even

IN 2025, SUPERIOR PRODUCTS ALONE DON'T GUARANTEE SUCCESS. THE COMPANIES THAT WIN AREN'T JUST MASTERS OF THEIR CRAFT-THEY'RE MASTERS OF MAKING THEMSELVES KNOWN.

imagined yet. Create visualization tools, sample kits and design guides that speak their language.

Contractors need reliability and speed. Be the company that never lets them down. When others are making excuses, you're making deadlines. Back this up with case studies showing your on-time delivery rates and problemsolving capabilities. And building owners want peace of mind. Give them numbers that make their accountants smile and performance that makes facility managers sleep easy at night. Provide detailed return on investment calculations, energy savings projections and lifetime value analyses.

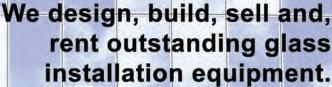
Share your genius

Don't keep your expertise locked in a vault. Create content that makes people stop scrolling with behind-thescenes videos of your most challenging installations, case studies that read like victory stories, technical blogs that showcase your expertise, educational content that positions you as the industry authority, project photos that make competitors jealous, and tips that make you look like a genius.

Own the digital space

Your online presence should hit like a glass truck. Make your website a showcase of innovation. Turn your LinkedIn into a masterclass in glass fabrication. When someone searches for glass expertise, they should find you everywhere they look. Create content that matters through project showcases that tell compelling stories of transformation, installation videos that prove your







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capabilities, and customer testimonials that build trust and credibility. Share technical insights that demonstrate your deep industry knowledge, interactive tools that help clients visualize possibilities, and regular updates that keep your brand top-of-mind.

Dominate industry events

Don't just attend trade shows—be the company everyone remembers. Host the demonstrations people line up to see. Give the presentations that change how people think about glass. Make your booth the one everyone's talking about. Consider these power moves:

- Host VIP events for key clients and prospects
- Conduct live demonstrations of innovative techniques
- Offer exclusive previews of new technologies
- Create memorable experiences that attendees will talk about

Leverage strategic partnerships

Build relationships that amplify your brand by partnering with complementary suppliers, collaborating with influential architects, joining forces with industry innovators, and creating alliance programs that benefit all parties.

Track your success

Keep score of what's working by monitoring website engagement and conversion rates, tracking lead sources and quality metrics, collecting and showcasing testimonials strategically, watching market trends and staying ahead of the curve. You should also be measuring brand awareness and perception, and analyzing competitor positioning and responses.

Recognize the game-changing truth

Here's the deal: Making great glass isn't enough anymore. You need to be memorable. Remarkable. The company that comes to mind first when someone

needs exceptional glass work. Think about it—Ferrari doesn't compete on price, they compete on being Ferrari. Be the Ferrari of glass fabrication. When you're known for excellence, price becomes secondary to value.

Start today. Pick one thing from this list and do it better than anyone else. Then do another. Before you know it, you won't be chasing customers, they'll be chasing you. And remember, the world is full of glass companies. But there's only one of you. Make that difference count. Make it impossible for customers to forget you. Because when you're the best at what you do, and everyone knows it, that's when the magic happens.



Stefanie Couch is a leader in the construction industry, heading Build Women and Grit Blueprint.



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THE POWER OF A STEADY HAND

IN AN ERA OF SIGNIFICANT CONSOLIDATION AND RATIONALIZATION, ECONOMIC UNCERTAINTIES, GEOPOLITICAL INSTABILITY AND OTHER CHALLENGES, ONGOING SUCCESS FOR COMMERCIAL GLASS FABRICATORS REQUIRES STABLE, RELIABLE PARTNERSHIPS BY JOE ERB

ate last year, Glass Magazine published its 2025 forecast, and it didn't pull any punches about the potential challenges that the commercial glass and glazing industry faces now and in the near future. From the piece:

The industry faces persistent difficulties in attracting and retaining talent, ongoing supply chain disruptions fueled by geopolitical tensions and global economic uncertainties, higher interest rates, economic uncertainty, inflationary pressures, and shifting regulatory hurdles in response to natural disasters and evolving building codes and environmental regulations.

The report isn't without optimism. Experts expect a continued increase in construction spending, with a more than \$10 billion jump in commercial construction starts. By the time you read this column, we'll be a few months deep into 2025, and I'm confident that our

industry will have begun to tackle the year as best we can to grow our collective success.

I think one of the most important parts of doing so is to develop and grow meaningful partnerships throughout the value chain. Amidst volatility, solid relationships between vendors, fabricators and glaziers are essential to capitalize on the potential of commercial construction this year. Let's explore a few reasons why.

An increasing need for scalability

Another trend in the wider fenestration space is a rising number of significant mergers, acquisitions and consolidations among companies. (And I speak from personal experience—Quanex recently completed its merger with Tyman and they are in the process of fully integrating this year.) There are a variety of implications here, but I'll focus on one of them: When a company grows larger, it needs ready access to more resources to effectively scale and meet its full potential.

That means you need vendors that can effectively meet your growing needs. Commercial glass fabricators may suddenly find themselves in need of higher volumes of insulating glass spacer, for example. If you've established a presence in the growing market for commercial vinyl options, you may find yourself requiring an influx of profiles. Fenestration sealants and hardware might be another area of need. No matter the need, you'll require a supplier partner who can match demand to meet your new growth potential.

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AMIDST VOLATILITY, SOLID
RELATIONSHIPS BETWEEN VENDORS,
FABRICATORS AND GLAZIERS ARE
ESSENTIAL TO CAPITALIZE ON
THE POTENTIAL OF COMMERCIAL
CONSTRUCTION THIS YEAR.

What's more, mergers often mean consolidation—of product lines, of operations and of vendor networks in some cases. Indeed, pursuit of simplicity is often a goal of increasingly large organizations. A vendor who has the ability to both scale and provide you with a wide variety of products through a single point of contact, for example, can help streamline your procurement processes and help you maximize efficiencies in meeting the demands of your customers.

A steady hand

Amidst market volatility, one thing can be invaluable for commercial glass fabricators: Predictability.

Supply chain disruptions have become increasingly commonplace in the years since the COVID-19 pandemic upended global trading and shipping, and the ripple effects are still being felt. And it's made the ability of your vendors to deliver on time one of the most important criteria in modern manufacturing. Success in today's commercial construction space requires that you have the materials you need to make high-performance glass systems when and where you need them. Your most trusted suppliers should be able to provide not just a quality product, but consistency and predictability that you can count on.

Volatility and unpredictability can also mean that your demands and needs may vary. Your supplier's ability to adapt and deliver based on what you need to grow your business is critical—and it's why scalability and stability go hand in hand.

Of course, even the most reliable supplier isn't immune to the whims of an unpredictable supply chain, and in such cases, order visibility and clear, two-way communication can be key. Open channels and clear expectations can be two lynchpins of a successful partnership.

Collaborative partnership can be a major difference-maker in today's commercial glass and glazing industry. To best predict success, it's worth evaluating your partner network and focusing on the relationships that drive real value for your business.



Joe Erb is national account manager for Quanex.

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The Richards
Boulevard Office
Complex in
Sacramento,
California.
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of Glassfab
Tempering
Services.

GREAT GLAZING: RICHARDS BOULEVARD OFFICE COMPLEX

A glass marvel

The Richards Boulevard Office Complex in Sacramento stands as a beacon of modern architectural excellence and environmental consciousness. This state-of-the-art facility, which features over 300,000 square feet of glass, exemplifies the seamless integration of aesthetics, functionality and sustainability. The sheer scale of glass used in the project required precise engineering and collaboration among architects, engineers and fabricators.

An architectural gem

The building's façade combines sleek lines and innovative glasswork, utilizing Solarban 72 VT on Starphire glass manufactured by Vitro Architectural Glass, creating a structure that is both visually striking and highly functional.

Low-emissivity coatings on the glass minimize heat transfer while maximizing natural light, reducing reliance on artificial lighting and further lowering the building's carbon footprint. Designed to achieve zero net energy and zero net carbon using state-purchased carbon-free green power, the building is also targeting LEED Gold certification from the U.S. Green Building Council. The glass panels provide a luminous exterior that captures Sacramento's abundant sunlight, making the building a standout feature of the city's skyline.

A hub for the community

The complex includes four office towers ranging from seven to 11 stories, accommodating approximately 5,200 workstations. Additional features include a seven-story parking garage, an auditorium for 300 people, a multipurpose center with conference rooms, and a childcare facility for 120 children. Beyond its architectural and environmental merits, the California state building serves as a hub for state employees and the broader Sacramento community. By leveraging advanced glazing technologies, it sets a precedent

for sustainable and energy-efficient design in large-scale projects, inspiring innovation and pushing industry standards forward. The abundant natural light fosters a healthier and more productive work environment, while the building's design encourages community engagement through open spaces and accessible features.

Conclusion

The Richards Boulevard Office Complex is more than a government facility; it's a testament to what modern architecture can achieve when design, sustainability and functionality converge. The building stands as a symbol of California's commitment to innovation and environmental stewardship, setting a benchmark for future state projects.

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A SOFTENING MARKET AND HIGHER COSTS THREATEN SALES FOR LEADING FABRICATORS BY
NORAH DICK
WITH
CONTRIBUTIONS
FROM RACHEL
VITELLO

THE LIST 38-50

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PRODUCT TRENDS 54-55

INVESTMENTS 56-58







op Glass Fabricators, and likely glass fabricators more broadly, are facing challenging times. Only 32% of reporting companies this year said they experienced higher sales in 2024, compared to 70% the previous year, a milestone in what has been a downward slope in year-over-year gains since 2022.

The number of reporting companies included in the Top Glass Fabricators report is not static and shifts from year to year. Even so, this statistic seems significant, especially given other pain points shared by fabricators, to be discussed at length on pages 52-53.

Perhaps in response to a tougher market, the industry consolidation noted in last year's report has continued. Trulite Glass & Aluminum Solutions acquired three fabricator companies within the last year, all of them longtime Top Glass Fabricators: American Insulated Glass, Insulite and Dependable Glass Works. Trulite, backed by private equity firm Truelink Capital, indicated in the announcement of Dependable's acquisition that the company was employing an "active M&A strategy focused on acquiring high-quality businesses that expand our geographic reach and enhance our product offering."

Top Glass Fabricator Glaz-Tech also acquired Tomakk Glass Partners, a fabricator based in Shreveport, Louisiana, which allows the West Coast-based Glaz-Tech to expand its market reach in the Southeast and broaden its product mix, including energy-efficient glass products.

After a year of uncertainty in markets and elections, companies also saw the costs of raw materials increase in August from major float manufacturers, the timing of which surprised several fabricators, as reported in Glass Magazine. According to non-seasonally adjusted data pulled at the time of this writing from the Producer Price Index, costs for flat glass rose 2.9% from August 2024 to September of the same year. Overall, costs for flat glass rose 3.3% from the end of 2023 to the end of 2024, based on non-seasonally adjusted data pulled in February of this year.

Increased prices have not aided the slowing market, and inflation rates are likely to continue rising if and when the business cycle picks up again, according to Connor Lokar of ITR Economics, who presented at last year's GlassBuild. "We're projecting inflation will be back at 3% to 5% as we move through the rest of the 2020s. ... [Glass industry companies] need to make a plan in their business with how they're going to deal with higher inflation and interest rates," Lokar says.

Responses from this year's survey respondents note the difficult position of trying to grow their business during softening demand, all while costs increase. "The market slowed, yet prices for raw materials, equipment, etc., all increased and are continuing to increase," says Max Fisher, vice president, Eastern Glass Resources.

The end of 2024 and the beginning of 2025 have seen a higher-than-average amount of closures across the glass industry, including Top Glass Fabricator Oldcastle BuildingEnvelope, which closed a Los-Angeles area facility at the end of December 2024. Vetrotech North America, a specialty glass fabricator, also ended North American operations at the start of 2025.

The market insights for this report are compiled from survey responses completed by Top Glass Fabricators. For more information about the growth of the fabricated glass market, and the headwinds fabricators have faced and will continue to face go to page 52. To learn more about how leading fabricators are investing in their facilities and futures, go to pages 56-58. And to learn about product trends and further development in the fabricated glass segment, see pages 54-55.



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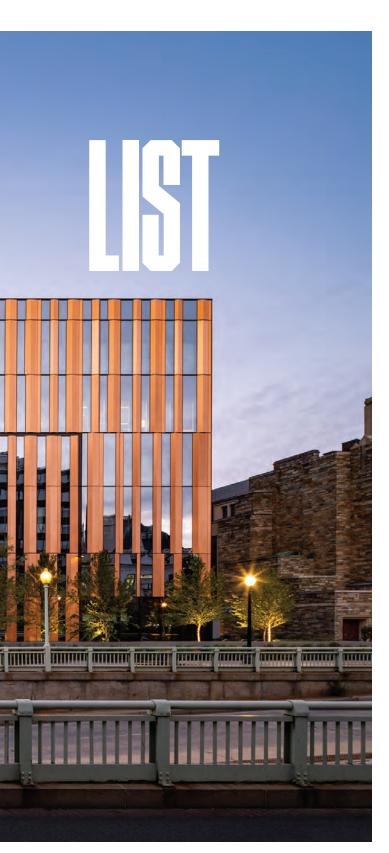
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The 59 companies on this list represent some of the leading fabricators in North America. If you feel that your company belongs on this list, please contact Associate Editor, Rachel Vitello. It is only with continued industry cooperation that we can compile the Top Glass Fabricators report

For more information about the North American fabrication market, see our updated fabricator map on glass.org/world-glass-map, which now also includes recycled glass locations.



500 MILLION - 1 BILLION+

01

Oldcastle BuildingEnvelope

obe.com Dallas, TX Plants: 83 Employees: 6,400

02

Tecnoglass

tecnoglass.com Miami, FL Plants: 1 Employees: 9,000

03

Trulite Glass & Aluminum Solutions

trulite.com Alpharetta, GA Plants: 26

Employees: 2,500+

100-500 MILLION

04

Viracon LLC

viracon.com Owatonna, MN Plants: 1 Employees: 1,500

05

Hartung Glass Industries

hartung-glass.com Tukwila, WA Plants: 8 Employees: 900

06/07/08

Prelco Inc.

prelco.ca Rivière-du-Loup, QC, Canada Plants: 3 Employees: 650

06/07/08

Glasswerks LA Inc.

glasswerks.com South Gate, CA Plants: 5 Employees: 600

06/07/08

HMI Glass

hmiglass.com Louisville, KY Plants: 2 Employees: 450

09

Aldora Glass

aldoraglass.com Coral Springs, FL Plants: 7 Employees: 525

10/11/12

Basco Shower Door

bascoshowerdoor.com Mason, OH Plants: 4 Employees: 500

10/11/12

Vitrum Glass Group

vitrum.ca Langley, BC, Canada Plants: 2 Employees: 400

10/11/12

PRL Glass Systems Inc.

priglass.com City of Industry, CA Plants: 3 Employees: 500

13

Glassfab Tempering Services

glassfabusa.com Tracy, CA Plants: 5 Employees: 325

50-100 MILLION

14

Tristar Glass Inc.

tristarglass.com Catoosa, OK Plants: 3 Employees: 225

15

Grupo Tecnovidrio

grupotecnovidrio.com Mexico City, Mexico Plants: 5 Employees: 1,200

16/17

GGI - General Glass

International

generalglass.com Secaucas, NJ Plants: 1 Employees: 200

16/17

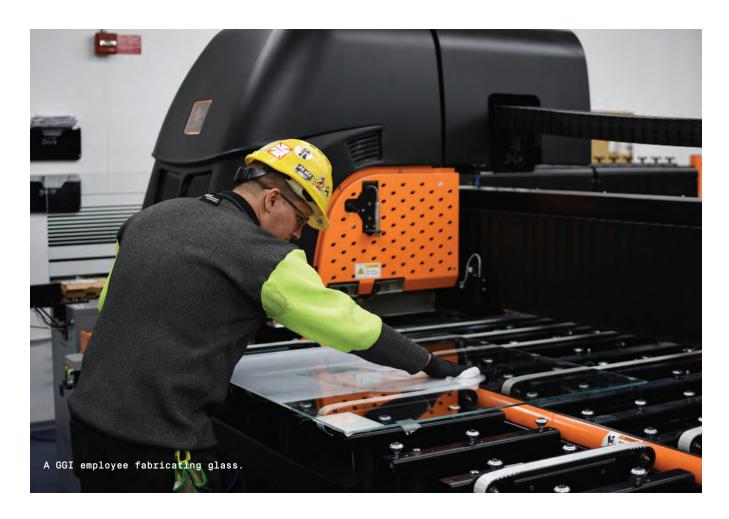
Safti First

safti.com Brisbane, CA Plants: 4 Employees: 350





The List



18

Press Glass Inc.

pressglass.us Ridgeway, VA Plants: 1 Employees: 450

19

AGNORA

agnora.com Collingwood, ON, Canada Plants: 2 Employees: 146

20

Garibaldi Glass Industries Inc.

garibaldiglass.com Burnaby, BC, Canada Plants: 1 Employees: 242

21/22/23

Millet Glass Industry

milletglass.com Conkal, Yucatan, Mexico Plants: 1 Employees: 800

21/22/23

Tvitec | Cricursa

tvitecglass.com, cricursa.com Cubillos del Sil, Spain Plants: 9 Employees: 800

21/22/23

Clarus

clarus.com Fort Worth, TX Plants: 1 Employees: 200

30-50 MILLION

24

Glaz-Tech Industries Inc.

glaztech.com Tucson, AZ Plants: 9 Employees: 270

25

Dallas Flat Glass Distributors

dallasflatglass.com Carrollton, TX Plants: 2 Employees: 194



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The List

26

Splendor Glass

splendorglass.com Holland, OH Plants: 1 Employees: 128

27

Goldray Glass

goldrayglass.com Calgary, AB, Canada Plants: 1 Employees: 75

28

Insulite Glass Co.

insuliteglass.com Olathe, KS Plants: 2 Employees: 180

29

Glass and Metal Craft

glassandmetalcraft.com Wixom, MI Plants: 2 Employees: 140

30

Paragon Tempered Glass LLC

paragontemperedglass.com Antwerp, OH Plants: 2 Employees: 140

31

Dillmeier Glass Co.

dillmeierglass.com Van Buren, AR Plants: 2 Employees: 145 32

Standard Bent Glass

10-30 MILLION

standardbent.com East Butler, PA Plants: 2 Employees: 90 33

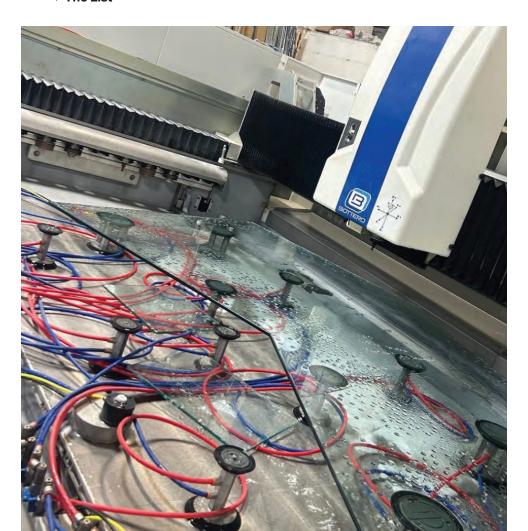
Machinery at the manufacturing facility of Vivid Glass & Mirrors Inc

M3 Glass Technologies

m3glass.com Irving, TX Plants: 2 Employees: 100 34/35/36/37

Cristacurva

cristacurva.com Houston, TX Plants: 2 Employees: 250





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Sizes: Up to 60" x 96"

Thickness: Varies by

threat level



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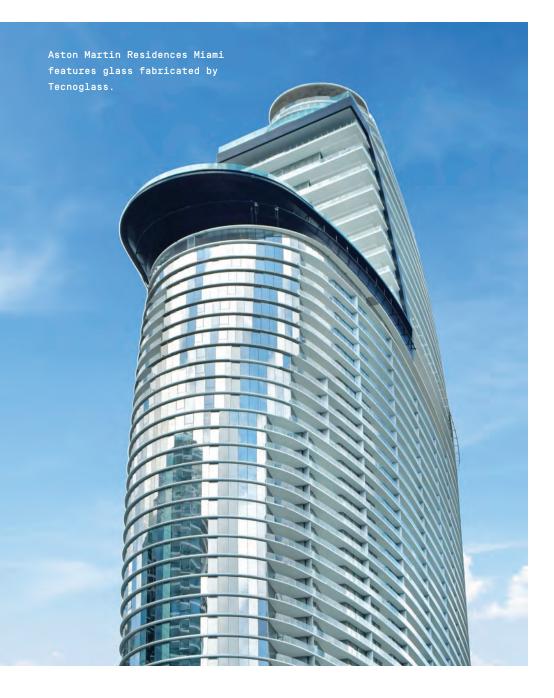
ALL GLASS & METAL PRODUCTS ARE DESIGNED/ ENGINEERED & MANUFACTURED IN HOUSE



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The List



38

Thermalsun Glass Products Inc.

thermalsun.com Santa Rosa, CA Plants: 1 Employees: 50

39

Northwestern Glass Fab

nwglassfab.com Fridley, MN Plants: 1 Employees: 55

40

Maryland Glass & Mirror

marylandglass.com Baltimore, MD Plants: 1 Employees: 55

41/42/43/44

Skyline Design

skyline.glass Chicago, IL Plants: 1 Employees: 65

34/35/36/37

W.A. Wilson Glass wawilsonglass.com Wheeling, WV Plants: 3 Employees: 100 34/35/36/37

Southern Wholesale Glass southernwholesale.glass Americus, GA Plants: 1 Employees: 180 34/35/36/37

Control Glass Acustico & Solar SL

controlglassusa.com Teruel, Aragon, Spain Plants: 4 Employees: 150 41/42/43/44

Quality Glass and Mirror Service LLC

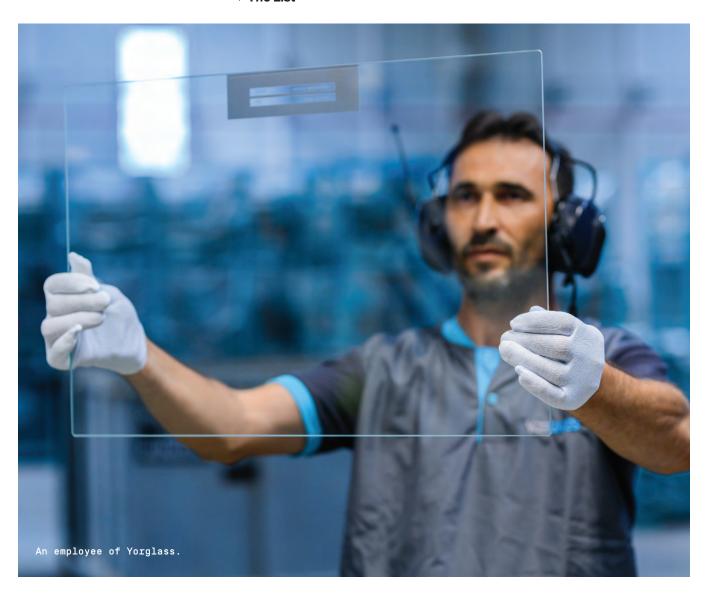
qualglass.com Omaha, NE Plants: 1 Employees: 60

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Upgradeable - No Costly Replacements
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ric.schimdt@viprotron.com

The List



41/42/43/44

Over the Mountain Glass

otmglass.com Bessemer, AL Plants: 2 Employees: 50

41/42/43/44

Flat Glass Distributors

flatglassdistributors.com Jacksonville, FL Plants: 1 Employees: 65 45/46

AGF Glass Inc.

agfglass.com Springfield, MO Plants: 1 Employees: 78

45/46

Tecesa

tecesa.com.mx Irapuato, Guanajuato, Mexico Plants: 1 Employees: 200 47

Consolidated Glass Corp.

cgcglass.com New Castle, PA Plants: 1 Employees: 801

48

Eastern Glass Resources Inc.

eglassr.com Harrison, NJ Plants: 1 Employees: 70 49

Kensington Glass

kensingtonglass.com Ijamsville, MD Plants: 2 Employees: 60

50/51

InKan Ltd.

inkan.ca
Brampton, ON, Canada
Plants: 2
Employees: 60



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The List



54

D&W Inc.

dwmirrorglass.com Elkhart, IN Plants: 1 Employees: 55

55

Dundy Glass & Mirror Corp.

dundyglass.com Springfield Gardens, NY Plants: 2 Employees: 18

56/57/58/59

Yorglass

yorglass.com Istanbul, Turkey Plants: 6 Employees: 500

56/57/58/59

FG Glass Industries Pvt Ltd.

fgglass.com Mumbai, Maharashtra, India Plants: 2 Employees: 600

56/57/58/59

Vitralum Glass Solutions

vitralum.glass Altamonte Springs, FL Plants: 1 Employees: 32

56/57/58/59

Vivid Glass & Mirrors Inc.

vividglass.net Mississauga, ON, Canada Plants: 1 Employees: 11

UNDER 10 MILLION

50/51

Precision Glass Bending Corp.

e-bentglass.com Greenwood, AR Plants: 1 Employees: 75

52

Adriatic Glass & Mirrors Ltd.

adriaticglass.com Concord, ON, Canada Plants: 1 Employees: 50

53

Privacy Glass Solutions

privacyglasssolutions.com Coral Springs, FL Plants: 1 Employees: 51



Brooklyn, NY

ulp Studio collaborated with Public Art for Public Schools (PAPS) to create a colorful mural for the Pacific Park Campus in Brooklyn. PAPS, the nation's only public art program for schools, creates custom art projects to enhance learning environments. The artworks serve as educational resources, sparking imagination and inspiration in students.

The text states "REMEMBER WHEN TOMORROW CAME" in 170 different languages spoken in New York City. This invigorating phrase promises hope for students in the pivotal, transformative time of middle school. The New York-based artistic collaborative Ghost of a Dream, chose this phrase to showcase New York's linguistic diversity, displaying a global perspective to students and inspiring them to chase the infinite possibilities in the world.

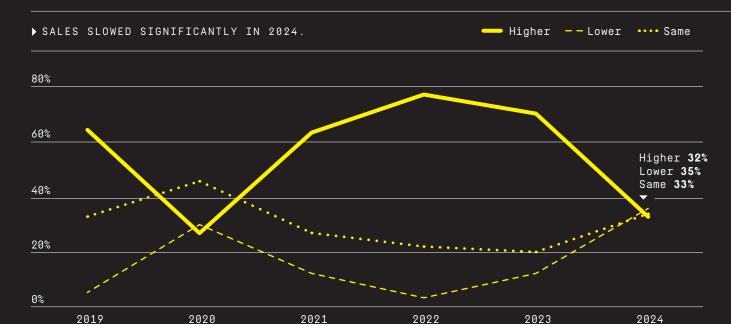
To bring this energetic mural to life, Pulp Studio used tempered laminated glass 1/4" low iron with coating on #1 surface over 1/4" low iron and an opaque graphic interlayer. To create the vibrant colors of this mural, Pulp Studio used PGI™, which is a photographic process that creates the substrate used in a laminated glass product. PGI™ is best used when the graphic design demands photographic quality. Additionally, this project utilizes Pulp Studio's Precision Edge®, which complements designs by providing a high-quality, zero-tolerance finish, ensuring that any of the exposed edges meet the same high standards as the artwork itself.

Commissioner: NYC Department of Education, NYC School Construction Authority Public Art for Public Schools program, in collaboration with NYC Department of Cultural Affairs Percent for Art program Artist: Ghost of a Dream Photographer: Samuel Morgan Photography



2100 W. 139th St. Gardena, California 90249 Tel: 310-815-4999 Fax: 310-815-4990 Email: sales@pulpstudio.com

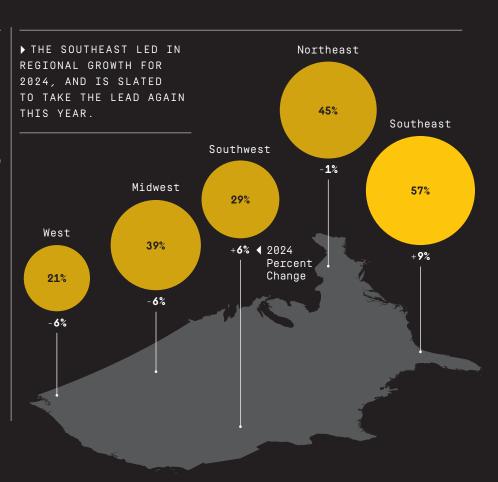
SALES



▶ Growth slowed significantly in 2024 based on leading fabricator survey responses. Only 32% of reporting companies said they experienced higher gross sales in 2024, compared to 70% in last year's report. Perhaps more importantly, the number of fabricators reporting lower year-over-year sales increased by over 20 percentage points this year.

The last time fabricators reported growth this slow was, predictably, in 2020 during the beginning of the pandemic. In the last five years, it was the only other time that more companies reported lower year-over-year sales, 29%, than reported higher year-over-year sales, 26%. Since then, sales growth has recovered to a peak in 2022, when 77% of fabricators reported growing sales.

During market turbulence, statistics can fail to capture the range of challenges that some in the industry face, and the responses from leading fabricators suggest that they're facing several difficulties. While the



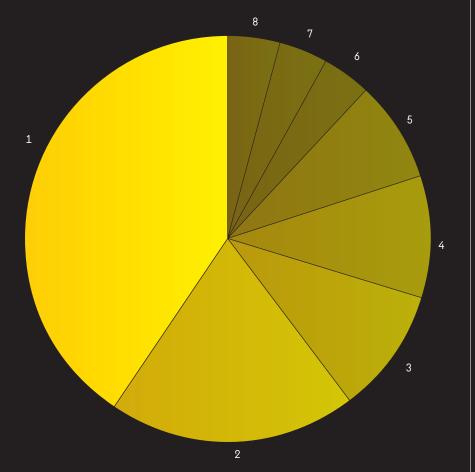
THE TOP GLASS FABRICATORS

AND CHALLENGES

▶ IN 2024, INFLATION REMAINED A MAJOR CONCERN.

- 1. Inflation 41%
- 2. Other* 20%
- 3. Logistics/trucking 10%
- 4. Supply chain 10%
- 5. New codes and standards 8%
- 6. Procuring raw glass 4%
- 7. Getting hardware 4%
- 8. Material shortage 4%

*interest rates, undercutting on pricing, unfair competition, lower sales, market uncertainty



► LAST YEAR, 26% OF COMPANIES ADDED SHIFTS, AND 19% REDUCED SHIFTS. numbers suggest that inflation may have eased somewhat, fabricator responses suggest it's still the top concern but compounded by a range of other challenges.

"Inflation is causing rising costs of labor and everything while the fabricated glass market has remained flat or declined," says Aaron Day, CEO, AGF Glass.

The unpredictability of costs has made pricing difficult for some fabricators. "Prices have fluctuated so much, and for someone like us who quotes so far in advance it is very difficult to price and hold that price," says Kevin Roth, CEO, Privacy Glass Solutions.

As costs rise, a plurality of fabricators also report increasing customer expectations for performance and more. "More and higher certifications are being demanded by clients. This requires a lot of resources to be dedicated to every new certification incurred," says Alejandro Monfort Bernal, export manager, Control Glass Acústico & Solar SL.

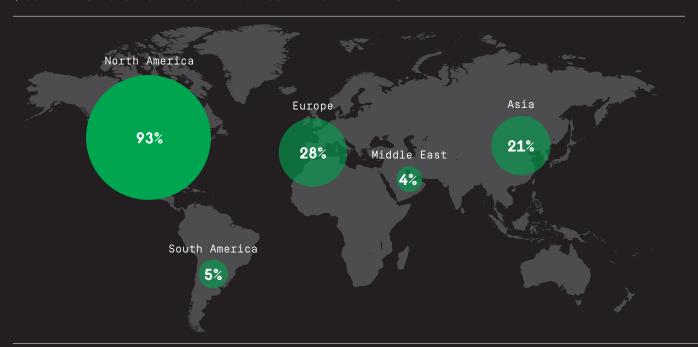
"Customer expectations are increasing when it comes to anisotropy, iridescence, rollerwave distortion, bow and warp," says Sunny Mhay, marketing manager, Glassfab Tempering Services. "ASTM standards are not good enough for our customers—they all want enhanced quality control programs."

Another indicator of a slowing market, the number of fabricating companies reporting that they reduced shifts this last year doubled from the previous year's report.

In terms of regional growth, the Northeast is still at the top, narrowly edged out by the Southeast this year, fulfilling predictions from last year's report that these two regions would see the most growth. Moving into the new year, companies again predicted growth for the Southeast.

PRODUCT TRENDS

▶ COMPANIES PURCHASED MOST RAW GLASS IN NORTH AMERICA.



▶ FABRICATED GLASS CAPABILITIES, BY TYPE.

Tempered glass	98%
Decorative glass	86%
Laminated glass	79%
Shower enclosures	78%
Insulating glass	75%
Mirror	67%
High-performance	56%
Spandrel	56%
Jumbo glass	56%
Bird-friendly	54%
Digitally printed	54%
Protective	49%
Other	40%
Bullet-resistant	35%
Ballistic glazing	25%
Curved	21%
Dynamic	11%
VIG	0%

▶ DESIGN TRENDS IN 2024.

Security glass/impact systems	69%
Bird-friendly	65%
Energy-efficient glass	52%
•	48%
More jumbo glass	44%
Decorative glass	26%
Division 10 interiors	19%
Dynamic glass [switchable]	7%
Biophilic design	4%
Anti-viral/anti-bacterial coatings	4%
Transparent PV	
	4%
Other*	4%

*fire-rated glass, asymmetrical, decorative glass designs

▶ RETROFIT RATES DECREASED YEAR-OVER-YEAR.

<25% of business 25-50% 50-100% is retrofit

36% 34% 12%

▶ Fabricators continue to manufacture glass for all needs and aesthetics. Rates of fabrication for the four main glass types—tempered, decorative, laminated and insulating glass—remained relatively stable, with a 12% uptick in decorative and a 7% decrease in laminated.

This year's survey solicited information on several new glass types, finding that a significant majority, 75% of respondents, fabricate shower enclosures, 54% fabricate mirror, 54% fabricate digitally printed glass, and 56% manufacture spandrel glass.

While slightly more companies noted that bird-friendly glass continues to be a design trend in installed glass—65% of this year's respondents compared to 68% the previous year—there was a fairly significant decrease in the number of companies that say they manufacture it, 54% in this survey versus 72% in 2024's report.

Companies again predicted that jumbo glass sizes will continue to grow in 2025, with 83% predicting larger sizes. The number of companies actually manufacturing what they consider jumbo glass remains flat year over year, at 56%. Without a standard definition of jumbo glass, it remains difficult to exactly gauge how sizes are increasing.

This year's survey drilled down into rates of protective glazing manufacturing, finding that over a third of respondents manufacture bullet-resistant glazing, and a quarter fabricate ballistic glazing. About the same number of respondents in this year's survey also said security glass and impact systems were a trend in installed systems this year, 69% compared to 67% in last year's report.

There was a decrease in the percentage of companies that say they do retrofit work this year. Last year, 62% of companies said retrofit comprised 25% or more of their work, compared to 46% this year. Given the softer market, it will be an important indicator to track for next year's report.

THE TOP GLASS FABRICATORS

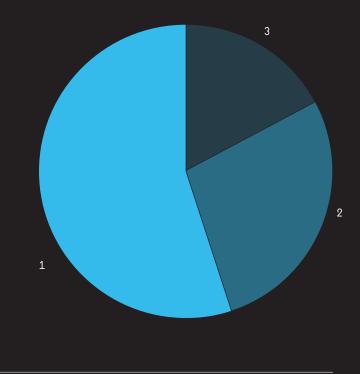
INVESTMENTS

▶ ABOUT THE SAME NUMBER OF FABRICATORS AUTOMATED SOME PART OF THEIR MANUFACTURING PROCESS, YEAR OVER YEAR.

- 1. Automated 55%
- 2. Did not 45%

▶ AND THE SAME NUMBER PLAN TO AUTOMATE IN 2025.

- 1. Will automate 55%
- 2. Will not 28%
- 3. Will not, but would like to 17%



▶ Companies continue to plan for growth and for a more robust market to come.

More 2025 survey respondents than last year's report said they increased capacity by adding new locations and new product lines; in both areas, the number of companies that said they added capacity in 2024 increased 10 points year over year.

Fewer companies in 2024 invested in capital equipment year over year—77% compared to 85% in the previous year's

report. Still, about the same number of fabricators said they automated some part of their manufacturing process, and 55% plan to automate in the coming year. Almost the exact number of 2024 respondents that said they would invest in capital equipment did so this past year—77% of fabricator respondents in this year's report said they invested in capital equipment.

Seventy-six percent of companies plan to invest again in capital equipment in the

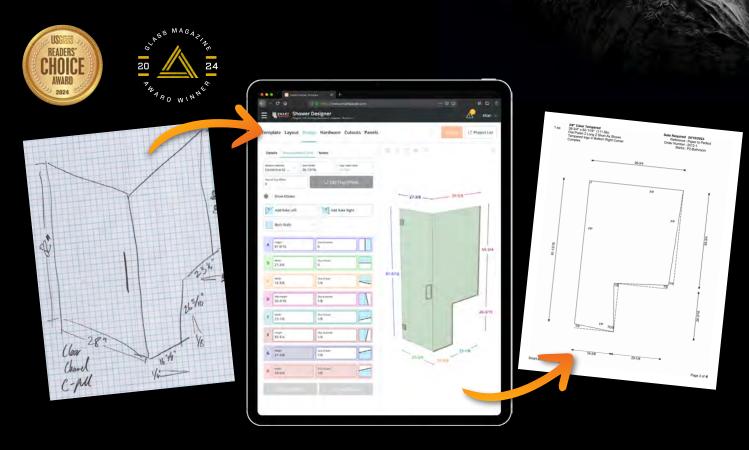
coming year, a fairly flat year-over-year increase, and 58% plan to launch new product lines in the coming year.

Outside of equipment, companies also invested in their workforce. Last year, 27% of companies said they plan to invest in a training program, and 22% of this year's respondents again said that they plan to do so in 2025.

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INVESTMENTS

CAPACITY THAT FABRICATORS ADDED.

Capital equipment 77%
Launched new product lines 55%
Added locations 18%
Made acquisitions 11%
None 11%
Investments on hold 2%

EXPANSION AND INVESTMENT PLANS FOR 2025.

Capital equipment	76%	
New product lines	58%	
Training program	22%	
Add locations	16%	
Make acquisitions	15%	
Other*	9%	
None for now	5%	*adding software, facility
On hold	4%	expansion, improving marketing



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Glazier - Pacoima, California





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GONZALO RAYA

Glazier - Miami, Florida





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COMMERCIAL OFFICE BUILDING IN HOUSTON, TEXAS, DAMAGED BY STRONG WINDS.



THE IMPORTANCE OF

PRODUCTS

When hurricanes storm through communities, they can ravage and destroy buildings, homes, businesses and other property. Hurricane impact-rated systems are one way to help alleviate and prevent this destruction.

Hurricane impact-rated systems refer to glass and fenestration products that are specifically designed and tested to withstand the high winds and flying debris associated with hurricanes. These systems are especially important in areas prone to hurricanes, like coastal regions in the United States.

Hurricanes Milton and Helene were two such hurricanes that caused widespread damage across the southern United States in the fall of 2024. Hurricane Helene, a Category 4 storm, caused economic losses estimated at 250 billion, while Hurricane Milton's estimate is around 50 billion, according to The Harvard Gazette.

"Extreme weather events increasingly pose significant threats to human health, infrastructure and economic stability across North America. The devastation from hurricanes and tornados has led to a staggering loss of life, homes and livelihoods, particularly affecting vulnerable coastal states," says Jennifer Brereton, vice president, marketing and customer service, Binswanger Glass.

"In these regions, windows, doors, skylights and façades need to survive the storm without having the external surfaces of the building breached. Wind-borne debris often wildly flies about, impacting the buildings," says Brereton.

"IMPACT-RATED PRODUCTS
ARE CRUCIAL FOR SAFETY AND
PROTECTION, AS THEY CAN
WITHSTAND STRONG IMPACTS
FROM STORMS OR BREAKINS, MINIMIZING THE RISK
OF INJURIES AND PROPERTY
DAMAGE"

THE IMPORTANCE OF IMPACT-RATED PRODUCTS

Hurricanes and other extreme weather events can have a devastating effect on homes, even if only one system is damaged. "Impact-resistant products are essential for protecting from rapid internal pressurization," says Dean Ruark, vice president, engineering and innovation, PGT Innovations. "If a single window or door fails during a storm, it can create intense pressure on the building's roof and walls, often leading to catastrophic structural failure."

Looking back at the 2024 hurricane season in the U.S., it was particularly active, with warmer waters causing rapid intensification of storms. The impacts of climate change are also increasingly apparent. According to the National Center for Environmental Information, there is a 59% chance that 2024 will rank as the warmest year on record.

"Impact-rated products are crucial for safety and protection, as they can withstand strong impacts from storms or break-ins, minimizing the risk of injuries and property damage," says Gendy Samaan, general manager, Binswanger Glass.

One real-life example of the importance of impact-rated systems is when a strong storm hit the Houston area in May of 2024. Binswanger's Houston Metro Branch Manager Steven Schrant received an emergency call from the owner of a high-rise office building about severe damage from a violent storm. The building did not

have impacted-rated systems in place. If it had, the damage could have been preventable.

"The rain was blowing sideways, and the power was out across the city," says Schrant

Schrant gathered his gear and put out a call to the entire Houston team to ask for help. The team arrived on-site during the storm. They devised a safety plan, met with the superintendent, assessed the situation, determined next steps, and were eventually released after midnight.

"One of our core values at Binswanger Glass is to always 'Do what's right for the customer, period," adds Schrant. "This was put into action when our customer faced an emergency and needed our help."

THE FUTURE OF IMPACT-RATED PRODUCTS AND THE INDUSTRY AT LARGE

Josh Jensen, president of YKK AP's residential business group, says that these more frequent weather events often cause building codes to be reviewed and modified, which drives changes to product development and design.

Jensen says that when it comes to impact-rated systems, customers have been asking for larger window lites, a bolder aesthetic and energy efficiency. "These trends will likely remain; however, we will likely see higher demand for hurricane-resistant windows and doors in coastal areas, particularly Florida," says Jensen.

In Florida specifically, Ruark says that many new Floridians are less familiar with

hurricanes, which has driven a surge in demand for impact-resistant products.

"Currently, most of the conversation centers on designing for surge and wave action, as recent hurricanes have been predominantly surge-related. However, when we see wind-driven storms like Hurricane Andrew in 1992—or more recently, Hurricane Dorian in 2019—that bring significant debris impacts to structures, the focus traditionally shifts to improving impact-resistant products and standards. Both surge and wind resilience will likely shape future industry standards and building codes," says Ruark.

When it comes to what customers are asking of their hurricane impact-rated products and what the trends are for these products, experts say that is heavily driven by building code requirements.

Ruark says that the Florida Building Code is proving effective, where homes built to recent codes are withstanding the barrage of hurricanes that have made landfall in Florida in 2024. He says that PGT Innovations is exploring "code-plus" options, such as those in the Insurance Institute for Business & Home Safety's Fortified Program, which prepares buildings for even more severe wind events than what the current codes mandate.

"New products and companies are entering the hurricane-impact industry, introducing more suppliers and enhancing efficiency. This is strengthening the supply chain, adding new choices and reducing lead times, which benefits architects, glass manufacturers and building owners alike," says Brereton. "The growing frequency of natural disasters calls for a proactive approach to enhancing building safety and resilience. Storm impact-rated glazing provides a dependable solution for safeguarding lives and properties against the severe effects of extreme weather conditions."

Binswanger's Samaan says that moving forward, the industry should focus on developing more resilient products, enhancing existing systems for extreme weather resistance, and proactively educating customers about the benefits of impact-rated solutions.



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PRODUCTS



The E-D 101 Vertical Machining Center from HHH Equipment Resources and premium CNC tooling from Salem Fabrication Supplies.



KEY FEATURES

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Twin-head technology for efficiency and flexibility

Long life with minimal maintenance required

Tooling with unbeatable performance in high-production environments

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HHH Equipment Resources, SFTG's machinery division, offers the reliable E-D 101 Vertical Machining Center from Skill Glass—an 8-axis CNC designed for drilling, milling, grinding and polishing with exceptional precision and speed. Its twin-head system processes glass

simultaneously, delivering a finished product in one step. Featuring a vibration-free drill machining center and heavy-duty electro spindles, the E-D 101 is built for large glass sheets, requires minimal maintenance and is backed by HHH's U.S.-based technical support.

High-performance tooling

Salem Fabrication Supplies, SFTG's tooling division, provides top-tier CNC peripheral wheels, routers, countersinks and core drills. The Thunder Cut high-speed diamond core drills offer self-dressing capabilities and a feed rate of up to 1.8 millimeters per second, reducing cycle times and increasing tool life—perfect for vertical CNC applications.

Extended tool life

For even greater productivity and cost savings, SFTG's K&W Grinding division offers professional tool re-truing services, extending the life and performance of tooling such as peripheral wheels. This service helps fabricators maximize their tooling investment while maintaining superior edge quality and precision.

"This solution combines the precision of the Skill CNC with the unmatched performance of Thunder Cut core drills," says Ed Robles, vice president of sales. "Together, these industry-leading products and services offer fabricators a comprehensive solution to optimize efficiency, enhance quality and reduce downtime."

Learn more at salemftg.com, or call 800/234-1982. ■

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02

01. Decorative glass

Skyline's Matrix Collection, designed in collaboration with Gensler LA, includes two patterns—Diamond and Dash—designed to offer a high degree of customization, including ombrés and satin finishes. All Skyline glass is made to order to meet exact requirements of scale, finish, texture, palette and translucency.

773/825-6203 | SKYLINE.GLASS

02. Window system

Euro-Wall's Vista TL window system features edge-to-edge glazing with zero obstructive sightlines for uninterrupted views that maximize access to natural light. This window system can accommodate single glass lites up to 16.5 feet tall and wide, and an unlimited number of lites in an opening. Its minimal, 2-inch perimeter frames create nearly unobstructed glass walls to transform residential and commercial spaces with expansive views.

888/989-3876 | EURO-WALL.COM

03. Moving glass wall

Milgard's AX450 moving glass wall features an aluminum frame with wide openings that stack or slide into pockets, eliminating barriers between indoors and out. The AX450 glides seamlessly on a track for easy operation due to sealed stainless-steel, ball-bearing rollers. A warm-edge spacer system and thermally improved aluminum frame provide energy efficiency, with optional upgrades like low-emissivity glass and gas between the panes to help reduce energy bills.

253/922-2030 | MILGARD.COM



Steel windows and doors (not pictured)

Fabricated from solid hot-rolled steel profiles, Hope Windows' Old World Suite windows and doors are designed to withstand extreme weather conditions while providing slim sightlines for aesthetic appeal. These products are tested and certified to meet the standards of the Florida Building Code, including High Velocity Hurricane Zones. They combine proprietary profiles that are fully welded, hot-dip galvanized and factory finished for coastal protection and tailored for elite commercial projects.

716/665-5124 | HOPESWINDOWS.COM

01. Security latch

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

800/421-6144 | CRLAURENCE.COM

02. Fire-resistant PPE

Magid's AeroDex FR is a cut-resistant, fire-resistant technology made in direct response to workers wanting fire-resistant technology that is more comfortable, less itchy and provides more dexterity. AeroDex FR has ANSI A6 cut protection, is half the thickness of comparable cut-resistant aramid materials and is specially engineered to feel cooler. A foam neoprene palm coating provides contact heat and flame resistance without sacrificing grip in dry, oily and wet conditions.

800/867-1083 | MAGIDGLOVE.COM



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(3)

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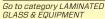
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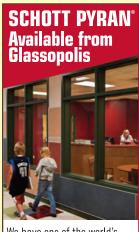
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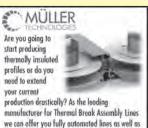
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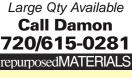
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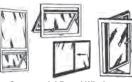


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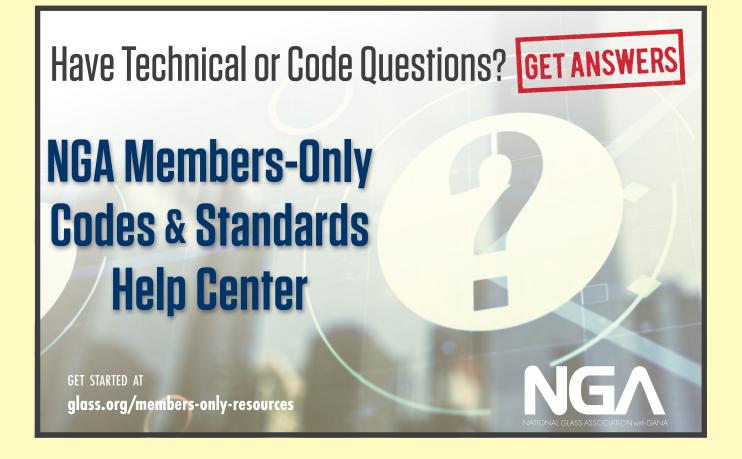
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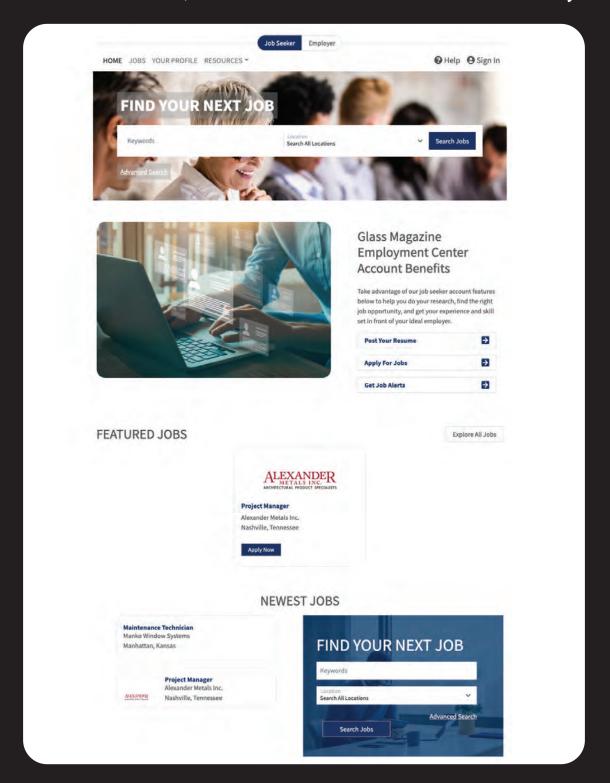
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PREPARING FOR IMMIGRATION WORKSITE ENFORCEMENT

WHAT TO KNOW ABOUT INCREASED I-9 AUDITS AND UNANNOUNCED WORKSITE RAIDS BY RACHEL VITELLO

ebecca Winterscheidt from the law firm of Snell & Wilmer discussed the impact of President Donald Trump's immigration policies on businesses during a live webinar on Feb. 19 hosted by the American Subcontractors Association. Key points included the potential for increased worksite audits and raids and the importance of compliance with I-9 and E-Verify requirements.

E-Verify is an online system that informs employers of the eligibility of their employees to work in the United States. Form I-9, Employment Eligibility Verification, is a form used by employers to verify the identity and employment authorization of new hires in the U.S.

Winterscheidt highlighted the need for companies to have clear immigration

policies, conduct regular self-audits and be prepared for legal fines if they do not comply with E-Verify requirements and if their I-9s for employees are not in order.

What to know

President Trump's plans for immigration include "the largest deportation operation in U.S. history," Winterscheidt says, not only using Immigration and Customs Enforcement but also the National Guard in collaboration with state officers and agents for sweeping worksite audits and raids.

Currently, 22 states require some public or private employers to E-Verify all new employees, including Alabama, Arizona, Colorado, Florida, Georgia, Idaho, Indiana, Louisiana, Michigan, Minnesota, Mississippi, Missouri,



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Nebraska, North Carolina, Oklahoma, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Virginia and West Virginia. Employers located in one of these states who fail to E-Verify employees risk being fined.

What employers can do

Winterscheidt advised employers to implement a policy on employing non-citizens as part of the company handbook, clearly stating that the company will only hire individuals with work authorization and including a provision prohibiting discrimination based on national origin. The policy should then be disseminated to all employees. She said that managers should be notified that they will be terminated if they knowingly hire unauthorized workers.

Winterscheidt adds that if you get audited, you're going to need as many favorable things on your side to try to negotiate fines with ICE, and an official immigration policy is one of those things.

Winterscheidt says that companies should audit themselves to confirm compliance and catch any missing I-9s or information within an I-9 before ICE can come knocking. "Offense is the best defense," says Winterscheidt.

If ICE arrives on your jobsite, employers should ensure that all employees are accounted for and not hiding or fleeing from the site, she says. A manager or supervisor should follow the agent on the jobsite and take note of any items that are seized and what else ICE agents do while there. Winterscheidt says employers should talk with an attorney immediately after a worksite raid.

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