

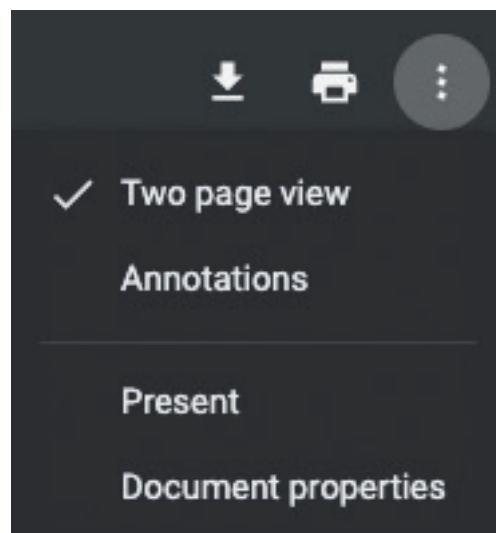
# GLASS MAGAZINE®

THE GLASS AND GLAZING AUTHORITY

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# GLASS

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THE GLASS AND GLAZING AUTHORITY • NOVEMBER/DECEMBER 2023

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**ON THE COVER:** The First Americans Museum in Oklahoma City thoughtfully implements the Native American circular philosophy rather than the traditional Western linear approach to architecture. The buildings and grounds primarily use spirals and ellipses instead of right angles and corners, and glass and metal systems were critical elements in helping the design team achieve this goal. Read more on this unique and collaborative project on page 42.

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## BONUS CONTENT

Available at GlassMagazine.com and glass.org.

### CAREER PATHS

NGA helps showcase glass and glazing as a rewarding career path to young people

### AWARDS

Winners of the 2023 Glass Magazine Awards show that glass is a multifunctional marvel

### GLASS CAST

Learn more on the need-to-know topics vital to anyone in the glass industry

## GLASSBLOG



### WORKFORCE Recruiting and Retaining Gen Z

By Rachel Vitello, NGA



### TECHNOLOGY Impact of AI on Flat Glass

By Chris Kammer, A+W Software North America



### FLOAT GLASS An Underground History of Glass

By Katy Devlin, NGA



## PROJECT SHOWCASE

Featured in Glass Magazine Weekly and on GlassMagazine.com. To submit projects or case studies, write Norah Dick, ndick@glass.org. Pictured: The four-level, 520,000-square-foot Google Alta project in Mountain View, California. Linetec finished 111,692 individual metal flappers in 35 different colors to compose the wind-activated KINETICWALL system

by EXTECH/Exterior Technologies Inc., the largest in the U.S. The colorful selections were matched in 70% PVDF resin-based architectural coating systems, tested to 4,000 hours of salt spray under California's sunny skies and coastal conditions to resist fading. Photos: Clark-Pacific.

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# Industry Metrics to Watch



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

The U.S. economy in 2023 proved more resilient than many economists projected, at least at time of this writing in early October. Inflation has slowed, while domestic GDP and employment gains have continued to defy expectations. That said, major uncertainties loom on the horizon. A potential government shutdown, an escalation of the conflict in Israel, further fallout in China's economy, and more could all disrupt the economy's trajectory.

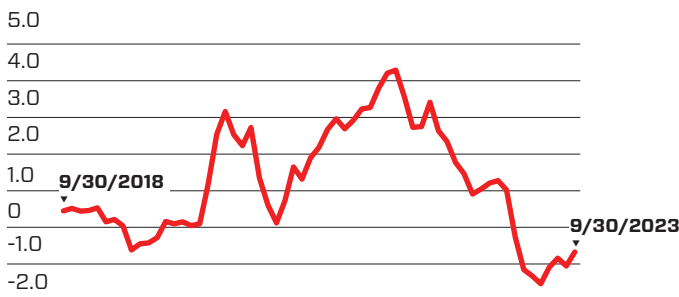
At Glass Magazine and its publisher, the National Glass Association, we regularly track a series of economic and industry trend data to better understand what's on the horizon for glass companies. We look at macro-economic data points, including unemployment and GDP, right along with construction industry-specific metrics, such as the Architectural Billings Index and the Dodge Momentum Index. Below are three additional data points we're tracking that offer additional insights into market factors that affect glass companies.

## Supply chain

One metric our team has been closely watching in the wake of the pandemic is supply chain. The global disruptions in manufacturing and shipping turned all of us into dinner party experts in the fragile nature of supply chains. But thankfully, we have had some increasingly good news from this segment throughout 2023.

## Global Supply Chain Pressure Index:

Hitting record lows in 2023



Sources: Bureau of Labor Statistics; Harper Petersen Holding GmbH; Baltic Exchange; IHS Markit; Institute for Supply Management; Haver Analytics; Refinitiv.

The New York Fed produces a Global Supply Chain Pressure Index, which tracks freight costs, delivery delays reported by manufacturers, and other information about how easy or hard it is for companies to get materials, manufacture products, and transport those products to their destination.

This index hit its lowest point on record in May. It ticked up slightly in the summer and early fall but is still well below pre-pandemic levels.

Freight costs are also back to normal and are down 90% from their peak. To provide some real numbers here: The FBX global container index put the average cost of a shipping container—for all routes across the globe—at \$1,088, as of Oct. 6. By comparison, at peak in September 2021, that same container cost more than \$11,000.

## Construction jobs

Data Digest, a weekly newsletter from Ken Simonson, chief economist of the Associated General Contractors of America, provides a regular look at construction employment, with additional context on what this might mean for companies. Construction employment bounced back to pre-pandemic levels in February 2022 and has continued to see gains.

As of September, construction employment totaled 8,014,000 in September, and is up 2.8% year over year. The sector has seen faster employment growth than the rest of the economy, which saw a growth rate of 2.1% for all nonfarm employment, according to Data Digest. Unemployment in the sector among workers with construction experience rose slightly to 3.8 percent, and wages were up 5.5% year over year.

## Industry investment

Glass Magazine also tracks industry investment trends through its leading market surveys, including Top Glass Fabricators, published in April. Despite uncertain conditions, North American glass companies are growing and investing in their companies.

In our 2023 Top Glass Fabricators survey, 81 percent of fabricators say they plan to invest in capital equipment this year. This comes on the heels of an incredible year for investment in 2022 in which 91% of fabricators said they made capital investments. ■



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# YOUR ASSOCIATION AT WORK

## NEED-TO-KNOW INFORMATION FROM THE NGA

### NGA WELCOMES NEW CHAPTER

The National Glass Association welcomed the California Glass Association as an NGA-affiliated chapter. NGA's Chapter Affiliation Program reflects NGA's commitment to support and encourage participation in regional glass industry associations through promotion and mutual engagement in chapter and NGA activities and events.

"The new California Glass Association has the opportunity to play an important role in supporting the state's glass and glazing industry, and the CGA Board of Directors is leading with dedication and new ideas," says NGA President and CEO Nicole Harris. "I'm pleased to welcome CGA as an NGA-affiliated chapter and look forward to collaborating in the months and years ahead." ■

### SAVE THE DATE

Mark your calendars for the following first quarter 2024 events from the National Glass Association:

#### **NGA Glass Conference: Isle of Palms, Charleston**

Feb. 5-8

Wild Dunes: Charleston Island Resort in Isle of Palms, South Carolina

#### **BEC Conference**

March 3-5

Omni Nashville Hotel

#### **GPAD Glass Processing Automation Days**

co-located with BEC Conference

March 5-6

Omni Nashville Hotel

### WINDOW-CLEANING GTPs

Uninformed window cleaners may damage glass using improper cleaning techniques and tools such as razor scrapers. NGA has three glass technical papers, or GTPs, on how to properly clean architectural glass. Two of these were written in collaboration with the International Window Cleaners Association.

The GTPs, available in English and Spanish, can be downloaded for free in the NGA Store at [glass.org/store](http://glass.org/store). Fabricators should consider including these documents with glass deliveries, and glaziers should consider leaving the instructions behind at jobsites. ■



Heat-Treated Glass Surfaces Are Different



Proper Procedures for Cleaning Architectural Glass Product



Construction Site Protection and Maintenance of Architectural Glass

### WEBINAR EXPLORES HURRICANE PREPAREDNESS

The latest Thirsty Thursday webinar was held on Sept. 28 and covered hurricane standards history, the 2023 Florida Building Code, standards and testing, and product approvals for Florida and Texas. Tanya Dolby, manager of engineering services, Intertek, detailed wind velocity calculations, missile impact testing, cyclic wind pressure loading, and windborne debris protection in the model codes, as well as the product control process for Miami-Dade Notices of Acceptance for manufacturers. ■



CATCH UP FOR FREE

### Did you know?

The NGA offers a Codes & Standards Help Center for members. The Help Center features answers to tough technical codes and standards questions, compiled by NGA's technical

services team. For example, access answers to common energy glazing questions. How can I find out what version of the energy code is enforced for a building project? How do I know whether to follow ASHRAE or IECC for a

project? What's the difference between prescriptive path and performance path in the model building and energy codes? Find the answers to these questions and more at [glass.org/member-help-center](http://glass.org/member-help-center).



# GLASS ADVOCATE

## Resources for Glass and Glazing Professionals

The National Glass Association offers Glass Technical Papers (GTPs) free for the industry on a wide range of topics pertaining to the commercial/residential glass and residential window and door industries. Glass Technical Papers are developed by NGA's dedicated member volunteers and subject matter experts. Below we present the first half of the list of all GTP titles available—look for the second half of the list in the January/February 2024 issue of Glass Magazine.

FB01-00 (2020) Proper Procedures for Cleaning Architectural Glass Products\*

FB02-02 (2018) Heat-Treated Glass Surfaces Are Different\*

FB03-03 (2023) Construction Site Protection and Maintenance of Architectural Glass\*

FB04-03 (2021) Design Considerations for Laminated Glazing Applications

FB05-04 (2017) Emergency Egress through Laminated Glazing Materials

FB06-05 (2019) Proper Procedures for Cleaning Flat Glass Mirrors

FB07-05 (2019) Point Supported Glazing

FB09-06 (2023) Suggested Procedures for Dealing with Broken Glass

FB10-06 (2023) Skylights and Sloped Glazing Are Not Walking Surfaces

FB11-06 (2022) Marking and Labeling of Architectural Glass

FB12-07 (2023) Blast Resistant Glazing

FB13-07 (2018) The Importance of Fabrication Prior to Heat-Treatment

FB14-07 (2020) Glass Floors and Stairs

FB15-07 (2022) Describing Architectural Glass Constructions

FB16-07 (2022) Bullet Resistant Glazing

FB17-08 (2019) Glossary of Terms for Color and Appearance

FB18-08 (2023) Methods for Measuring Distortion

FB19-08 (2020) Guidelines for Handling and Cleaning Decorative Glass

FB20-08 (2022) Iridescence in Heat-Treated Architectural Glass

FB21-09 (2021) Installation Techniques Designed to Prolong the Life of Flat Glass Mirrors

FB22-09 (2019) Proper Procedures for Fabrication of Flat Glass Mirrors

FB23-09 (2019) Approximate Weight of Interlayer Used in Laminated Architectural Flat Glass

FB24-09 (2019) Hurricane Product Substitution

FB25-09 (2017) Performance Criteria for Glazing Subjected to Seismic Events

FB26-10 (2022) Detention Facility Glazing

FB27-11 (2015) Guidelines for the Appearance of Insulating Glass Unit Edges in Commercial Applications

FB28-11 (2022) Assessing the Compatibility of Glazing Materials and Components

FB29-11 Fire-Rated Glazing Changes in the 2012 International Building Code

FB30-11 (2019) Proper Procedures for Receiving, Storage and Transportation of Flat Glass Mirrors

FB31-11 (2019) LEED® White Paper—Mirror

FB32-11 (2018) Dynamic Glazing for High Performance Buildings

FB33-11 (2023) Glass Use in Guardrails

FB34-12 (2023) Screening Out UV Radiation with Laminated Glass

FB35-12 (2020) Bird-Friendly Glass Design Strategies

FB36-12 (2019) Coastal Glazing and the Turtle Codes

FB37-12 (2019) Laminated Glass Use in Furniture

FB38-14 (2021) The Recyclability and Reusability of Glass Products

FB39-14 (2019) Glass Properties Pertaining to Photovoltaic Applications

FB40-14 (2021) Recyclability of Architectural Glass Products

FB41-14 (2019) Design Considerations for Use of Sealants/Adhesives with Coated Glass

FB42-14 (2019) Decorative Glass Strength Properties

FB43-14 (2020) Security Glazing

FB44-14 (2019) Assessing the Durability of Decorative Glass

FB45-14 (2019) Recommended Applications for Heat-Treated Architectural Glass

\*Also available in Spanish.



ALL GTPS ARE FREE TO DOWNLOAD IN NGA'S ONLINE STORE.

# GLASS INFORMATIONAL BULLETIN

## Construction Site Protection and Maintenance of Architectural Glass

Once finished materials arrive on a construction site, they become exposed to various conditions that can adversely affect product aesthetics and functionality. Irreparable glass damage can occur from improper storage and handling, exposure to chemicals and leaching agents, prolonged exposure to moisture, mechanical attack and breakage, damage related to adjacent construction activities and improper cleaning methods. Materials for windows, doors and skylights must be properly stored throughout the construction process. The complex nature of construction projects and site management requires well-planned and executed material delivery and storage.

### Site handling and installation

Glass and glazing system manufacturer's recommendations for site handling and installation procedures should be followed. Light commercial windows, doors and skylights should be installed per ASTM E2112 Standard Practice for Installation of Exterior Windows, Doors





This excerpt is from a technical document developed by member volunteers and subject matter experts from the National Glass Association and the International Window Cleaning Association, available at [glass.org/store](http://glass.org/store).

### Recommended practices

- Consult glazing system suppliers for specific material recommendations.
- To minimize on-site storage durations, coordinate glass deliveries.
- Select and clearly mark on-site storage locations that avoid water runoff, work areas of other trades, and high-traffic areas to minimize material movement and handling.
- Secure, block and brace individual cases of glass and pre-glazed materials. Keep the bottom edge of materials above potential pooled water or other damaging conditions.
- Provide secure, temporary covering that prevents direct water flow but ensures ventilation and combats condensation build-up on the glass.
- Do not subject stored glazing components to deposits from concrete and masonry building materials or hard water spotting from various tap water sources.
- Do not expose stored materials to the activities of other trades, such as welding, painting, insulating and fireproofing.
- Establish a program for daily inspection of stored glazing systems to monitor conditions and ensure prompt corrective action as needed.
- Follow the manufacturer's guidelines when using temporary protection films.
- Do not allow protective films to remain on the surface beyond their useful life, as removal methods may damage certain glass types and coatings.
- Do not expose open packs of glass to direct sunlight, as the glass layer's insulating effects may increase the thermal stress in the glass, resulting in breakage.

damage, take corrective actions and mitigate the potential for future damage. Deep surface scratches, contact by hot weld-splatter and edge damage threaten the structural integrity of glass and may require glass replacement. Surface contact with harmful materials will require prompt cleaning by professional window cleaners. Careful thought and discussion must precede the use of aggressive cleaning procedures. The general contractor or builder may need to schedule periodic glass cleaning during construction. Extended construction schedules and site conditions often result in dirt and debris build-up. Professional cleaning at the initial signs of build-up can decrease the potential for glass damage.

### Long-term maintenance

Building facades can be exposed to sealant rundown, pollutants, dirt and debris, which can damage glass surfaces over time. Building maintenance schedules should include frequent cleaning to ensure long-term glass aesthetics and performance. Tailor cleaning frequencies to the individual characteristics inherent to these conditions and the severity of local environmental factors, such as acid rain and atmospheric pollutants that vary by region.

Building owners should ensure that individuals cleaning fenestration materials are well aware of the glazing products in the building and their unique properties, and are knowledgeable on proper cleaning procedures and practices recommended by the glazing manufacturer and the glass industry. ■

and Skylights. Glass for commercial glazing applications should be handled and installed according to NGA's GANA Glazing Manual guidelines.

### Post-installation inspection

After installation, all trades should give special attention to construction activities to prevent exposure of glass to weld splatter, paint, plaster, sealants,

fireproofing, and alkali and chemical attack. The subcontractor, general contractor or builder should inspect and document the glazed materials' condition daily.

### Construction clean-up

If damage has already occurred, consult the glazing contractor and glass fabricator/supplier to assess

# The most-clicked news stories on GlassMagazine.com, brought to you by **GLASS MAGAZINE WEEKLY** \*

## **Guardian Glass Furnace Set to Restart**

Following a successful cold tank repair, the new furnace at the Guardian Glass Bascharage, Luxembourg, plant is scheduled to be operational in Q4 2023. The furnace will be the most energy-efficient Guardian Glass furnace, say officials. Once put into operation, the furnace is expected to be about 25% more energy efficient. The furnace will also provide extra capacity for the plant to produce both Guardian ExtraClear float glass and Guardian UltraClear low-iron float glass.

The installation of a transferred laminated glass line is also expected to be completed in Q4 2023. The Bascharage plant already hosts a coater that produces Guardian ClimaGuard low-emissivity and Guardian SunGuard high-performance coated solar control glass for residential and commercial applications.

## **Press Glass to Expand in Virginia**

Virginia Governor Glenn Youngkin announced that Press Glass Inc. will invest \$155.2 million to expand at the Commonwealth Crossing Industrial Park in Henry County, Virginia. The company will construct a 360,000-square-foot addition to its existing facility to expand its U.S. presence and manufacture glass for the commercial construction industry. The project will create 335 new jobs. The company opened its Henry County facility in 2020 and employs more than 300 individuals.

The Virginia Economic Development Partnership secured the project with the Martinsville-Henry

County Economic Development Corporation. The Governor's office approved a \$2 million grant from the Commonwealth's Opportunity Fund to assist Henry County with the project. Funding and services to support the company's employee training activities will be provided through the Virginia Jobs Investment Program.

## **AGC Starts Study on Methanol Made from CO2**

AGC Inc. and Mitsubishi Gas Chemical Company Inc. agreed to study the production and sale of methanol made from carbon dioxide (CO<sub>2</sub>) generated from AGC's architectural glass production by applying the methanol production technology developed by MGC. This study targets commercialization by around 2030 at AGC's Kashima Plant. When achieved, it will be the world's first case of producing and selling circular carbon methanol that effectively utilizes the CO<sub>2</sub> generated from glass production, say company officials.

## **Sisecam Plans to Invest in Tech Company**

Sisecam signed a letter of intent to become an investor in ICRON, a Turkish technology company that provides optimization platform services to numerous sectors for their strategic and operational decision-making needs. According to a company release, Sisecam's ongoing discussions on its initial investment in technology development reflect its eagerness and appetite for innovative, technological, digital and promising technology companies and projects.

If the negotiations reach an agreement, ICRON will become Sisecam's first investment in technology development. This investment from Sisecam will support the growth of ICRON and provide gains for Sisecam. According to the letter of intent signed by Sisecam CEO Gorkem Elverici and ICRON CEO Gurer Unal in Barcelona at Gartner's Supply Chain Expo 2023, if the negotiations end with an agreement, Sisecam will have an option right to increase its total stake in ICRON by up to 50% by 2027.

## **Tanzania Float Glass Facility Near Completion**

The construction of a float glass manufacturing factory in Mkiu Village in Tanzania has reached 90% completion, according to a report by Tanzania Daily News.

The Sapphire Float Glass Co., owned by Chinese investor Jack Feng, is responsible for the project. It brings several economic benefits, including reducing Tanzania's import bill for glass products, a surge in foreign exchange profits and expanded exports to neighboring nations. When the project is complete, it will produce 700 tons of float glass, toughened glass and mirror per day at the first production line and 500 tons per day at the second line.

## **Saint-Gobain Sells Fabrication Business, Signs Major Renewable Electricity Supply Contract**

Saint-Gobain completed the sale of its glass-processing business, Glassolutions in Slovakia, to Glasora a.s. With its industrial plant located in Nitra-Chrenová, the business generated sales

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**NEWS TO KNOW**

of around \$21.3 million in 2022 and employs 150 people. This transaction is part of Saint-Gobain’s continued business profile optimization strategy, in line with its “Grow & Impact” strategic plan.

Saint-Gobain also signed a renewable electricity purchase contract for 15 years with TotalEnergies, which will provide solar energy for its 125 industrial sites in North America. This 100-megawatt

contract, also named Danish Fields Solar Project, should reduce carbon dioxide emissions linked to electricity by Saint-Gobain in North America at a rate of 90,000 tons per year.

**PGT Innovations Launches Diamond Glass Production**

PGT Innovations is now producing and offering Diamond Glass as the standard glass in its WinDoor product portfolio.

Diamond Glass is a laminated, ultra-lightweight glass featuring Corning Architectural Technical Glass. It is up to 45% lighter and three times more scratch-resistant than traditional laminated glass. The next-generation glass technology stems from a collaboration with Corning Inc., which PGTI announced earlier this year. Diamond Glass can be used for either laminated or laminated-insulated windows or doors.



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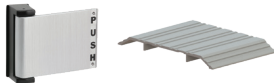
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**Adelio Lattuada Celebrates 45 Years in Business**

Adelio Lattuada is celebrating 45 years of business. The company says the achievement is due to “the passion for our work, the experience gained in the field and all our customers who have given us confidence and who continue to be at our side.”

**All Weather Architectural Aluminum Launches Apprenticeship Program**

All Weather Architectural Aluminum launched its first annual Manufacturing Apprenticeship Program. The apprenticeship program creates a career pathway for graduating high school students who are mechanically inclined but are not immediately pursuing a college degree. Five high school students finished the program this year. Held at the company’s headquarters and manufacturing facility, the 12-week paid apprenticeship program began mid-June and ended mid-September. Throughout the program, each apprentice received extensive on-the-job training, exposure to multiple departments, performance reviews and weekly group training sessions for topics like lean manufacturing, human resources, safety, purchasing and new product development.

**Assa Abloy Joins the Mindful Materials Manufacturers Forum**

Mindful Materials launched three building industry groups, known as The Forums, and Assa Abloy is participating. The Forums represent owners and over

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NEWS TO KNOW

80 individuals from over 40 companies across the manufacturing, architecture, design, engineering and construction industries. The three groups are the Owners Forum, the AEC Forum and the Manufacturers Forum. These groups offer participants a neutral, pre-competitive space to navigate mutual challenges and help accelerate meaningful action by others in the industry.

PEOPLE NEWS



Mahajan

**Permasteelisa** hired *Sandip Mahajan* as the company's new chief financial officer.

The company says that Mahajan brings a strong finance background from the construction sector and CFO roles across multiple industries.



Matthews

**McGrory Glass** appointed *Tim Matthews* as president.

"We are excited that Tim has accepted a new role at McGrory and will help us continue to create innovative solutions for the community," says Chris McGrory, acting CEO and former president. "Our team and our clients will benefit directly from his strong leadership background and unique service-oriented skill set."



Zuniga

**YKK AP America** appointed *Ivan Zuniga* as director of product development, where he will lead, direct

and oversee daily operations of the product development group. Zuniga brings over 30 years of architectural product development experience to YKK AP. Most recently, he served as product development manager for a manufacturer of architectural aluminum systems for the commercial construction industry.



Rutledge

**Super Sky Products Enterprises LLC** hired *Jeffrey Rutledge* as national sales director.

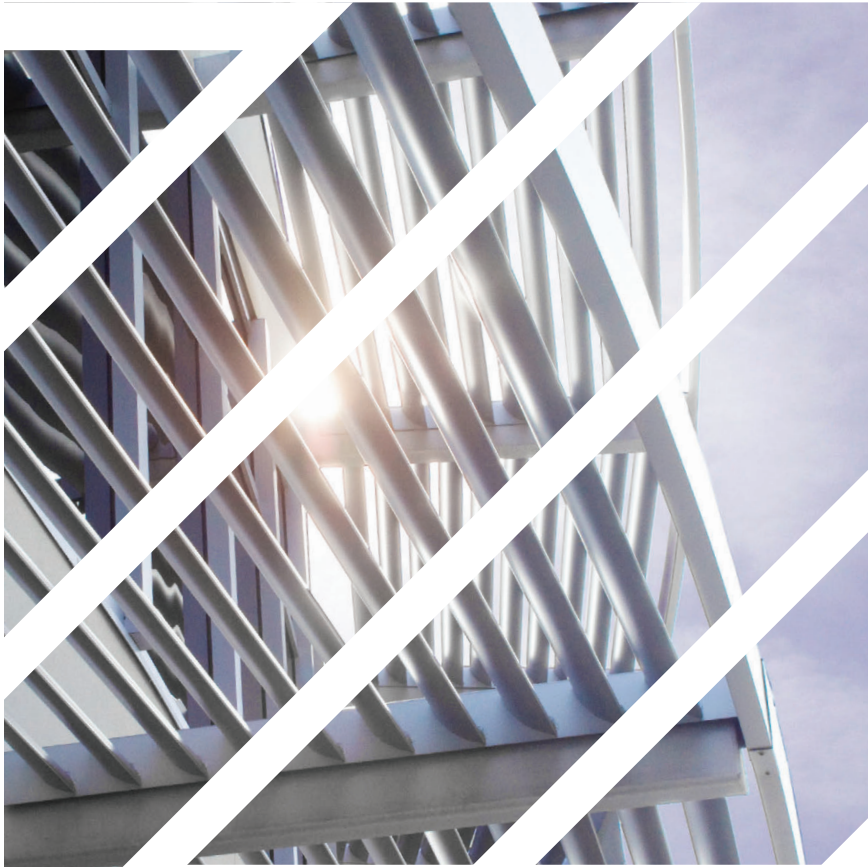
Rutledge has over 30 years of experience in the commercial skylight and overhead glazing industries.



Graham

**Glassfab Tempering Services** appointed *John Graham* as president, Mountain West Region, as part of its ongoing efforts

to bolster its presence within the U.S. market. With over three decades of glass industry experience, Graham has consistently demonstrated leadership qualities, operational excellence and a visionary approach, resulting in a track record of notable accomplishments and successes.



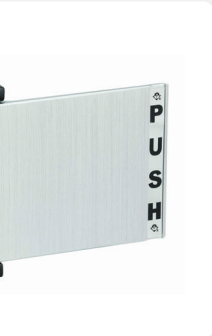
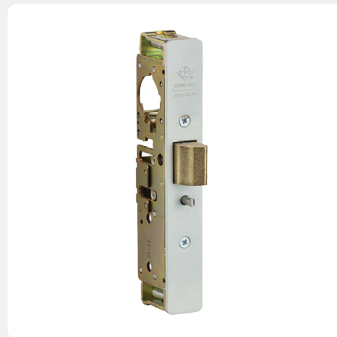
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### NEWS TO KNOW



Dvorak

Cass Dvorak has been named as an **Alumicor** client development manager serving the Atlantic region, including Nova Scotia,

Prince Edward Island, New Brunswick, Newfoundland and Labrador. As part of the sales team, Dvorak works closely with glazing contractors to support their selection and specification of aluminum-framed curtainwall, storefront, window and entrance systems for commercial building projects.

### IN MEMORIAM



Walker

**The Fenestration and Glazing Industry Alliance** announced the passing of *Rich Walker*, 74, former president and CEO of the

American Architectural Manufacturers Association. Walker retired from the Association in 2018, before its unification with the Insulating Glass Manufacturers Alliance to form FGIA. He is survived by his wife, Diane Walker—who shares with him the namesake of the Rich and Diane Walker Cup golf event held at FGIA conferences—their two adult children, Kate and Adam, and their granddaughter, Maddie Mae.

“Rich was a great man, leader and friend,” says Janice Yglesias, FGIA executive director. “He was level-headed in any situation and his sense of humor brightened any room. I had the pleasure of working with Rich for almost 20 years and always admired the depth of the professional friendships he cultivated and his ability to bring a smile to the face of anyone he encountered.” ■

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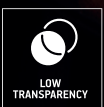
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# INSIGHTS

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CRL Cascade glass wall office partition. Photo ©Lawrence Anderson.

## TRENDHUNTER

# NEW APPROACHES TO GLASS PARTITION DESIGNS

MODERN INTERIOR GLASS PARTITIONS ARE MEETING THE NEEDS OF CONTEMPORARY NEXT-GENERATION OFFICE SPACES  
BY MARK SUEHIRO



The push from many companies to bring employees back into the office continues. Whether organizations are pursuing a full-time return or a hybrid model, the design and construction of office spaces are changing to meet the evolving needs of companies and their workforce.

The marketplace requires architects and interior designers to consider employees' physical, social and emotional well-being; energy-saving strategies; sound privacy; and aesthetics as they create modern office spaces.

New interior glass partitions are helping meet the needs of next-generation office spaces. Here are a few considerations driving the use of glass partitions in contemporary office settings.

## Daylighting

Execution of energy-saving strategies remains a high priority for building owners. Glass partitions help achieve energy usage goals by replacing opaque partition systems with transparent glass walls. Glass partitions allow natural daylight from exterior-facing windows to better diffuse through the interior spaces of the office because they minimize obstructions.

Less reliance on electrical sources for lighting reduces energy costs and decreases a building's carbon footprint. More natural light is also a significant positive psychological benefit to the overall well-being of staff.

There are a host of glass partitions with daylight-diffusion capabilities available designed to maximize the

potential of daylighting. Options include frameless systems that feature recessed u-channels or low-profile top and bottom rails to secure the glass. There are also new, freestanding post systems that offer greater floorplan flexibility.

### Privacy

Access to quiet and private areas is no longer a perk, but a requirement for employees. To meet this new expectation, architects and designers are creating office models that heavily leverage glass partitions to provide private work and meeting spaces while maintaining a vibrant, open-office aesthetic.

For visual privacy, smart glass technologies with switchable film transform glass from clear to opaque through an electric current and the push of a button.

Another critical component is the reduction of sound. Framed glass partition systems with dual glass lites are the most effective for improved sound

mitigation. Available systems feature 1-inch insulating glass that acts as a buffer for incoming/outgoing speech.

### Aesthetics

Balancing aesthetic objectives with workplace requirements remains essential. The visual impact of office design remains critical when creating engaging and collaborative spaces, especially in an environment where employees have greater expectations of how an office space should function.

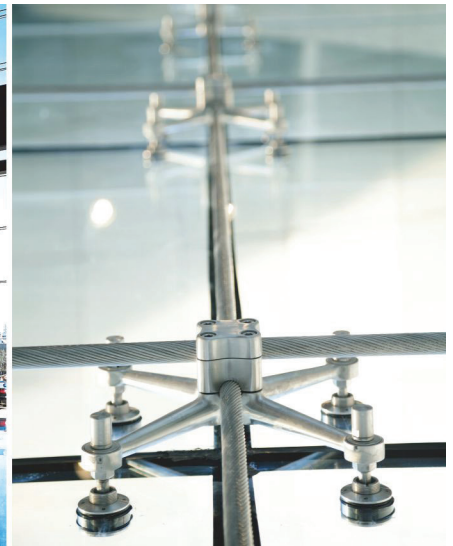
Demand for interior designs that provide alternatives to opaque interior walls is increasing. Interior glass partitions are being successfully utilized to create a sense of openness and transparency and to help attract new talent. The benefits range from staff's physical, social and emotional well-being to a reduced carbon footprint via decreased energy costs. Superior aesthetics bind all of these benefits together, resulting in interior spaces workers will enjoy and be productive in.

Framed, frameless and freestanding-post partition systems all have distinct visual impacts in office settings that make a space unique. For example, systems are available that feature a contemporary floating-on-air door frame.

### Takeaways

Creating contemporary designs that today's employees will embrace is a grand vision, one that is being met, in part, by a new approach to interior glass partitions. Ultimately, this vision will be achieved by the thoughtful and careful efforts of the glazing community. Understanding new approaches to glazed partition systems for office designs will prepare glass professionals for success. It will also help companies in encouraging employees to return to the office. ■

Mark Suehiro is director of architectural hardware and entrances for C.R. Laurence Co. He can be reached at [mark\\_suehiro@crlaurence.com](mailto:mark_suehiro@crlaurence.com).



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## TACKLING GLASS AND GLAZING'S TECHNICAL CHALLENGES

AS GLASS AND GLAZING GROW INCREASINGLY SOPHISTICATED, ENSURING NEXT-GEN PROFESSIONALS MAINTAIN TECHNICAL EXPERTISE WILL BE CRITICAL **BY JOE ERB**



**H**ere's an interesting question: Is the glass and glazing industry doing enough to address technical challenges?

This topic came up during Max Perilstein's "From the Fabricator" podcast, which I was privileged to join as a guest. With performance demands in commercial glass and glazing rising and architectural designs growing bolder, glazing must continue to prove itself as sustainable, resilient and able to deliver on performance demands for decades. However, this requires deep technical knowledge throughout the glass and glazing value chain. It requires new technologies, new fabrication methods and more to meet evolving needs.

As an industry, do we have what it takes? Yes, but it won't be without its challenges. Here are some things to consider.

### Fostering the next generation

I've been a part of this industry for three decades. I've interacted with countless incredibly talented people in the commercial glass and glazing community. The collective knowledge and experience we share make for a powerful force in solving today's toughest challenges, but it will take tomorrow's minds to solve them, foster the next generation

of experts and get new blood into the industry.

We all know that recruiting has been challenging and no simple solution exists. Whether it's on the production or installation side, we must do everything we can to cultivate a new generation to help our businesses succeed. This means getting familiar with what interests and motivates younger workers. We need them to see the potential of glass and the many opportunities to build a fulfilling career. Whether using drones for surveying, automation for installing glass, or working with next-generation technologies like electrochromic glass, our industry deploys cutting-edge technology in every part of our work.

There's also an opportunity to change the stigma associated with manufacturing. Today's glass plants are safe, clean and filled with technology. Automated processing lines are a modern wonder, but they won't accomplish much without workers to operate and maintain the equipment.

### Optimizing skill sets

Fostering younger workers also means bridging a generation gap. Younger generations may have different skills and interests, but glass professionals can harness them in a way that best suits their business. Modern automated glass processing equipment is an opportunity to leverage cross-generational skills for everyone's benefit. Growing up with computers and smartphones, younger workers flourish in a digitally controlled environment. By contrast, more seasoned glass production workers have a better eye for product quality, safety and continuous improvement.

Tackling the technical challenges of an increasingly advanced glass and glazing industry will require fostering a robust new generation of professionals through proactive outreach. It also will require investment in good training and mentoring programs, and an openness to new ways of doing things. Most of all, it will take a concerted, collective effort from all of us today. ■

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Joe Erb is national account manager for Quanex.

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# STRATEGIES FOR GLASS CURTAIN WALL INSTALLATIONS

EFFICIENT INSTALLATION CAN HELP GLAZING SUBCONTRACTORS PIN “BIG TICKET” COSTS AND OPTIMIZE THE PROCESS

BY CHUCK KNICKERBOCKER



**C**urtain walls present unique challenges and opportunities to glazing subcontractors compared to other typologies, such as storefronts or punched windows. These systems have been around for a long time and are likely to stay. Being able to install them better, cheaper and faster can help glazing subcontractors find where the “big ticket” costs and schedule items are and optimize the process.

## Pre-installation considerations

Stick-built curtain wall systems are fabricated before they’re shipped and assembled on-site. Whereas, in unitized wall systems, complete wall panels, usually one module wide (center-to-center of mullions being the module width) by one-story tall, are factory assembled and glazed, then shipped to the site. Generally, they are quicker to install than stick systems. Both systems require a lay-down area, but crating materials in smaller bundles or stackable skids might save on the required floor area.

For stick systems, any overlap between the deliveries of fabricated

framing material and glass might increase the required floor area and the risk of damaging glass lites. The whole process of lifting the lites or units requires special equipment for heavy lifting. However, as unitized systems are pre-assembled, the time needed to load floors with pre-assembled units is likely different than that required for stick systems. Usually, the floor space is more quickly turned back to the general contractor.

After the frames are erected and glazed, follow-on activities complete the installation in stick-built systems, such as adding insulation, safing and smoke seals, and any necessary interior trim. The glazing subs must also carefully clear dunnage from floors in stick-built systems. The skids that carry the unitized panels to the site are often returned to the shop for use in future deliveries, negating the need to dispose of them. Planning such details can be critical to the construction schedule and budgets.

## Successful installation tips

There are many aspects to consider for

successful glazing installations. One of them is sealant strategies. Glazing teams may need to pay more attention to appropriately sealing stick wall assemblies in the field. In contrast, this aspect is often handled during shop assembly in unitized walls. The field seals between unitized panels are repeatable and fairly easy to accomplish.

Another is the glass size. With larger lites coming to the fore in both stick-built and unitized systems, there is less material to procure, fabricate and install. But for glazing teams, this requires increased caution in handling and installing larger lites. Additionally, sourcing the right equipment to handle these can be crucial to safe and timely installations.

**Timelines for deliverables**

While equipment and storage are important to ensure timely deliverables, glazing subcontractors can evaluate the commonalities between the two systems to streamline installation time and costs.

One is how the system is anchored to the building. Simplifying the anchoring to the greatest extent possible can greatly impact field installation costs. Most unitized wall systems have anchor systems with built-in adjustability for in/out, left/right and up/down setting tolerances within acceptable limits, generally, +/-1 inch in any direction.

The stick-built system’s anchoring mechanism tends to be simpler, consisting of anchor clips bolted through vertical mullions and connected to embeds (in concrete structures) or welded to structures (in steel-framed buildings). Their installation can be further simplified if the unitized wall’s anchoring concepts could be applied to them.

In all of these, planning is key. Sitting with the general contractor, ideally when the proposal is submitted, working out the time and delivery of materials to the site, regardless of the system, can lower costs and simplify site logistics

for a glazing sub. Discussing anchor tolerances and how much the general contractor will control the edge of the floor slab is also a worthwhile effort.

But looking internally within one’s operations is well worth the time, effort and expense if a better, cheaper and faster way can be found. In the past, I’ve seen glazing subcontractors on new projects sit down with their project managers, field supervisory personnel, material suppliers, and engineering resources to carefully examine every phase of the planned installation. Everyone has an equal say with the added benefit of immediate feedback and understanding within the team of the “why are we doing that” aspect of the installation. ■

Chuck Knickerbocker is the curtain wall manager for Technical Glass Products, a supplier of fire-rated glass and framing systems and specialty architectural glazing products.

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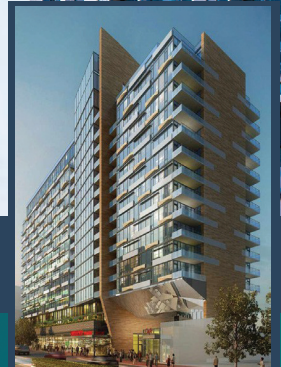
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## PPE FOR GLASS-SPECIFIC HAZARDS AND CONDITIONS

GLASS WORKERS WANT PROTECTION, COMFORT AND SAFETY FOR THEMSELVES AND THEIR PRODUCTS

BY M.B. SUTHERLAND

Ask anyone who's been in a glass plant to describe the atmosphere and they'll describe it as loud, hot and full of cut hazards. Regarding PPE, you might also hear "uncomfortable, itchy and 'why do I need to wear this?'" The good news is that the hot, bulky and cumbersome safety gear of the past is being replaced by new technologies designed to keep workers safer and more comfortable.

### Comfortable, safe workers

Glass workers know their work is dangerous and want to be protected from harm. But when temperatures rise and workers get sweaty and miserable, it's human nature to cut corners—pushing protective sleeves up or down, unzipping protective clothing, removing gloves—often to cool off or stop the itch just for a moment. But those vulnerable moments

can be the ones when accidents happen. While important in any industry, offering glass industry workers PPE that keeps them cooler and more comfortable is crucial.

### Cut-resistant clothing

Manufacturers are using new materials, combined with advanced knitting technologies, to create lighter cut-resistant clothing that offers better protection than past PPE. Protective tops up to ANSI levels A7–A9 are 15% to 30% lighter than older products and don't trap heat against the body. The same materials are used to create aprons and chaps for jobs requiring full-body protection. Most recently, for tasks that primarily face the cut hazard, tops are available with A7–A9 protection at the front with an A5 mesh back to release more body heat and keep workers cooler.

### Protective gloves and sleeves

Glasswork is unique in that we often need to protect the product and the people handling it. New gloves explicitly developed for the glass industry allow workers to stop the common practice of double gloving for cut protection without marring glass. These new gloves offer cut protection up to ANSI Level A9 and coating options designed for the glass industry. These coatings also provide improved glass grip for safer handling and fewer accidents, and are formulated so they don't stick to glass-specific substances like butyl.

Protective sleeves have also advanced. Available up to ANSI A9 cut protection, many sleeve materials are cool to the touch, and some at slightly lower cut levels are coreless to help prevent contact dermatitis. The comfort of these new sleeves is an entirely new experience for many workers who've grown used to thick, hot, itchy sleeves they can't wait to take off.

### Body-cooling PPE

Gone are the days of cooling garments that start cool but end up a warm, sweat-soaked burden after an hour on the job. The wet-wring-snap products we've all become used to have upped their game with body-cooling materials that cool to as low as 30 degrees below average body temperature in 60 seconds and can stay cool for up to two hours. These materials are now used to create skull caps for under hats, neck gaiters and cooling t-shirts, which are a good addition under a lighter, cooler, cut-resistant top. Some of this cooling gear is even available in FR-rated materials.

The bottom line is that your employees are far more likely to wear their PPE if it doesn't make them miserable. Highly protective garments, gloves, sleeves and more have become comfortable enough for employees to happily wear them on the job. ■

M.B. Sutherland is the senior safety writer at Magid. Learn more at [magidglove.com](http://magidglove.com), or 800/444-8030.



# GREAT GLAZING: BLOCK 185

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## THE BASICS

Block 185 is a new addition to the skyline of one of the fastest-growing cities in the country: Austin, Texas. Capitalizing on good talent flooding the area, major employers are setting up shop in the state's capitol, including Google, who will lease the entire Block 185 building. The structure features several high-performance, Ellison Bronze custom balanced doors specified by the architects in charge, Pelli Clarke & Partners.

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## THE DESIGN

Block 185 is a 35-story building known for its sail-like curtain wall and spacious outdoor balconies. The design priorities were security and aesthetics, and Ellison

balanced doors were selected for their minimalist beauty and ability to deliver the level of security the project required.

---

## THE MATERIALS

All Ellison doors on the project are made from stainless steel with exposed pivot shafts and a sleek #4 satin finish. There are no thresholds, and the gear boxes are recessed into the floor for a clean appearance. Triple laminated sidelites enhance structural support and the availability of natural daylight, promoting sustainability and creating inviting lobby spaces. From a design perspective, the stainless steel and glass balanced doors fit flawlessly into the glass curtainwall design.

Learn more at [ellisonbronze.com](http://ellisonbronze.com), 800/665-6445. ■





# BUILDING EFFICIENCY

Metal companies adapt  
their systems for less labor  
and greater sustainability

BY NORAH DICK



● One of the first vertical convention centers in North America, the 15-story Seattle Convention Center Summit building's curtain wall features Technoform building envelope products aimed at fulfilling the project's sustainability goals. Fabricator CareyGlass International

selected Technoform's plastic hybrid stainless steel warm-edge spacer as its edge seal solution. The aluminum-framed curtain wall, manufactured and installed by Enclos, also integrates Technoform's polyamide thermal barriers throughout the fenestration assembly. Inside the

center, visitors and staff are treated to expansive views and abundant natural light from the large atriums to "The Hillclimb" glass-enclosed staircase, into the exhibit halls, and up to the grand ballroom. Photo courtesy of Technoform.

● 2023 has been a slightly more stable one for glass and metal companies, say leaders in the industry. Supply chains have calmed down, even though inflation and interest rates remain a question mark. "It feels like we finally have control of the future a little bit more. Before, it felt like we were just kind of hamstrung," says Josh Wignall, director of commercial sales and marketing, Quaker Windows & Doors.

While most companies voiced a sense of cautious optimism and a return to the business of building, what has not changed is the difficulty of finding labor. Across the board, labor is expensive, and there's not enough of it. "I still hear from multiple industries that companies are still struggling to find enough staffing to do the job. It's gotten better, but it's not back to where it was pre-COVID," says Mary Avery, vice president of marketing, Tubelite Inc.

High labor costs may be pushing the adoption of some metal systems, says Zeke Miller, president, MillerClapperton, which fabricates and supplies metal composite material and plate aluminum panels, among other building products. Miller sees greater adoption of the company's products in lieu of eaves, stucco or lower-density fiber cement, likely due to labor costs. "Because all those products are still very labor intensive. And labor is just out of control right now."



**Prefab systems offer speed and quality control, but require space and transportation**

Lack of available, skilled labor is also fueling a continued rise in prefabricated and modular systems, say industry representatives, though adoption can depend on the company’s capacity.

Prefabricated systems can be used as an umbrella term to refer to a range of building systems that are fabricated or constructed in a manufacturing environment before being shipped to the jobsite. Unitized systems often refer to a façade system or curtain wall that is pre-glazed or has windows installed. Modular systems describe a container-type system. Reps for Kawneer say they see modular building happening more on smaller projects, such as hotels, where room and floor layouts are fairly identical.

Prefabricated options offer several advantages for project completion and can accelerate production timelines. “A main advantage is just construction speed,” says MillerClapperton’s Miller. “You can dry-in a building much faster, literally an entire floor in a day [using prefabricated systems], whereas with traditional stick-built construction, it could take

a week, two weeks or even longer to dry-in a floor. Drying-in early allows the interior trades to start earlier.”

Prefabrication in the factory or shop can reduce labor needs and increase quality in a more controlled, automated environment. “Factory fabrication requires less people and involves more automated and lifting equipment. In a prefab situation, you’re setting the units, locking them in place and then can move on, versus having to go unit by unit and dropping them in [like you would in the field]. The workforce required to do that in the field is much more expensive than what you must do for modular or unitized systems,” says Quaker’s Wignall.

While beneficial for the jobsite, considerations remain for implementing prefab in the shop, especially the space required. “Shop-glazed or unitized units take up considerably more space than shipping fabricated parts,” says John Trainor, general manager, AGS Inc. Transportation of systems is also a major consideration, he says. “How do you bunk the units? Load and unload the bunks? How many units can you fit on a truck?”

C.R. Laurence’s Mark Suehiro, technical director, product group sales, architectural



Sustainability and occupant well-being were essential objectives for the James M. McKelvey Sr. Hall at Washington University. To meet the project’s numerous design goals and performance requirements, Tubelite Inc. and its representative, Doug Urich of Archon Fenestration Technologies, worked closely with the design and building team. In addition to Tubelite, WashU’s 86,500-square-foot McKelvey Hall project was supported with products and services from Wausau Window and Wall

Systems, Viracon, and Linetec. To create the McKelvey Hall’s transparent elements, Archon provided Tubelite’s ThermoBlock 900RW Series thermal window wall, and 400T Series thermal curtain wall and wide stile doors for the hall’s entrance area. Wausau supplied additional unitized curtainwall glazed with Viracon’s VNE24-63 glass. Photo by Paúl Rivera.

9:15 AM

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Located in the center of San Francisco, 1145 Polk Street is a six-story mixed-used retail space and multifamily building. Architect BDE Architecture selected Quaker Windows & Doors M600 Series project-out and fixed windows for the new construction, which offer an SHGC of 0.12-0.54 and STC of 41-43. Argonaut Window & Door was the commercial window distributor.

hardware, says companies can think strategically about their goals in bringing fabrication in-house. “For shops that want the flexibility to fabricate on-site and eliminate the possibility of manufacturing delays, the modular approach works great. Other shops want to focus on the install, using completed systems built-to-spec, which makes the unitized approach optimal.”

### **Interest grows in circularity, embodied carbon and recycling**

Sustainability initiatives continue to transform markets, say industry reps. Code changes especially have accelerated more stringent performance requirements in recent years. “It used to be

the industry had a sell time on systems of multiple years,” says Tubelite’s Avery. “Now codes change quite often.”

Some of the resulting energy and thermal efficiency code changes have had significant impacts. “We are seeing customers designing completely new systems to address more stringent energy codes, especially in Canada, but also in the Northeast and Northwest U.S. They are utilizing deeper thermal barriers—moving from approximately 28 millimeters to approximately 50 mm—and lower thermal conductivity materials, such as low lambda polyamide for thermal barrier products,” says Chad Ricker, general manager, Technoform.

Beyond product energy performance, there is an

increasing interest in sustainability throughout the manufacturing process. “In building design, the focus is definitely shifting to total embodied carbon during the building’s sourcing, construction and operation,” says YKK AP’s Derick Clutchey, director of branch sales.

Kawneer reps say they also see interest in material transparency, environmental product declarations from the architectural community and growth of the retrofit market. “A lot of focus now is on how to reskin existing buildings, to make those buildings more energy efficient without necessarily knocking them down,” says Chris Giovannielli, director of global product management, Kawneer.

An interest in the reuse and recycling of building materi-

als also continues to expand. Giovannielli points out that better waste management and recycling is a byproduct of factory prefabrication. “If you think about how buildings and homes have been built over the last 50 to 60 years, there’s a dumpster at the job-site, and then all the cut-offs always wind up in a dumpster which goes to a landfill. ... What we’re beginning to see more of now is how we can recycle more of these materials,” he says.

Despite the increasing interest in manufacturing and specifying more carbon-neutral systems, Miller-Clapperton’s Miller says he still sees energy-efficient solutions, such as continuous insulation, dropped from projects when the cost gets too high. “The architects always

make a valiant attempt to get the proper [continuous insulation] designed into the project, but it's usually the first thing to be value-engineered out of a project. Everybody says it's an absolute requirement until you get the price, then all of a sudden, they can live without it."

### Remodeling and institutional building remain strong

Most industry reps report a slowing commercial sector. "The commercial segment and multi-family housing market has slowed in recent months, so cost-effective solutions are, and will become, more prominent in this space as budgets tighten," says Matt Syring, director of project planning, Sightline

Commercial Solutions. YKK AP's Clutchey says growth in commercial and multi-family is also very regional. "Larger markets like Atlanta, Boston, Houston and Los Angeles remain strong," he says.

Institutional building, however, is growing. Many reps said health care continues to be a strong segment. "Trends seem to be going to those freestanding emergency departments, smaller facilities that do 75% of everything, rather than a larger facility that does everything," says MillerClapperton's Miller.

University and K-12 school building is also a strong sector. For university campus building, Kawneer's Giovannielli says he's seen projects mixing retail and dormitories to "create an experience" for students. "Universities

are creating more of a 'back home' feel [with these new buildings] versus a five-story building that has punched-out little windows," which used to be common.

### After pause in interest rate hikes, companies plan ahead

Interest rates have been a major concern this year, with July marking the 11th interest rate increase by the Federal Reserve since March 2022. As of this writing, the Federal Reserve has not raised interest rates again, but may do so by the end of 2023.

For the most part, interest reps were fairly neutral about inflation and interest rate increases. Still, the possibility of a changing financial landscape is leading to project

pauses for larger, more expensive projects, says Tubelite's Avery. "Under any type of uncertainty, there's a bit of a delay. And there's some concerns around some banking situations right now."

Supply chain snarls remain mostly in the past, but companies have focused on securing vendor and supplier relationships to ensure resiliency. "Our procurement team continues to diversify our suppliers, as needed, to ensure we continue to provide our products to market in a timely manner. We have also enhanced our risk exposure and management strategies when it comes to our supply chain partners," says YKK AP's Clutchey. ■

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# GLASS HANDLING SAFETY

HANDLING GLASS REQUIRES THE UTMOST CARE AND ATTENTION TO ENSURE THE SAFETY OF WORKERS AND THE QUALITY OF THE FINAL PRODUCT

BY TARA LUKASIK

## SAFETY BY THE NUMBERS

According to the U.S. Bureau of Labor Statistics, for glass and glazing contractors in 2020, there were 2.7 total recordable cases of nonfatal occupational injuries and illnesses per 100 workers. While this is higher than the injury and illness rate for all building construction workers—2.3 per 100 workers—it's an improvement over the reported 2.9 incidents per 100 workers reported in 2018 and 3.7 cases reported in 2016.

For glass and glass product manufacturing workers in 2021, there were 3.5 total recordable cases of nonfatal occupational injuries and illnesses per 100 workers, and 3.2 total cases for flat glass manufacturing workers in the same year.

# W

Workers in the glass industry, whether in the field or the factory, are exposed to various hazards common in many construction and manufacturing environments, including the usual slips, trips and falls, or injuries from moving objects. But workers in the glass industry have additional safety concerns, including safely handling large, awkward, heavy sheets of glass; for installers, working at heights while installing glass in skyscrapers or other tall buildings; cuts and lacerations from sharp edges of glass or the tools used; exposure to dust and flying particles from cutting, grinding, drilling and polishing glass as well as solvents in adhesives, sealants and etching chemicals; transporting increasingly larger and more complex glass for installations; and more.

Glass handling safety is paramount in ensuring the well-being of workers and the integrity of glass installations. With proper training, handling techniques, inspection, PPE, a well-organized work environment, and effective cleanup procedures, glaziers can significantly reduce the risk of accidents and deliver high-quality glass products to their clients. But all workers, whether they have been in the job for one day or many decades, must remember that

when it comes to glass, safety should always come first.

“You may think you have handled glass a thousand times, but hazards are still there,” stresses William Davis with Vitro Architectural Glass. Davis presented a session on glass handling and processing in February at the Fenestration and Glazing Industry Alliance Annual Conference, and reminded participants not to become complacent about potential dangers. “You can get comfortable working with glass and that can make you forget hazards. Don’t get too comfortable.”

Handling glass requires the utmost care and attention to ensure the safety of workers and the quality of the final product. It’s crucial for companies, manufacturers and the workers themselves to make safety a top priority when working with glass. Regular safety training, adherence to guidelines and protocols, and a proactive approach to identifying and mitigating risks can help prevent accidents and injuries.

## TRAINING

Before embarking on any glass-related task or project, glaziers and glass workers should undergo a comprehensive training program that includes classroom instruction, hands-on practice and mentorship for new hires. Training should cover three essential areas.

**Glass properties.** Teaching workers the different types of glass, such as tempered, laminated and float glass, is essential. They may have specific handling requirements. Knowing their strengths, weaknesses and how they break helps prevent accidents.



**Equipment operation.** Familiarize workers with the tools and machinery they'll use, such as glass cutters, glass racks and suction cups.

**Safe handling techniques.** Teach proper lifting, carrying and installation methods. Workers should know how to distribute weight evenly and use mechanical aids when needed.

#### GLASS INSPECTION

Never assume that a piece of glass is flawless. Practice quality control and thoroughly inspect it for scratches, cracks, chips, and other defects and imperfections beforehand to avoid breakage during handling. Even minor defects can compromise the structural integrity of the glass, weakening it and leading to unexpected breakage during installation.

While ensuring that the glass type and dimensions meet the specifications required for the project, examine the edges of the glass for smoothness and uniformity. Sharp edges or irregularities may pose safety hazards and require further processing.

Finally, discard damaged glass promptly and safely. Cut large pieces into smaller sections, especially long, narrow trim pieces, and carefully place them in hoppers for disposal.

#### HANDLING AND STORAGE

Handling glass correctly is fundamental to safety. Teamwork helps prevent accidents, and two or more people should work together to carefully lift and position larger or heavier glass sheets to distribute the weight and maintain stability.

Carry glass vertically whenever possible to minimize the risk of breakage. And for large or heavy glass sheets, use suction cups or appropriate lifting devices such as vacuum-lifting frames to create a seal, making it easier to lift and move glass panes.

Glass should always be handled carefully to avoid introducing new defects. Store it in a clean, safe and upright position to prevent damage.

Finally, when glass is handled manually, always wear appropriate cut-resistant

gloves with a good grip to provide better control and reduce the risk of injury.

#### PROPER PPE

Personal protective equipment is the first line of defense and will help protect workers from cuts, lacerations and soft tissue puncture wounds caused from sharp or broken glass and cutting tools. Long sleeves and pants cover exposed skin to prevent cuts and abrasions. Closed-toe shoes or steel-toed boots with non-slip soles shield feet from heavy glass and tools and help to avoid slips and falls. Cut-resistant gloves prevent cuts and punctures while handling glass. Safety glasses or goggles protect eyes from potential glass fragments or splinters and debris. And hard hats prevent head injuries from falling glass or tools.

"Glass-handling PPE, and wearing it correctly for maximum protection, is critical," says Davis. The neck is a critical area with major blood vessels, and many glass incidents are fatal because the worker did not zipper their jacket or close

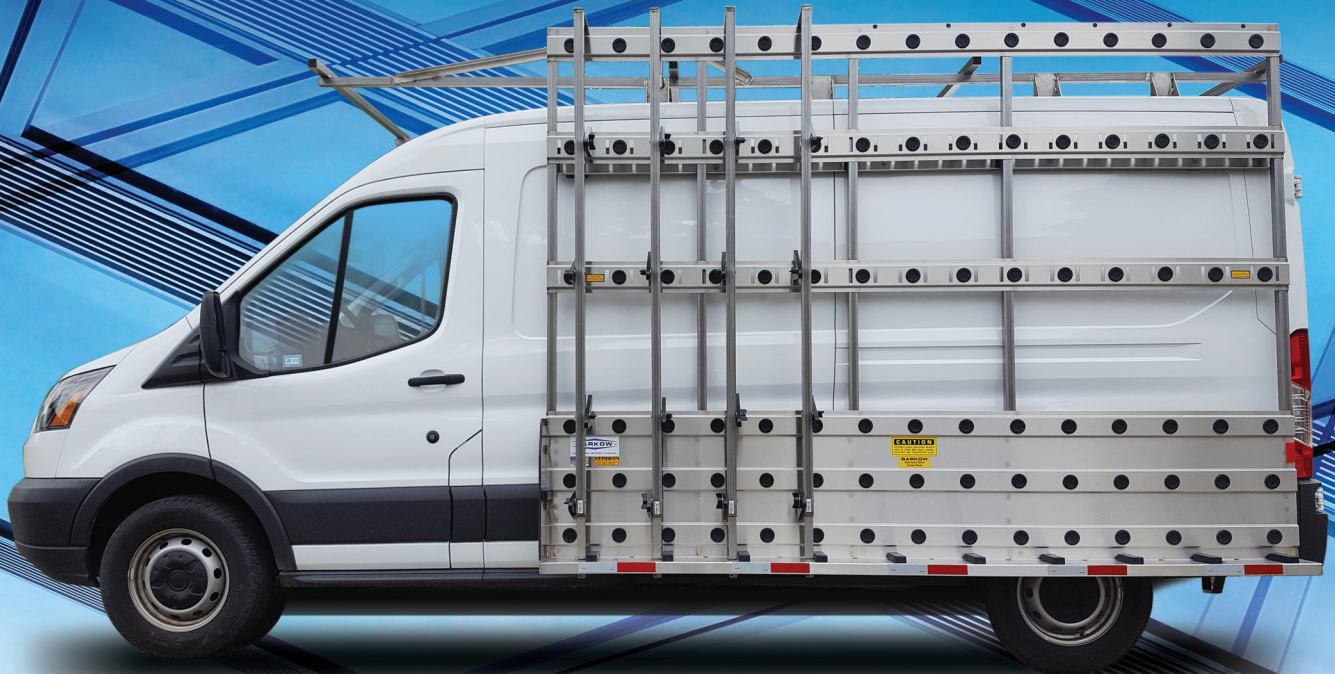
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the collar and was cut in the neck. “I see this violation a lot: unzipped jackets in hot plants,” he adds.

### WORK ENVIRONMENT

Keeping your workspace or work area clean and well-organized reduces hazards, minimizes the risk of accidents and promotes safety. Clear the work area of obstacles and clutter to prevent trips and falls. Provide adequate lighting to identify potential hazards, and for accurate glass inspection and precise cutting. Well-maintained, ergonomic tools and equipment for cutting, shaping and handling glass as well as sturdy workstations, shelves and designated storage racks for glass sheets help head off injuries. And ensure proper ventilation when working with glass cutting tools to avoid inhaling harmful dust and particles.

Be sure to label glass containers and storage areas to identify potential hazards and communicate potential risks to all personnel working with glass.

Finally, have a first aid kit readily available in case of injuries, and establish

clear emergency procedures.

### BREAKAGE AND CLEANUP

Despite all precautions, glass breakage can still occur. If glass breaks or shatters, cordon off and secure the area with warning signs or cones to prevent accidents. Wearing appropriate PPE (gloves and safety glasses), use a specialized vacuum cleaner designed for glass cleanup to collect all the broken glass fragments and dispose of them properly.

### SECURE TRANSPORTATION

In the warehouse, while loading glass sheets onto vehicles, the load can fall sideways. The same risk applies to large and unsecured items falling while unloading. A single sheet of glass may not seem like much of a hazard, but when several sheets are stacked together their combined weight can cause serious injury or even death. Always properly secure glass during transportation to prevent shifting or breaking. Use protective materials such as padding, foam or crates to cushion and stabilize glass.

Racking is also very important, as bowing and venting will occur if the angle of lean in the sheet glass racks is too great from the vertical. Sheets will also be unstable and be pulled over if the angle is too small. Plants can prevent impact or crush injuries with proper glass handling. If using a cart or rack, ensure glass is secure to prevent it from falling, says Davis. Whenever possible, push carts rather than pull them. “This provides more balance, power and control.”

When automated glass handling equipment is available, it is best to use it, according to Davis. “Never try to adjust glass when it is being moved or processed by automated equipment. Use approved glass handling lifting equipment and other assets whenever provided.” ■



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MUSEUM PROJECT HONORS **NATIVE**





# WORLDVIEW

BY RACHEL VITELLO

The First Americans Museum opened in Oklahoma City after 25 years of planning. This project thoughtfully implements the Native American circular philosophy rather than the traditional Western linear approach to architecture, according to a press release. The buildings and grounds primarily use spirals and ellipses instead of right angles and corners, and glass and metal systems were critical elements in helping the design team achieve this goal.

## DIGGING DEEP INTO DESIGN

Arizona State University professor Donald Fixico was the cultural and heritage advisor for this project. Fixico was the one who broached the idea of honoring the holistic, non-linear ways of native people, or the “circular” way of seeing the world.

While Western culture values land as a commodity, native cultures value it spiritually. Circles relate to the cycle of life, the seasons and the earth’s rotation, reflecting the native tradition of a circular worldview, according to a press release. The design evolved out of multiple circles suggested by arcs.

The concept for the museum honors 39 tribes in Oklahoma. The overall structure is a spiral that “begins in the earth and ascends to the heavens.” It comprises two arcs: the western arc featuring permanent and rotating exhibitions and the northern arc that houses theaters, retail, dining, and other services.

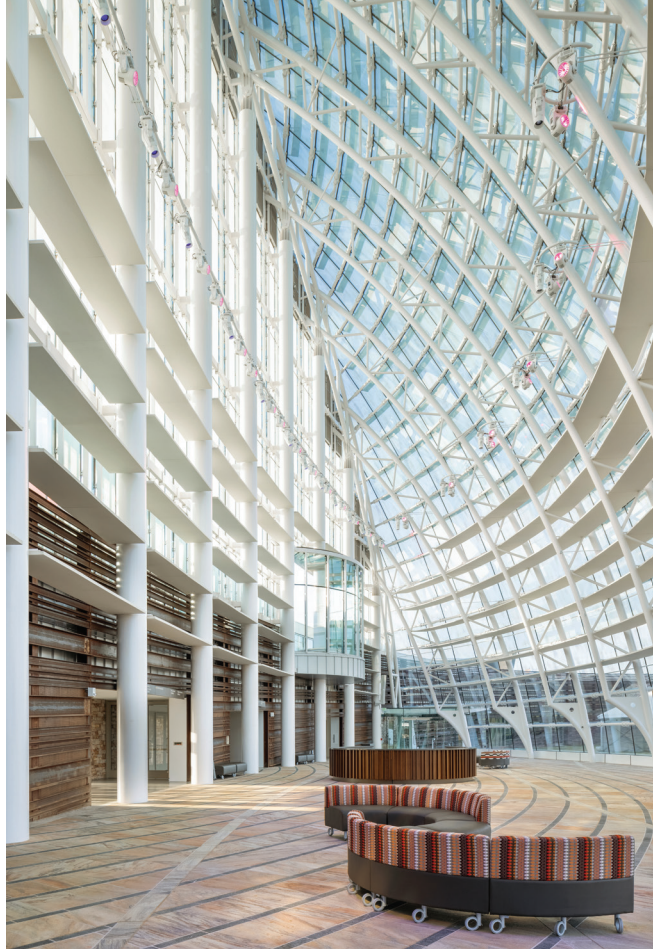
A 110-foot-tall prismatic glass structure called “The Hall of The People” acts as a starting point for visitors and a central gathering space. A Wichita grass lodge inspires its form, and it features 10 26-inch-diameter columns to represent the 10 miles per day that native people were forced to walk during the expulsion from their lands. Three sky terraces, representing the sun, moon and stars, provide visitors with views of the Oklahoma River and Downtown Oklahoma City.

## WHERE GLASS FITS IN

Founder of Tietsort LLC, Gus Tietsort, was the lead glazing contractor for the project. Tietsort LLC is an Oklahoma City-based glazing contractor.

“We [Tietsort LLC] like the challenging projects. We really got to spread our wings and stretch our ability,” says Tietsort. “There were a lot of unique challenges we had to navigate through with the non-traditional details included. Those took a lot of collaboration to complete.”

The glass systems used for this project included YKK AP America curtain wall with 1-inch tempered



glass units by Tristar Glass Inc.; glass entrances manufactured by Assa Abloy; a glass vestibule with 1 ½-inch laminated glass units in a ceramic frit pattern manufactured by Novum; a glass floor made with laminated floor panels by M3 Glass; a glass balustrade with clear tempered laminated glass by M3; and Dormakaba stacking partitions made with ½-inch Starphire glass from Vitro, fabricated by Tristar Glass Inc. The museum also features aluminum entrances by YKK AP with hardware supplied by Assa Abloy. Colorlite-painted glass wall panels manufactured by Tietsort are also featured in the museum. Tietsort exclusively produces these, which include architectural back-painted glass wall panels, partitions, doors, marker boards, countertops and more.

“It’s a great landmark for Oklahoma City and, as far as glazing goes, it’s highly visible, unique and significant for [our industry],” adds Tietsort. “I can appreciate working on a project where

design sometimes takes precedence over function. It’s nice to have the ability to participate in those projects.”

## MORE PROJECT SPECIFICS

The museum is 175,000 square feet, including a 4,000-square-foot First Americans Museum Center and a 280-acre campus along the Oklahoma River. The design architect for this project was Johnson Fain, an architecture, planning and interior design firm based out of California. Hornbeek Blatt was the associate architect.

A nonprofit corporation, the American Indian Cultural Center Foundation, manages FAM. The AICCF was initially established in 1998 to facilitate fundraising activities for the project and manage funds received through charitable gifts and grants.

The museum was recently selected as one of 10 Urban Land Institute’s Americas Awards for Excellence winners. Learn more at [famok.org](http://famok.org). ■

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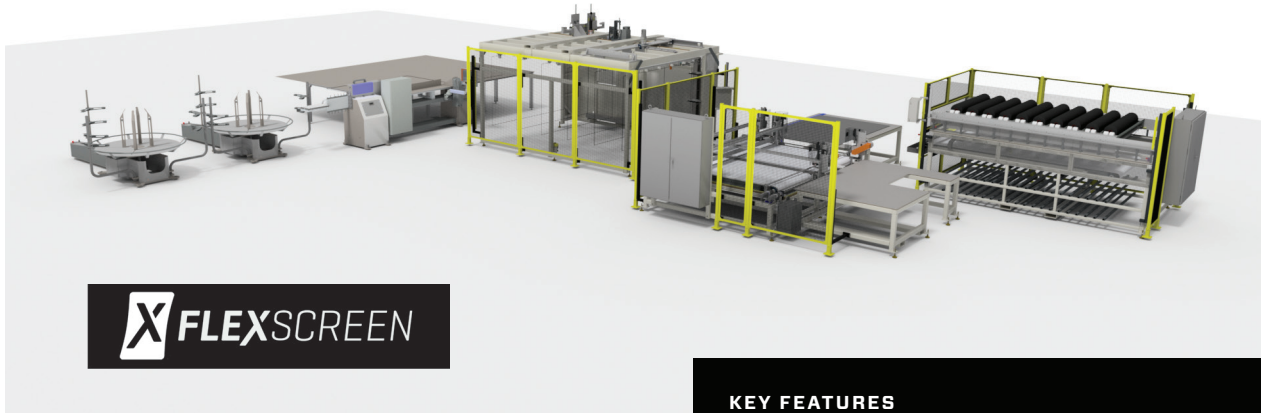
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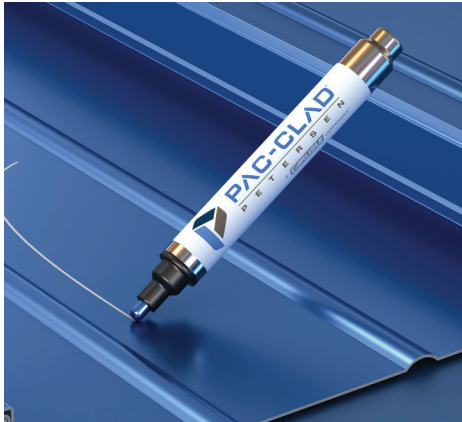
FlexScreen appeared on U.S. business reality television series Shark Tank in 2020, winning a deal with inventor and entrepreneur Lori Greiner. "FlexScreen is one of the most innovative household products we've seen on Shark Tank," says Greiner on the FlexScreen automated window screen line and FlexScreen/

Erdman partnership. "Licensing the manufacturing technology was the next logical step in making FlexScreen the industry standard. I'm excited to be a part of history in the making and proud to partner with Joe and his amazing team."

For more information, visit [erdmanautomation.com](http://erdmanautomation.com) or call 763/389-9475 and [flexscreen.com](http://flexscreen.com), 888/983-3539. ■

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01



02



03

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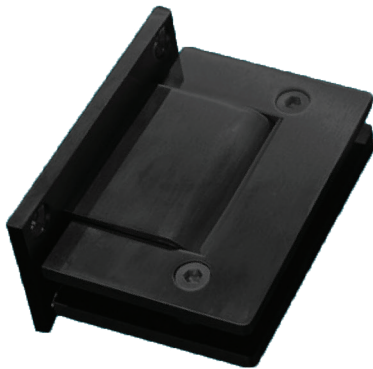
### 03. Tempered glass

sedak tempered+ is a new generation of fully tempered and heat-strengthened glass with no anisotropies, meaning it's not visible to the naked eye. Like common tempered glass, sedak tempered+ is produced by heating the glass to a high temperature, usually around 1,184 degrees Fahrenheit, and then rapidly cooling it using fans. Through its manufacturing technique, sedak tempered+ achieves all technical properties needed for tempered glass in line with all codes, but with better clarity and vision. +(49) 8212-4948-23 | SEDAK.COM

# GLASS HANDLING + TRANSPORTATION EQUIPMENT SHOWCASE



01



02

## 01. Sunshades

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01

Handling and transportation equipment is vital to help companies complete large, complex projects and to move glass and other supplies safely and efficiently. The following lists various transportation and handling equipment that may make your jobsite or factory operate more efficiently.



02

**01. Salem Fabrication Supplies**

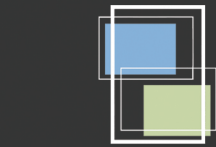
Salem Fabrication Supplies offers a low-profile manual rotator/tilter with pad channel. It's designed to fit in tight, narrow spaces and is ideal for glazing and window installation applications. It features a channel design similar to the P1 Lifter Series, a dual vacuum system, an adjustable lift point, removable pad frame extensions, and a 1,100-pound load capacity when using six pads. It comes equipped with a Quadra-Tilt design and Intelli-Grip technology.

800/234-1982 | SALEMFTG.COM

**02. Winlet**

The Winlet 915 is a material-handling machine with a 915-pound lifting capacity and an 11-foot, 4-inch reach. Its slim width allows easy navigation in confined workspaces. The 3-inch hydraulic sideshift ensures precise positioning. A front-wheel-drive system combines power and safety and precise control via full hydraulic linear movements and a multi-function controller. It excels in various industries, including construction and manufacturing.

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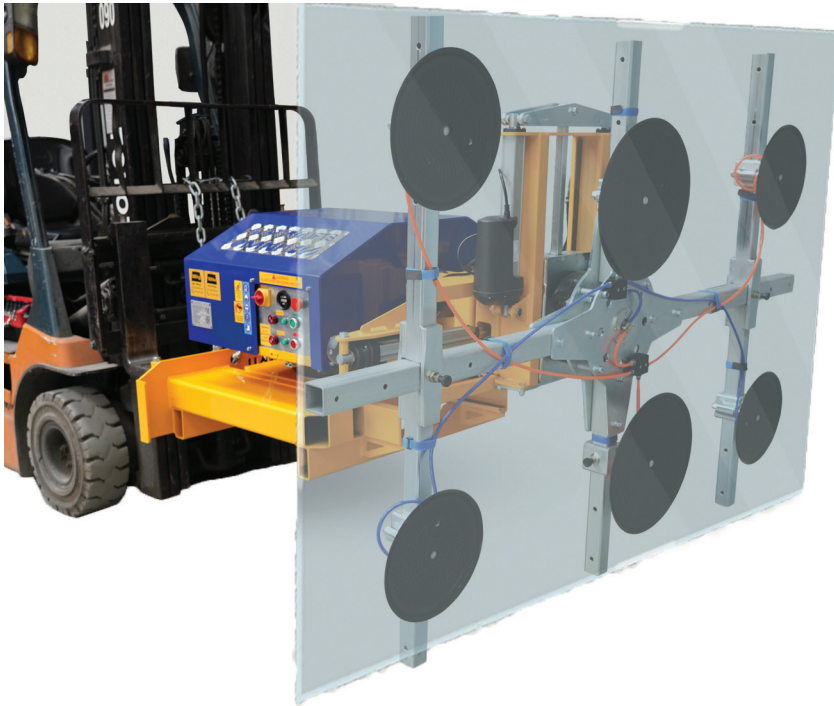


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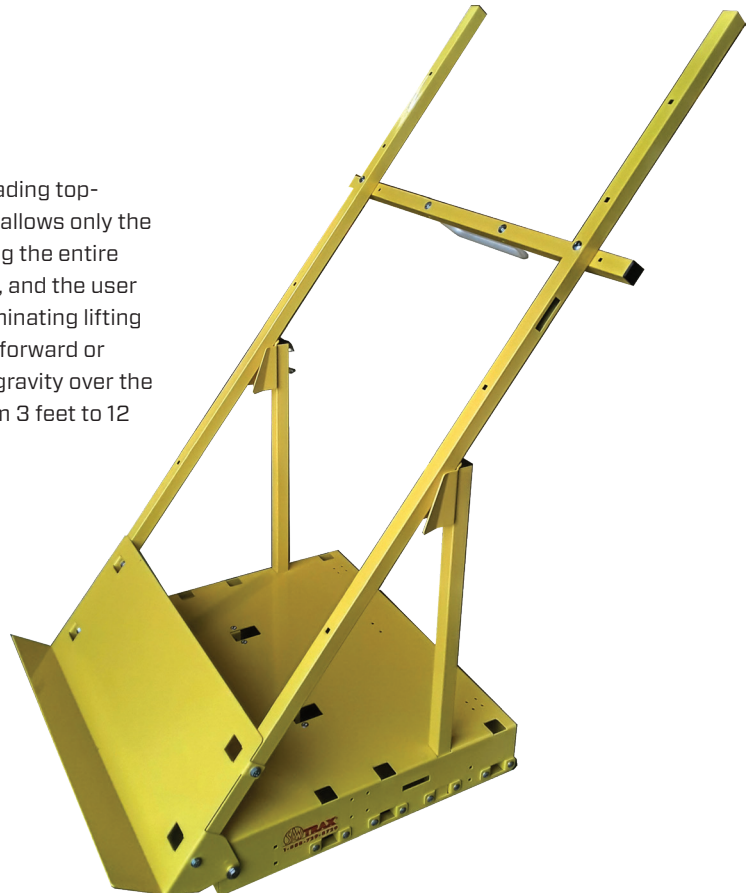
**Quattrolifts**

The Omni 1800 glass lifter by Quattrolifts is controlled via wireless remote, with six degrees of precise remote-controlled movement. It has a fully integrated and independent power supply to drive electric actuators and vacuum pumps. It glazes multi-story buildings and houses using a tele-handler, or off-road forklift, and allows for safe and efficient glazing of glass and windows weighing up to 1,800 pounds both inside and outside a building envelope.

301/748-7127 | QUATTROLIFTS.COM

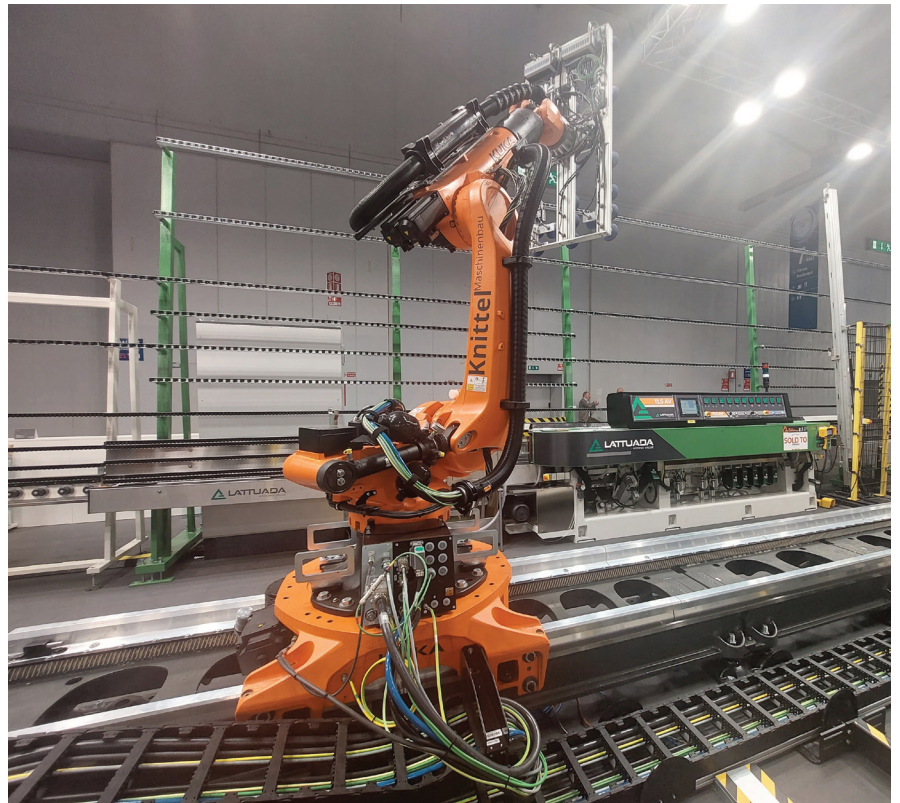
**SawTrax**

The Scoop Dolly makes loading or unloading top-heavy objects easier. Its unique design allows only the “scoop” section to pivot instead of tilting the entire dolly. The dolly lip slides under the item, and the user pulls it back rather than lifting it up, eliminating lifting injuries. Adjusting the support saddles forward or backward keeps the object’s center of gravity over the dolly base. Users can carry objects from 3 feet to 12 feet tall. 770/974-0021 | SAWTRAX.COM



### Lattuada North America

Lattuada North America's Knittel Robotic Solution provides increased automation levels, higher productivity and cost reduction since it requires only one operator. It's not fixed on the floor, but running on a track, and can reach a maximum speed of 92 inches per second. A new feature is a device to control a correct position on the glass edge. Customers can load the glass on the rack without a reference/zero point. 567/249-4486 | LATTUADA-NA.COM



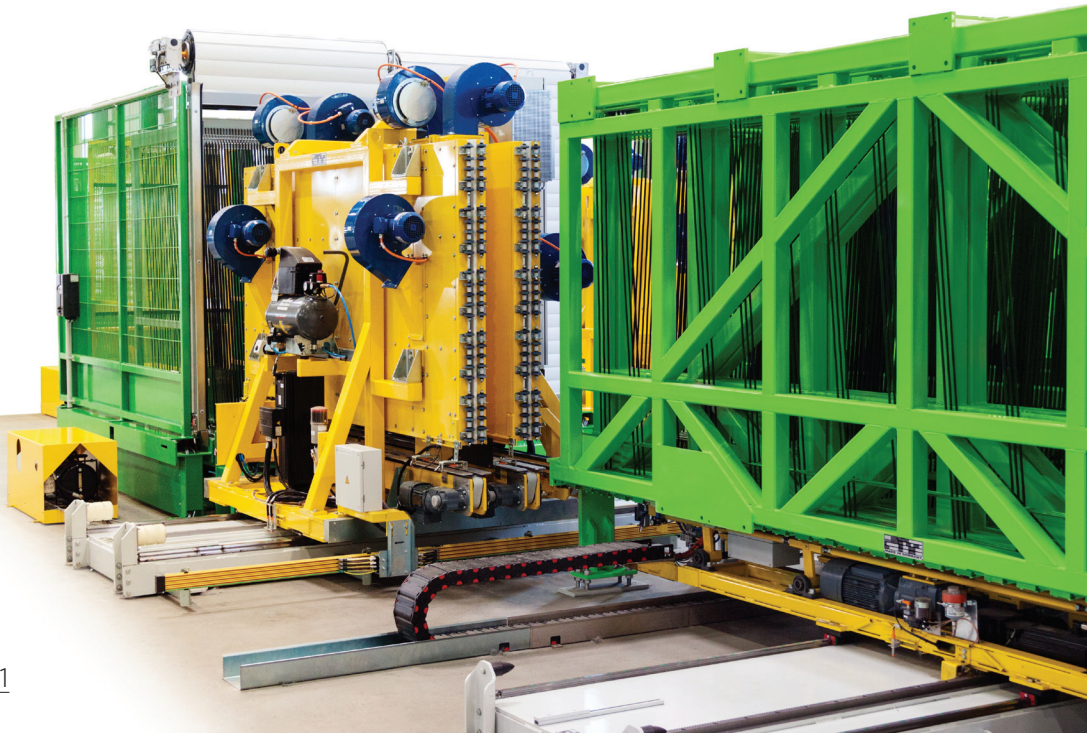
For nearly 60 years, Wood's Powr-Grip has put vacuum lifting power in your hands, providing you with a grip you can trust. The new 8" pad design is the best one yet.



“BEST ONE YET”

- Chris Nitschke  
33-year Pro Glazier





01



02



03

**01. Hegla**

The Hegla SortJet provides automation and integration of glass flow between cutting systems and subsequent insulating glass, lamination, tempering and other fabrication processes. It eliminates manual handling and improves quality, safety and throughput while reducing labor demand and optimizing process utilization. It can accommodate production integration across multiple process locations.

404/763-9700 | HEGLA.COM

**02. Wood's Powr-Grip**

Wood's Powr-Grip's 8-inch hand cup pad features fast attachment and release. When the cup is first applied firmly to a load surface, the pad establishes an initial grip on the load, keeping the cup in place until the user finishes the vacuum attachment by pumping the plunger. While some users could do this with earlier versions of a standard 8-inch hand cup, the result was never certain because it had never been engineered into the pad design. Now, this initial grip can be achieved more consistently.

406/628-8231 | WPG.COM

**03. OmniCubed**

Portable and maneuverable, the low-profile Pro-Dolly HD1 by OmniCubed is a grab-and-go solution for navigating shop floors and doorways with ease. With a weight capacity of 750 pounds per dolly, it ensures secure transportation of heavy glass pieces. Its construction aims to guarantee stability, mitigating the risk of accidents and damage. Engineered ergonomically, it minimizes worker strain during glass handling. It accommodates various glass sizes and thicknesses.

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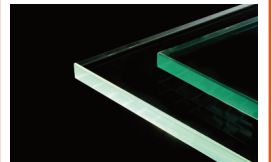


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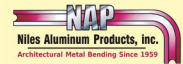
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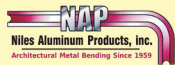
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Fax: 514/326-9982  
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joe@allmetalspecialties.com  
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Riot Glass LLC **ADV**  
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US (FL): 800/780-5051  
Fax: 610/534-3202  
E-mail: cservice@strybuc.com  
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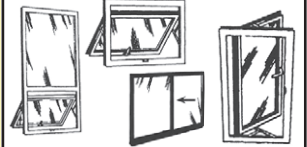
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# TOP GLASS

CONFERENCE & EXHIBITS 2024

A logo celebrating 10 years. It features a small horizontal bar at the top with segments of blue, green, red, and black. Below this, the number '10' is written in a large, bold, blue font, and the word 'YEARS' is written in a smaller, blue, sans-serif font directly underneath it.

10  
YEARS

A photograph of a modern glass skyscraper. The glass panels reflect the surrounding environment, including other buildings and trees with vibrant autumn foliage in shades of red and orange. The sky is a clear, pale blue. The overall composition is a low-angle shot looking up at the building's facade.

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Industry Spotlight profiles people across the glass and glazing industry, showing off the work of individuals while demonstrating the range of exciting careers in glass. To suggest someone to profile, write to Senior Editor Norah Dick, [ndick@glass.org](mailto:ndick@glass.org).

## CHILDREN'S BOOK FOCUSES ON THE QUALITY OF THE TRADES

BY RACHEL VITELLO



“Grit Leads to Greatness” is a children’s book written by duo Jenny Kerr Schroen and Chris Eccleston of Delmarva Veteran Builders that is about a brother-sister duo who help save society with the help of different creatures, who each represent a different trade. Delmarva is a commercial general contractor based in Maryland that has done projects spanning the commercial and institutional sectors.

### Message and goals of the book

A primary purpose of the book is to show young people that the trades hold many opportunities for rewarding and successful careers.

“Overcoming challenges leads to greatness. The construction industry uses grit every day because you’re constantly overcoming obstacles and challenges, problem-solving, and you must continually move forward. You can’t give up because people are depending on you,” says Schroen of the book title. “We believe this tagline

represents who we are as an industry and can also teach the world something as a character trait. That’s where we started with the children’s book idea.”

The book follows siblings Tegan and Trig who live in a dystopian society hypnotized by mysterious glowing stones. To save society, the brother-sister duo embark on a journey where they encounter creatures who help them. The creatures represent different trades, including welding, carpentry, plumbing, electrical and masonry. The first creature the children come across is Mason the mason. The siblings are climbing a steep mountain trail, blocked by construction of a retaining wall that is making it safer for travelers. They decide to stay and help build the wall until they can pass safely. They also learn from Mason that stone masonry can be an art form.

### Looking ahead

To further their goal of getting the next generation interested in different trades, the authors are planning on participating in a Read Across

America Week from March 4-8, 2024. Construction, manufacturing, glass and other trades companies are invited to participate by purchasing books to give to their local elementary schools and sending employees to read to students. They say Delmarva and other local companies have participated in past reading events at local schools in Maryland that have been a huge hit.

“Nathan, our glazing contractor, was with the third graders for about an hour and a half answering all their questions. [The students] just wanted to keep talking and he was telling them about stuff he does in real life every day,” Eccleston says of how the event went this year. “He was having the best time, the kids were happy, the teacher was happy, it was really memorable. That’s really what we’re trying to do, just get kids interested in these topics.”

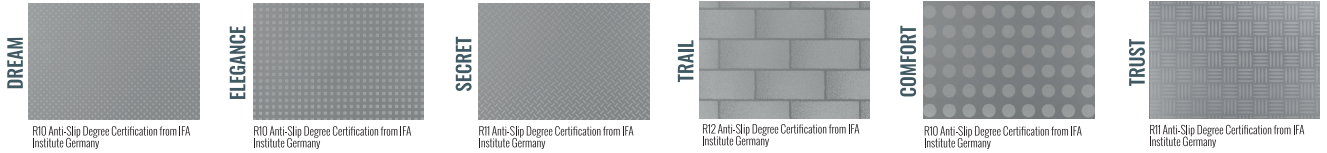
You can learn more about “Grit Leads to Greatness” and its mission, and how you and your company can participate in Read Across America Week, at [gritleadstogreatness.com](http://gritleadstogreatness.com). ■

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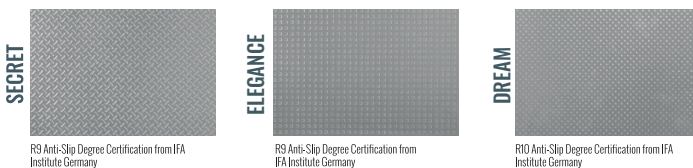
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Photo: alanblakely.com

## Colorful metal panels mimic signature sculpture

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View the case study and video



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