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**On the cover:** The University of Virginia Health System in Charlottesville, Virginia, recently underwent a major expansion project. 2021 Top 50 Glazier Pioneer Cladding and Glazing Systems was the glazing contractor for the project, from architect Perkins and Will and general contractor Skanska USA. Pioneer handled design, fabrication and installation of glazing systems for the expansion.

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Innovative projects from Top 50 Glaziers.

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### GETTING SPEC'ED What's Driving Specification 2.0?

By David Vermeulen, TGP



### INNOVATION Pushing the Boundaries of Glass

By Chris Phillips, Showcase Shower Door



### FORECAST A Positive ABI Report

By Max Perilstein, Sole Source Consulting

## PROJECT NEWS



Featured in Glass Magazine Weekly and on GlassMagazine.com. To submit projects, write Norah Dick, ndick@glass.org. Pictured: One Vanderbilt in New York City. Tvitec System Glass fabricated large format glass up to 26-foot tall for the lobbies of the two projects. Photo by SL Green.

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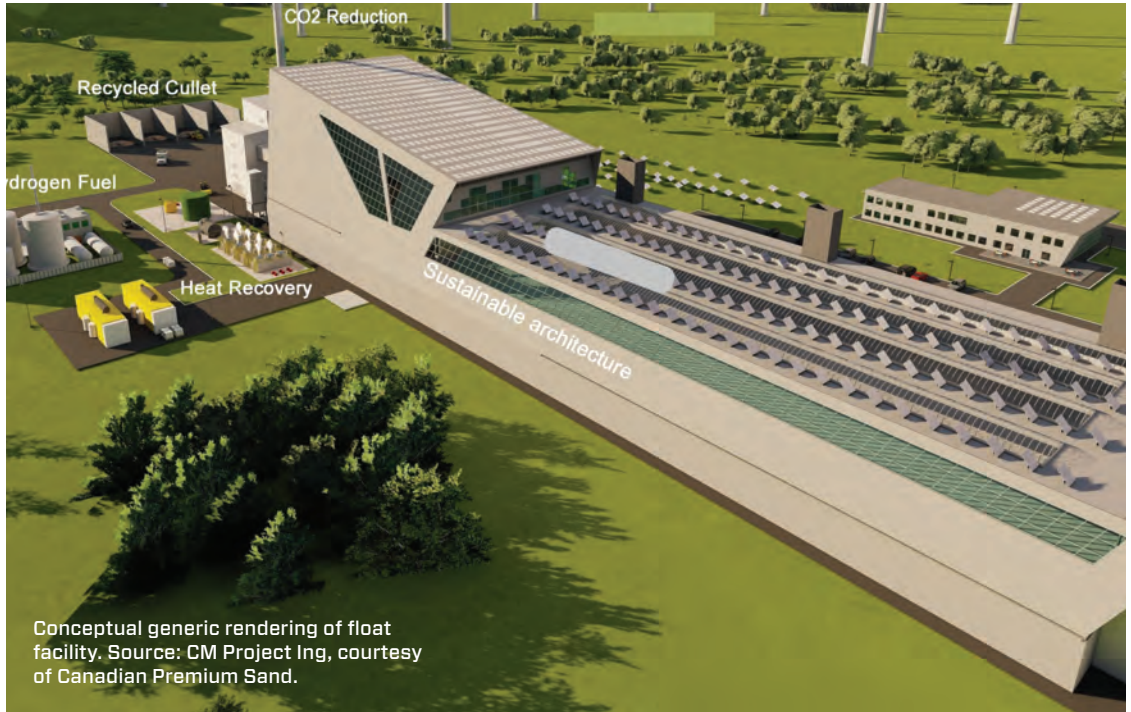
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## Introducing a New Name in Float Glass



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

It's not often the North American float glass industry welcomes a new plant, let alone an entirely new company, to the market. So, the March announcement that Canadian Premium Sand would be throwing its hat into the glass ring and starting up a float plant outside of Winnipeg, Manitoba, certainly caught the industry's attention.

CPS, a sand mining company based in Calgary, plans to build a sustainable float glass manufacturing and coating facility. The plant will rely on high-quality silica sand from the company's Wanipigow, Manitoba, sand deposit to produce coated high-performance glass and low-iron glass for the growing solar glass market.

The newly formed glass arm of CPS, called Wanipigow Glass, would mark the return of float glass production to Canada, a distinction that, up until February, looked to be going to Xinyi Glass, which announced a Canadian float plant in Ontario back in 2018. However, Xinyi's plans have been twice quashed due to local pushback—first in Guelph Eramosa Township and then in Stratford—and in February, officials announced they were indefinitely suspending plans for the facility.

I was able to meet with the CPS management team to ask about their ambitious endeavor into a new market. What attracted a sand mining operation to float glass in the first place? Why Winnipeg? And how will the company navigate the approval challenges that twice stymied one of the largest float glass producers in the world?

Glenn Leroux, president and CEO, and Anshul Vishal, vice president of business development, expressed confidence in the plan and excitement in the growth potential of the solar glass market. They say the time is right, with the current North American supply of float glass struggling to keep pace with demand, and the place is right, with Winnipeg's access to not only high-quality low-iron silica sand, but also to renewable energy sources.

"We have a vision for this. We have support from the community and [ways to address] problems for sustainability," says Leroux. "We really believe there is an immense amount of potential here. ... Winnipeg is an underappreciated distribution hub. The whole area of the Western states is at our doorsteps. ... In five to 10 years, this area could become a center of excellence for glass."





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## EDITOR'S NOTES

### Why float glass?

Wanipigow's sand deposit was not initially intended to be used for glass. "We were developing the deposit for frack sand. ... But we all know what happened to the oil and glass sector. So we scuffled those plans," says Leroux. "We looked at this deposit from another light."

The CPS team tested the sand in the deposit to determine potential end-uses. "The lab test came back with low-iron, and we came to the conclusion that this is a very high-quality deposit for float glass," Leroux says.

Once the team knew float glass production would be an option for the sand deposit, it turned its attention to numbers. "We started looking at value-added manufacturing component of it—float manufacturing for the energy-efficient glass market, solar glass," says Vishal. "We looked at the input costs for where it's located, and it just jumped out as something that made a lot of sense."

The demand is there, they say. Float supply is already strained in North America, with a manufacturing deficit of about 900 tons per day, per CPS estimates. No other floats have been announced, and the gap between available glass supply and demand is anticipated to grow to 2,350 tons per day by 2025. "The more we investigated, the more we understood the cost/benefit," Vishal says.

### A sustainable focus

The Winnipeg location also provides an opportunity for sustainable manufacturing, they say. This begins with the local grid. "The Manitoba electrical grid is more than 90 percent renewable with hydroelectricity," Vishal says. "We're able to align very well with the provincial climate action priorities for sustainable development."

CPS intends to incorporate sustainable manufacturing initiatives such as waste heat recovery and enhancing fuel with oxygen. And the company is looking into water re-use. "The city just

spent a great deal of money on water treatment. We may be able to incorporate gray water," Leroux says.

The company's sustainable focus continues through its end products—high-performance and solar glasses. New energy codes and sustainable building standards are driving demand for such products, they say. According to CPS, the solar glass market has grown 466 percent in the last ten years and is expected to double in the next five years.

"We are looking at it from a holistic view and thinking about the embodied carbon of the products going into buildings," Vishal says. "We want to build a plant that serves the immediate needs [of the building industry] and can serve future needs as well."

### The challenges ahead

Leroux and Vishal say the roadblocks faced by Xinyi Glass are not a factor in the plans to build a plant near Winnipeg. "We've been watching what happened at Xinyi," says Leroux. "Xinyi had the capital; they had the expertise. They had everything a glass company would want. ... The only thing they didn't have was the social license. We're not worried about that at all. We have a jurisdiction where this makes so much sense—a piece of property in greater Winnipeg, a city that has a vision. We're bringing 300 permanent jobs with the potential to expand."

That's not to say CPS doesn't face its own hurdles—the first being financing. "We need to bring in the capital to bring us to the next phase," says Leroux. "We are out raising money to complete the engineering and permitting." CPS is working to raise necessary capital through 2021 with a goal of breaking ground in 2022.

The team's second challenge is building a team of glass experts. "We have to build a team. We want to bring in people who see this vision and have expertise to realize that vision. That is a key component of this," Leroux says. ■

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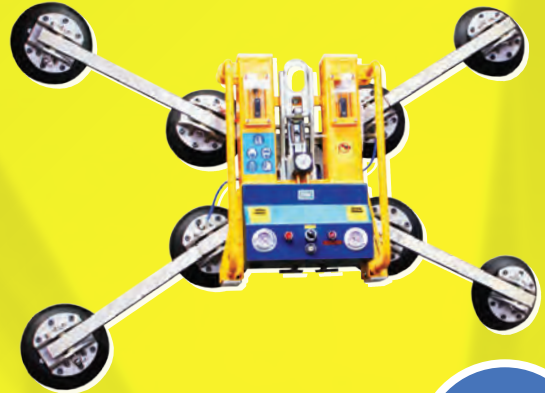
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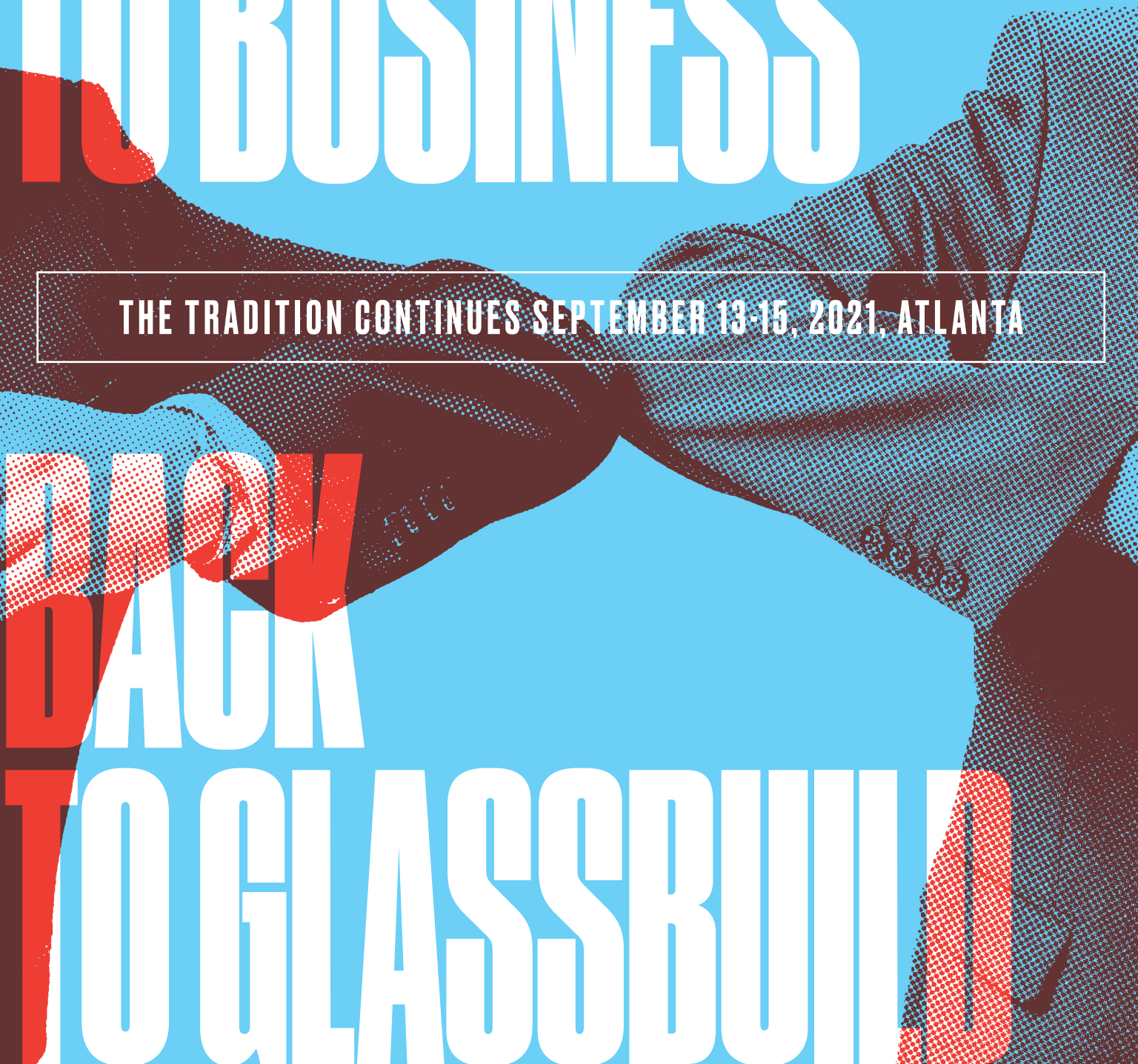
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# BACK TO GLASSBUILD



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Members will see news and articles about ASA in the NGA member newsletter and can browse and download free ASA documents by visiting the NGA Store and selecting Members Only under "Type" in the product search. ■

### DID YOU MISS BEC PRESENTS? WATCH ON-DEMAND

In March, NGA dropped the five-episode BEC Presents series. The episodes include a state-of-the-industry conversation, a legal take on the construction industry after COVID-19, insights into the changing commercial real estate market, and a codes and standards update.

The episodes are available for on-demand viewing in the NGA store at [glass.org/store](https://glass.org/store), and are free for members. ■

### WEBINAR: UNDERSTANDING THE TECH TABLES

In a recent NGA Thirsty Thursday webinar, Melissa Sztokowski, structural glass systems manager, Oldcastle BuildingEnvelope, explained key technical tables found in two important industry manuals: Engineering Standards Manual and Heavy Glass Door Design Guide.

Watch the webinar on-demand at [glass.org](https://glass.org). Click "Webinars" in the Education & Training menu. ■

### BACK TO BUSINESS, BACK TO GLASSBUILD

GlassBuild America: The Glass, Window & Door Expo—is back in person Sept. 13-15 at Atlanta's Georgia World Congress Center. Registration for the show is slated to open June 1 at [glassbuild.com](https://glassbuild.com).

North America's largest glass show, hosted by the National Glass Association, offers in-person products, interactions, and business opportunities for buyers and sellers across the supply chain.

"GlassBuild provides the safest, most productive space to grow your knowledge, business and market share. Join your peers, vendors, customers and competitors at the largest North American industry tradeshow this year," says Andrew Haring, vice president of business development for the NGA.

Running in conjunction with GlassBuild America will be the NGA's Glazing Executives Forum, scheduled for Sept. 13. Forum attendees will have an opportunity to go deeper into top-of-mind topics unique to installing companies. At this one-day conference, leaders of contract glazing and full-service glass companies come together to learn and share best business practices, and have an opportunity to walk the GlassBuild America tradeshow floor. For those who want to get more involved, a meeting of NGA's Installing Committee is also held in conjunction with the Glazing Executives Forum. ■



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## Protecting Glass Against Weld Splatter

Glass fabricators take great care during manufacturing to ensure that the products they make meet the highest quality standards. They carry these same standards to the packaging area, taking every precaution to deliver the products to the project in good condition. At the jobsite, there are many activities performed that can have negative effects on glass products, especially after glass is installed. One of these is welding, a common activity and the subject of this document.

### What happens to glass when exposed to weld splatter?

Splatter from nearby site welding or grinding/cutting operations can cause pitting of the glass surface, and in some cases, hot metal particles can fuse into the surface as seen in Figure 1. The pitting may be small in some cases or deep enough to penetrate into the glass's compression layer in others, as depicted in Figure 2. In either case, the strength of the glass is diminished. The basic tensile strength or modulus of rupture for annealed glass is 6,000 psi and two to four times that level for heat-treated glass. However, its strength can be significantly reduced by damage to its edges or surface, thereby reducing its ability to resist uniform loads such as wind loads.

Surface damage such as weld splatter can lower the tensile strength of the glass, which increases the probability of breakage at loads below that of the design load for the building. Glass stresses under uniform loads are greatest along the



Figure 1. Weld splatter on glass

## GLASS INFORMATIONAL BULLETIN—PROTECTING GLASS AGAINST WELD SPLATTER

lines of maximum deflection. These occur along the center line of the glass and along diagonal lines extending from the corners under typical trapezoidal bending behavior. Surface damage caused by weld splatter in these regions of the glass will significantly reduce the strength of the glass and its wind load resistance.

Weld splatter can be very visible on reflective coatings. This damage cannot typically be removed, thereby affecting the overall appearance of the installed glass.

### Different ways to protect glass

One of the oldest methods of protecting glass from welding splatter on a jobsite was to cover the glass with plywood during welding operations. While effective, the plywood is heavy and difficult to secure into position.

Today there are numerous products designed to protect materials from welding splatter. Woven 100 percent glass yarn, with a chemical treatment to increase resistance to heat, is available in bulk rolls. This glass yarn is woven into a drape material and resists high temperatures. Chemically treated woven acrylic drapes are available and offer good protection from medium heat. Canvas treated with a fire-resistant chemical and specially treated PVC can be used as protection from light duty welding. Treated welding paper can be used for light duty application on vertical surfaces only. All these products are designed for general applications and are not specific to glass protection. While not as difficult to install and remove as plywood, these materials do require some effort.

Polyurethane films with a flame retardant specifically designed for protecting glass is becoming increasingly available

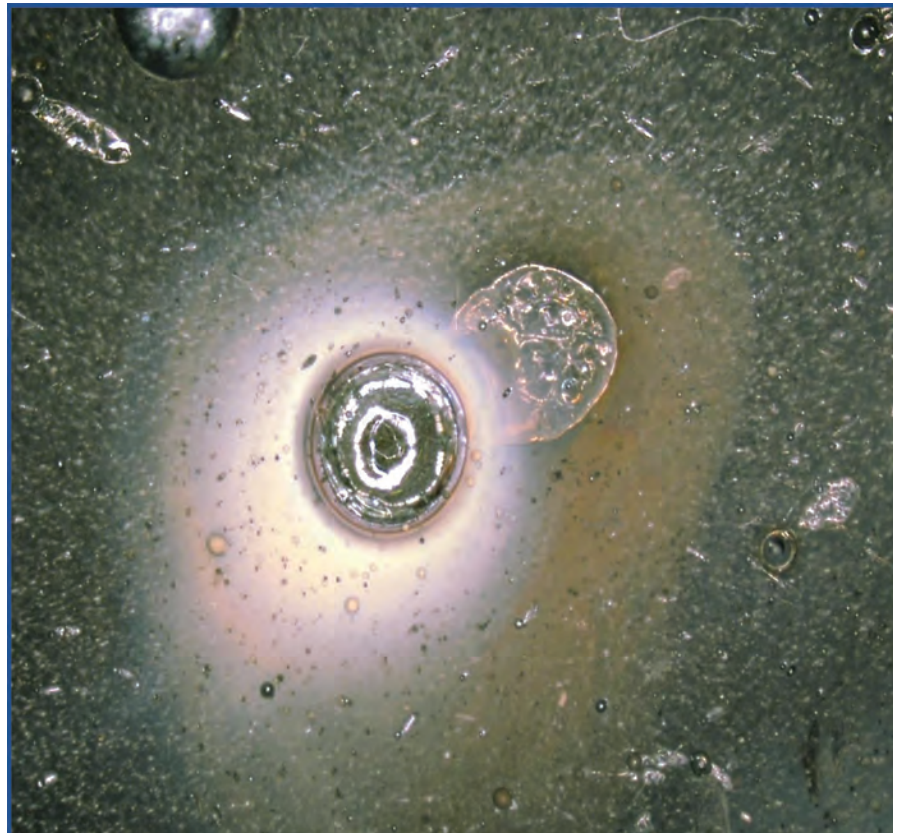


Figure 2. Close-up of weld splatter on glass.

in various roll sizes. These materials have a low tack adhesive and are easier to install and remove than some of the other materials. They provide protection from all but the most severe welding applications. Polyurethane films are a single-use only product.

As is usually the case, prevention is far better and less expensive than the actions required to fix weld splatter damage. Proper planning and execution of steps to protect the glass and framing systems from exposure to weld splatter is the best course of action.

To download this document, visit [glass.org](http://glass.org).

[glass.org/store](http://glass.org/store) and search for weld splatter.

For more information on this topic, visit the NGA Thirsty Thursday archive at [glass.org](http://glass.org) for the webinar “Restoring Glass Blemishes,” presented by Mark Schmidt of WJE Associates Inc. and Stephen Morse of Michigan Tech University. This session, presented as part of GlassBuild Connect, addresses common blemishes that can occur to glass-clad façades and methods to restore the blemished glass to an acceptable aesthetic while remaining structurally sound. ■





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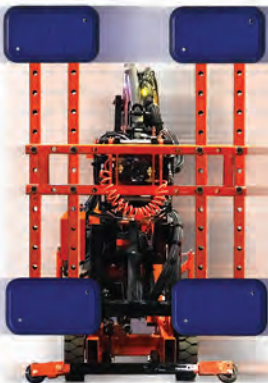
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## **Frameless Hardware Co., O3 Industries Acquire CGH Subsidiaries**

The Frameless Hardware Co. acquired substantially all of the assets of Columbia Commercial Building Products from Consolidated Glass Holdings, including inventory, fabrication equipment, and product designs for CCBP's entrance doors, storefront and curtain wall systems. Arcadia Inc. acquired CCBP's window line.

In addition, O3 Industries, a family investment company, acquired Solar Seal, which will now operate as the stand-alone corporation, Solar Seal LLC. No official information has been released about J.E. Berkowitz as of publication.

## **Canadian Premium Sand Plans Float Glass Facility in Manitoba**

Officials from Canadian Premium Sand Inc., or CPS, announced a shift in the company's business strategy to focus on developing its Wanipigow, Manitoba, silica sand deposit into a sustainable float glass manufacturing and coating facility.

According to the CPS announcement, the new float plant would be designed to utilize the best available technology with a focus on sustainability initiatives such as waste heat recovery and optimizing use of Manitoba's abundant and inexpensive renewable electricity to set a new standard for low-carbon footprint glass manufacturing.

## **Organizers Cancel glasstec 2021**

The glasstec International Trade Fair for Glass Production, Processing and Products will not take place as planned in June 2021 due to the ongoing COVID-19 pandemic and the continuing worldwide lockdown measures, as well as international travel restrictions. In close coordination with associations and

partners, Messe Düsseldorf has decided to cancel glasstec, which had already been postponed from 2020 to 2021 and was scheduled for June 15 – 18, 2021. The next glasstec will be held in line with its regular cycle from Sept. 20 – 23, 2022, at the fairgrounds in Düsseldorf, Germany.

## **AGC Issues Inflation Alert**

The Associated General Contractors of America issued an inflation alert in late March, responding to the construction industry's "unprecedented mix of steeply rising materials prices, snarled supply chains, and staffing difficulties, combined with slumping demand that is keeping many contractors from passing on their added costs." According to AGC officials, "this combination threatens to push some firms out of business and add to the industry's nearly double-digit unemployment rate."

Association officials called on the Biden administration to roll back tariffs on a range of key construction materials, including lumber and steel, that are contributing to the price spikes. They also urged the administration and Congress to work together to find ways to ease shipping delays that are undermining established supply chains. This could include providing temporary hours-of-service relief and looking at ways to expand port capacity, according to the release.

## **View Inc. and CF Acquisition Corp. II Finalize Business Combination**

View Inc., a Silicon Valley-based smart window company, completed its business combination with CF Finance Acquisition Corp., a special purpose acquisition company sponsored by Cantor Fitzgerald L.P. The business combination was approved by CF II stockholders in a special meeting held on March 5. View

shares are now traded on the Nasdaq Stock Market under the ticker symbol "VIEW" and its warrants will trade on the Nasdaq Stock Market under the ticker symbol "VIEWW."

## **Quanex Adds Screens Facility in Allentown, PA**

Quanex Building Products recently announced the addition of a 60,000-square-foot screens facility in Allentown, Pennsylvania. The site features enough capacity to operate up to 15 window and patio door screen lines, along with full shipping, receiving and warehousing capabilities, according to the company. Quanex also expanded its relationship with ISC Group, a sales agency serving the fenestration industry that will focus on selling its screens products and services.

## **AIG Expands Capabilities in Knoxville Facility**

American Insulated Glass completed a number of improvements to the fabrication facility in Knoxville, Tennessee, designed to expand the facility's insulating glass fabrication capabilities and improve the level of service experienced by customers. The improvements to the Knoxville facility include a supplementary tempering furnace to increase capacity, the addition of a Lisec bending machine, a Lisec butyl extruder, and a new 96-inch automated cutting table.

## **Donald and Andrea Friese Donate \$50 Million to Medical Center**

Donald Friese, former CEO of C.R. Laurence Co., along with his wife Andrea Friese, donated a \$50 million gift to Providence Tarzana Foundation, a transformational donation that will support the expansion and renovation



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## NEWS TO KNOW

of Providence Cedars-Sinai Tarzana Medical Center.

The new, five-story patient tower will be named the Friese Family Patient Tower to honor Donald and Andrea Friese, their children and grandchildren. The donation marks the largest ever to a Providence hospital in California and is among the largest across the 52-hospital health system.

### Eastman to Upgrade and Expand Extrusion Capabilities for Interlayers Production

Eastman Chemical Co. plans to upgrade and expand its extrusion capabilities for production of interlayers product lines at its Springfield, Massachusetts, manufacturing facility.

According to the company, the investment will strengthen Eastman's supply capability to respond to regional and global demand for Saflex polyvinyl butyral products in the architectural market and enhance facility capabilities to enable production of specialty architecture, including thicker gauges and advanced tri-layer formulations such as Saflex acoustic interlayer products. The project is expected to be complete in the fourth quarter of 2021.

### Greco Opens New Fabrication Facility in Terrell, Texas

Greco Aluminum Railings, a manufacturer of architectural railings and metal products for multi-family and commercial structures, opened a new architectural railing fabrication facility in Terrell, Texas, a suburb of Dallas. The new 20,000-square-foot plant will initially focus on fabricating railings for U.S. commercial projects. The Terrell facility will coordinate production with the Hudson, Florida, facility that manufactures both railings and custom architectural metal products for the U.S. market. ■

*\*From Feb. 24 to press time April 1. Read these stories, and others, in their entirety at [GlassMagazine.com](http://GlassMagazine.com).*



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## LEGAL

# PREVAILING PARTY: THE CONTRACTUAL BOOBY TRAP

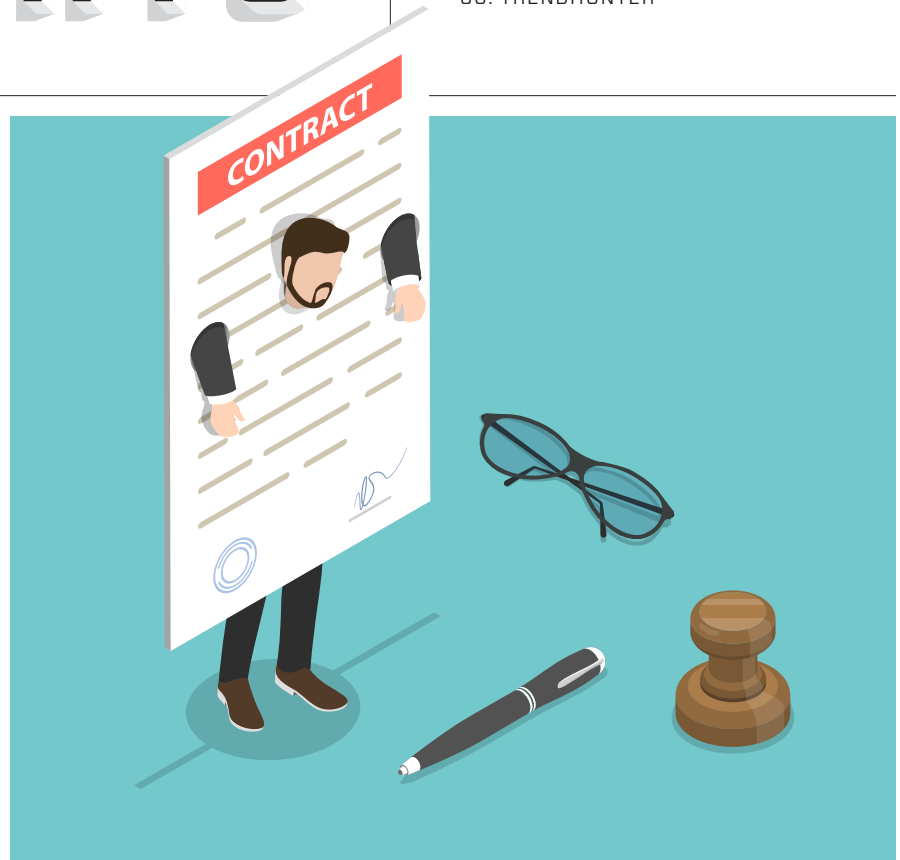
BY MATT JOHNSON



**A** contractual booby trap often overlooked is the “prevailing party” clause. This contractual term shifts the risk and expense of disputes and legal proceedings in ways that not only harm the bottom line, but also limit leverage and options when faced with adversarial claims.

The United States largely follows the “American Rule” when it comes to legal fees. This rule requires each party to a dispute pay their own lawyers, consultants and representatives. Despite that, virtually every state also allows contracting parties to define how fees and costs will be borne if there is a dispute on the contract. These terms are usually called prevailing party clauses.

On their face, prevailing party clauses seem reasonable. The concept is that by increasing cost risk frivolous claims are discouraged and parties are less likely to default to legal proceedings. In the real



world, these clauses are often abused and can present “bet-the-company” risks to small trades like glaziers. These risks come from the fact that the prevailing party terms are often vague, failing to define who prevailed and what fees are awarded, and are even hidden throughout contracts.

### Who prevailed?

The most common problem with these provisions rests in the failure to sufficiently define which party “prevailed” in a dispute. Where a claim is decided fully in favor of one party, the situation may be clear. In others, a party might feel it “prevailed” when it defended a claim but the award was only a fractional share of the original demand. In that situation, the defending party may still be required to pay the other side’s legal fees simply because it had to pay out on the claim, regardless of common sense.

### Which fees are covered?

Another risk is the failure to specify what fees are subject to award. Expenses in lawsuits or arbitrations are large and come from sources beyond lawyers. Court costs, experts, arbitrator fees and exhibits are just a few of the varied cost items that come with bringing or defending legal proceedings. There are few limitations on the scope of what can be recovered where a prevailing party clause does not define what costs are included or excluded.

### Are the clauses hidden?

Prevailing party clauses are also risky because they are often hidden in other clauses or do not have an easily identifiable heading. Language addressing fee recovery can be built into numerous sections of contracts and repeated multiple times throughout an agreement. For example, indemnity and “ADR” clauses



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often each have their own prevailing party language. So too can pricing disputes and change order provisions.

Beyond these drafting concepts, the simple presence of prevailing party fee exposure can impact options. Even where the clause is well-drafted, the additional cost exposure can impact claim strategies by limiting activities to manage potential cost exposure. These clauses can also influence overall value, with parties paying too much or getting too little simply to avoid fee exposure. Add to that the complexities surrounding whether prevailing party fees are covered by insurance, and the bottom-line risk is clear.

**Take care with the contract**

While seemingly reasonable, the realities accompanying prevailing party clauses are complex. Moreover, the only real way to address those complexities lies in the contract itself. Careful attention to these clauses and their

active negotiation should be as sensitive as other, more familiar risk terms like insurance and indemnity.

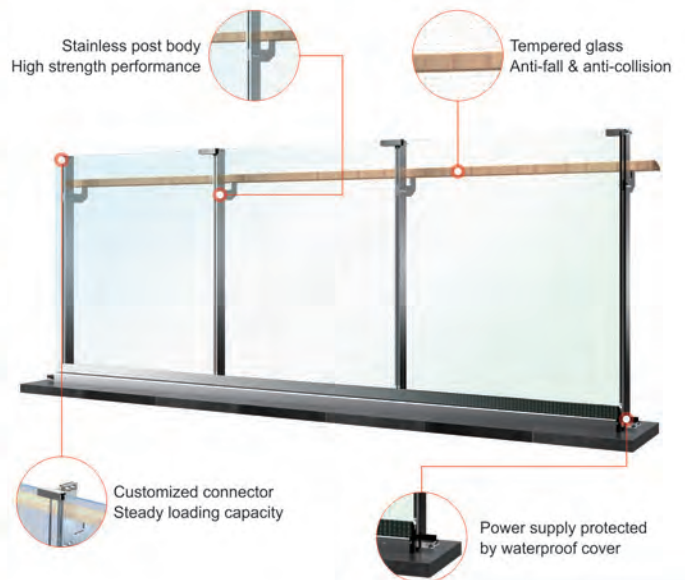
The best scenario is where prevailing party fee terms are removed from an agreement. This is the most equitable position and places the parties on equal footing. While one side may suggest that prevailing party exposure is needed to dissuade frivolous litigation, a reasoned response is simply why they think litigation must result. Parties are often sufficiently motivated to simply do good work to avoid litigation.

If the clause remains in place, the risks noted earlier must be addressed. Care must be taken to specify who is the “prevailing” party in any dispute. Contractual disputes rarely result in a clear success for one side, so the contract must address that potential. Better prevailing party clauses also anticipate things like cross-claims, dollar-value thresholds and dismissal values within their definition of who is entitled to an award of fees.

Likewise, and while not all costs can be identified, managing prevailing party exposure is helped by specifically defining included and excluded costs. Given the variety of costs that can accompany a dispute, negotiations on this point are often easier when there is an agreement to specifically identify recoverable costs, and everything else is disclaimed.

And where faced with huge contracts, careful review is required to ensure all prevailing party clauses have been identified. Admittedly, this can be a lengthy review. Even so, the effort to identify these clauses early can realize a reasonable return on investment by limiting prevailing party exposure at a later date. ■

Matt Johnson is a member of The Gary Law Group, a Portland-based firm specializing in legal and risk issues facing manufacturers of glazing products. He can be reached at [matt@prgarylaw.com](mailto:matt@prgarylaw.com).



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## MANAGEMENT

# ARE YOU READY FOR THE CHALLENGES AHEAD?

BY MARCO TERRY



Every January, I take my company through a process to prepare it for the year's challenges. The goal is to position the company to handle problems and take advantage of opportunities.

I've adapted this process through the years, as I gained more experience running a business. I like this process because it is useful regardless of the economic circumstances. Some parts of this process can be done once a year. You may need to do other parts more often in response to changing market conditions.

## 1. Are your invoice collections running well?

Most business owners think about collections only from the perspective of the last step in the process—waiting for clients to pay. However, at that point, there is little you can do to improve things. Your only option is to call clients and ask for money.

The collections process should start before your client signs a contract. This idea is not as counter-intuitive as it sounds. It begins by having a process to check the commercial credit of your clients. Give payment terms only to clients who have good credit. This step by itself solves many problems.

If you use your own contracts, ensure they have well-written payment clauses. If you use your clients' vendor contracts, review the payment clauses carefully.

Use a delivery acceptance document when you deliver products or services to your clients. The document should be signed by the right person, for example the site supervisor, GC, etc. An acceptance letter helps reduce

potential disputes later on.

Submit invoices promptly and include all relevant backup paperwork. Include a copy of the acceptance delivery document for their records. Follow your client's payment instructions carefully, especially if you work with large companies. Doing otherwise will only delay payment. Get a confirmation that the invoice has been received.

Lastly, follow up with late payers regularly, but treat everyone—even bad payers—professionally. It improves your chances of success. For more information, please see my column "Eight Steps to Getting Paid on Time" from the October 2017 edition of Glass Magazine.

## 2. Are your clients good payers?

The best invoicing and collections process will fail if your client has a bad commercial credit track record. This type of prospective client should either pay in advance or be avoided.

It's impossible to avoid every late payer, but you can improve your odds



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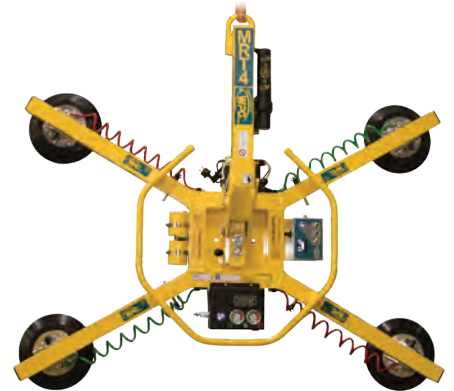
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dramatically by checking commercial credit reports. Companies such as Dun & Bradstreet, Cortera and others sell reports for very reasonable prices. Reports provide critical information such as:

- Payment history with other vendors
- Size of a company's other vendor lines
- Payment trends
- Suggested credit line

The pandemic has affected every company's credit profile. Check everyone. Never assume that a well-known brand must have good credit. Keep in mind that many famous brands are terrible payers.

### 3. Have you negotiated better terms with your suppliers?

Just as your clients pay you in 30 to 60 days, consider getting similar (or better) terms from your suppliers. Start discussions with suppliers and try to negotiate longer payment terms. Depending on your needs, ask for a larger line, longer terms or both.

### 4. Are you taking early payment discounts?

Taking early payment discounts can be a great way to increase your profits. If your vendors offer discounts and your finances allow it, consider taking them. Many vendors provide a 2 percent discount if you pay the invoice in 10 days or less. Terms vary by vendor. Those savings drop straight to your bottom line. For more information, please see my column “Strategies and Negotiation Tips for Early Payment Discounts” from the

August 2017 edition of Glass magazine.

### 5. Are your costs aligned with your revenues?

Costs and revenues must always align. If your company has a loss that your reserves can't handle, you have to cut costs. The sooner you do this, the better the outcome. If the company is profitable or breaks even, determine if profits and costs are sustainable. If they aren't, consider cutting expenses.

However, there is always a risk with cutting expenses too far. Your company could be unprepared to handle growth opportunities once market conditions change.

### 6. Are sales and operations performing?

We try to review general sales and operations performance at least once a year. Often, we go through this process every quarter unless things are hectic. This review helps uncover performance issues. I use simple key performance indicators, or KPIs, that help find potential problems.

### 7. Can you handle a bullwhip effect?

In simple terms, the bullwhip effect describes what happens to supply chains when demand shifts. Several industries have faced these effects during the pandemic. It started when demand slowed down, and everyone in the supply chain cut costs. When demand increased aggressively in some sectors, companies did not have the resources to respond.

This situation affects you in two ways. Once demand



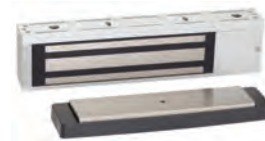
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picks up, you may face delays getting products from suppliers. If you made drastic cuts, your company would also affect clients who are downstream.

One can never fully forecast this effect because demand can be unpredictable. Countermeasures are not perfect and can add to expenses. These include strategies like order smoothing, good inventory systems, stringent return/cancellation policies and so on.

**8. Are you using your free time productively?**

Although things are better now for some, things can occasionally be slow. We implemented a rule that “free” time should be used productively. We classified activities into three areas.

**Create job manuals**

We asked everyone to document all the essential tasks they perform. This exercise was useful in case someone needs to take over in their absence.

This task was a high priority due to the pandemic. We needed to make sure all tasks would be done, even if some team members required medical leave.

This effort has been invaluable. We have documented many operational processes such as payroll, payables, invoicing, collections, sales and more. Team members documented their jobs with written instructions and short videos taken with a mobile phone.

This information has been helpful for training new hires or when colleagues had to fill in for someone. There is one additional purpose for this process: we have created an operations manual that will be helpful if (or when) we decide to sell the company. We know there is a need for this sort of information from our own experience. We finance business acquisitions and know that buyers always ask for operations manuals, but few sellers actually have them.

**Cross-train**

We have started cross-training people for some of the essential tasks of the business. This effort is especially important for companies in which some important jobs are handled only by one person. We made sure that more than one person knew how to run payroll, do collections and so on. This endeavor integrated well with the process of creating job manuals.

**Improve skills**

Creating manuals and cross-training took up most of the available time, especially because things picked up quickly for us. However, when time allows, we encourage everyone to improve their skills. Employee improvement is good for the company and great for morale. ■

Marco Terry is managing director of Commercial Capital LLC, a factoring company and provider of invoice financing to companies in the glass industry. He can be reached at 877/300-3258.

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# 3 APPLICATIONS TRANSFORMED WITH FIRE-RATED GLASS

BY DIANA SAN DIEGO



**G**lass has long been used by architects to add vision, transparency and a feeling of openness to an otherwise enclosed space. While the introduction of fire-rated glass took it one step further by adding a life safety function on top of vision and transparency, the development of fire-resistive glazing capable of meeting ASTM E-119/UL 263 gave architects the ability to design with glass like never before. Small fire-rated door lites and openings are transformed to wall-to-wall, floor-to-ceiling fire-resistive transparent walls, full vision temperature rise doors and even fire-resistive glass floors.

Here are examples of where this new breed of fire-resistive glass has transformed how architects design and reimagine spaces.

The University of Wisconsin School of Business Grainger Hall stairwell enclosure is designed with clear, fire-resistive butt-glazed walls using ASTM E-119/UL 263-rated Safti First SuperLite II-XLM with GPX Architectural Series perimeter wall framing. Photo by Safti First.

## 1. Stairwell enclosures

The design of stairwell enclosures is perhaps where fire-rated glass has had the most design impact in the last two decades. Traditionally, stairwells have had a more utilitarian function on a building. They are required to meet the more stringent fire-resistive wall standard for 1-2 hours because they perform specific life safety functions in the event of a fire: a means for safe egress so building occupants can evacuate safely or an area of refuge where occupants can



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60-minute fire-resistive glass floor, the GPX FireFloor System by Safti First, at the 21c Museum Hotel in Nashville. Photo by Mike Schwartz Photography.

wait for rescue if they cannot exit the building on their own.

Before the development of fire-resistive glazing that can meet the stringent ASTM E-119/UL 263 wall criteria, these stairwells were dark, closed off and away from view. They were seldom used because,

aside from being uninviting, the lack of vision into the space made stairwells a target for muggings or attacks.

Today, architects are using fire-resistive glazing to make stairwells a design feature instead of being purely utilitarian. New advances in fire-resistive

glazing technology, such as 1- and 2-hour clear butt-glazed walls in large sizes, add even more transparency and openness while still meeting the codes. Because these stairwells are full of light and vision, they are seen more prominently in buildings and used more frequently by occupants.

## 2. Glass floors

Certainly, glass floors are not new. But, fire-resistive, 1- and 2-hour glass floors are still a novel idea.

Testing for fire-resistive glass floors is grueling. The entire assembly (glass and frame) is tested to ASTM E-119/UL 263 with a load (typically 100 pounds per square foot) applied to the assembly for the entire duration of the test. If the assembly remains intact and limits the temperature rise to less than 250 degrees

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Clear, unobstructed views of the New York City skyline are possible in a zero lot line application thanks to oversized lites of SuperLite II-XLB in GPX Architectural Series framing by Safti First. Photo by Safti First.

Fahrenheit above ambient on the non-fire side, the assembly passes.

Designers use fire-resistive glass floors the same way they would fire-resistive glass walls: to bring natural light further into the building, or to maximize shared artificial lighting between floors. Not to mention, it provides a dramatic design statement to any space.

### 3. Lot lines

Fire-rated glass fulfills the designer's goals of having unobstructed views and natural light. In cities such as New York, Chicago, San Francisco or Boston, where buildings are typically in close proximity to one another, designers can turn to fire-rated glass to meet lot line requirements without sacrificing transparency.

Because the building code considers fire-resistive glazing that meets ASTM E-119/UL 263 as a wall instead of an opening—a very important distinction—it can be used in areas where exterior openings are not permitted all. Exterior openings are typically prohibited between 0 to 3 feet of the lot line, or they are limited in size per IBC Table 705.8. By using fire-resistive glass, designers don't have to sacrifice expansive clear views and abundant natural light in order to meet code requirements. ■

Diana San Diego is vice president of marketing for Safti First. Write her at [dianas@safti.com](mailto:dianas@safti.com).

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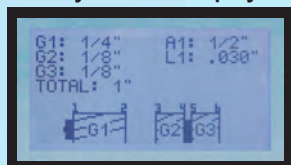
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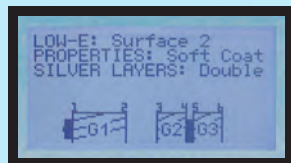


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The TS2300 is designed for efficiently testing float glass that has not had value added-features applied (i.e. coatings, tempered, laminated, etc.). Simply place the rugged meter on both sides of the clear float glass, and instantly read the results on the DIGITAL display. Because of its DIGITAL detection circuitry, glass processors no longer have to use a lamp style detector and make subjective guesses as to which surface is the tin side.



Model # TS2300

- **Backlit LCD Display** - Can be used in any light environment
- Powered by a standard 9-volt alkaline battery
- Includes an **automatic power-down feature** to further extend the battery life of the product.
- No expensive / fragile lamps to replace
- Less frequent battery replacement

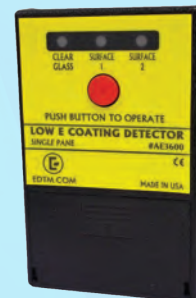
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Model # AE1601

- The "ETEKT+" Double Pane Low-E Detector has been the industry standard detector for over 28 years.
- Detect coatings on double pane windows in the field.



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# PROTECT WITH GLASS

## *Security glazing in schools*

**P**rotective glass and glazing solutions in windows and doors can provide security to school buildings through delayed forced entry. How can architects and school districts ensure they are choosing the appropriate products to protect students, faculty and staff in the event of an intruder or active shooter?

Design teams should determine the assets, the potential threats and hazards, and the level of vulnerability. This will dictate the level of testing or certification that is required before design teams specify the glazing. Many test standards are available to determine the suitability of glass for safety applications.

### **Specification considerations**

When deciding what level of protection to specify, consider these factors:

- Direct line of sight to students.
- Location and movement of students during an active shooter event.
- Distance and time for first responders.

This article is adapted from the School Security Glazing Glass Technical Paper from the National Glass Association. Download the GTP and others at [glass.org/store](http://glass.org/store).

“The task group of glazing professionals recognized the importance of helping school communities understand the levels of protection glazing can provide,” says Jen Daly, applications engineer for 3M and NGA School Security Glazing task group chair. “We hope this guide is a helpful tool in educating those making decisions on their school security options.”

### **NGA School Security Glazing Task Group Members:**

- 3M (task group chair)
- Eastman Chemical Co.
- Kuraray America Inc.
- Manko Windows
- McGrory Glass
- Midwest Glass Fabricators
- Oldcastle BuildingEnvelope
- SWM International
- Technical Glass Products
- Tristar Glass
- Trulite Glass & Aluminum Solutions
- Viracon



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Blast mitigation

Hurricane & tornado impact protection

Safety glazing



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## Specification considerations (cont.)

Design teams can also look for additional guidance from the Federal Emergency Management Agency's 2012 publication, "Primer to Design Safe School Projects in Case of Terrorist Attacks and School Shootings." The FEMA publication includes the following considerations in Appendix F:

- Use extensive glazing at main entrance to enhance visual surveillance to parking lots and pedestrian routes.
- Install openings or windows in solid walls to make areas adjacent to the school without line of sight visible from the interior.
- Consider using burglary- and ballistic-resistant glazing in high-risk school areas.
- Consider using steel windows.

---

## Security glazing selection

The appropriate glazing penetration resistance should be determined based on the below descriptions of levels of resistance: basic, enhanced, ballistic protection, forced entry, enhanced forced entry, multiple forced entry assault (ballistics plus forced entry) and blast mitigation.

**Basic:** the basic level of safety glazing is based on human impact forces and glass containment upon breakage. Often written into building codes, the intent is to ensure the glass has enough strength to withstand accidental impact with the glass, and has requirements that glass fragments be contained to avoid injury. The products rated for this category are recommended for situations such as slowing immediate entry through glass and reducing the ability of someone to reach through an opening to release a door handle. Products such as laminated glazing or surface-applied safety films are readily available to meet applicable test standards.

**Enhanced:** burglary-resistant glazing can be a deterrent to smash-and-grab crimes involving the use of hands, elbows, fists and general burglary tools such as a hammer. Products in this category are intended to deter vandalism, such as



An elementary school in Louisiana. The school features safety glass from Viracon, laminated with Vanceva Colors PVB interlayer from Eastman Chemical Co. The architect was Coleman Partners Architects. Photo by Miami in Focus Inc.

breaking into a display case or entering the building and fleeing.

**Ballistic protection:** bullet-resistant (BR) glazing is designed to resist penetration from a variety of firearm ammunitions. Several examples of bullet-resistant laminated glazing include all-glass laminates, glass clad polycarbonate laminates, glass laminates containing other rigid polymers, laminated polycarbonates, and glass/exposed plastic laminates (exposed polycarbonate or PET). Bullet-resistant glazing provides an improved safety barrier against bullets and related flying glass or plastic fragments (spall or splinters).

**Forced entry:** forced-entry (FE) resistant glazing is designed to increase the amount of time required to gain entry. This additional time is intended to allow for the enactment of lockdown protocols. These products may be used in areas with high risk of prolonged attack or in critical areas such as entry vestibules. Forced-entry-resistant glazing should meet the cri-

teria above and should resist penetration from handheld or hand-thrown objects such as hammers, crowbars, bats, knives, bricks and rocks.

**Enhanced forced entry:** products in this category are intended to meet the requirements for forced-entry-resistant glazing after being weakened by ballistic assault. The goal is to resist entry for an adequate amount of time to allow for the arrival of emergency response personnel. They are not designed for ballistic classification, thus the bullets may penetrate the glazing. Enhanced forced-entry testing can include shooting through the glass to weaken it followed by physical impact with various weapons. The glazing classification would carry an indication of the type of ballistic assault used along with a forced-entry classification.

**Multiple forced entry assault (ballistics and forced entry):** products in this category are designed to combine the resistance of ballistics classified laminates with additional resistance to

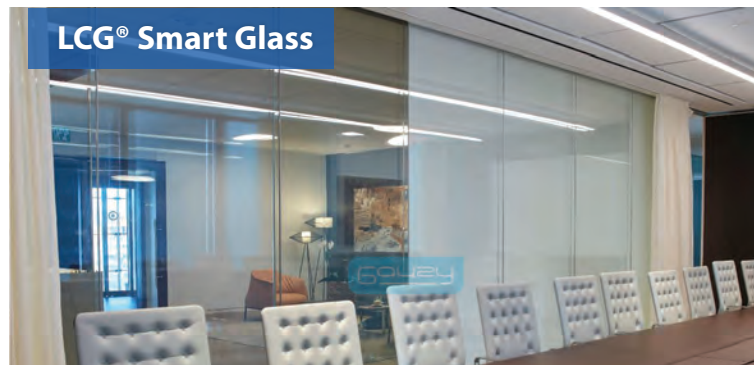


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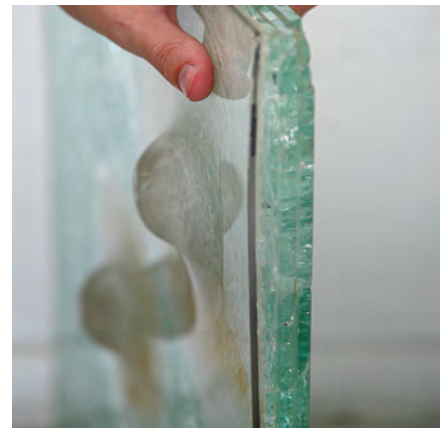
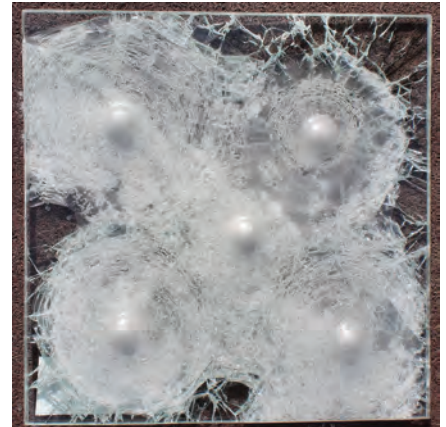
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Test 5-aa1 and ASTM F1233 tested forced entry resistant glazing. Visit our website to see the whole line of EntryGuard® products. While you're there, check out the design possibilities with Manko's Digital Designs™ In-Glass Printing and LCG® Switchable Smart Glass.



# Security glazing selection quick reference summary

		SECURITY LEVEL OF THE SELECTION*		
SECURITY SELECTION	TEST STANDARD	LOW	MEDIUM	HIGH
<b>Basic Safety Glazing</b>	ANSI Z97.1	Class B		Class A
	CPSC	Cat I		Cat II
	CAN CGSB	Class B		Class A
	ASTM F3006/ F3007	0.75 m Cat 2	3.66 m Cat 3	3.66 m Cat 2
<b>Enhanced</b>	UL 972	Std – 10 ft	Ind/ Outdoor	High Energy (40 ft)
	ASTM E2395	L1	L3	L5
	ASTM F1233	1	1.1	1.2
<b>Forced Entry</b>	ASTM F1233	1.4	2.3	5
	ASTM F3038 – mob with hand tools	5 min	15 min	30 min
<b>Enhanced Forced Entry</b>	ASTM F1233 Annex A2	3 shots with 9 mm handgun; Class 1.4	3 shots with .357 Magnum; Class 2.3	3 shots with .44 Magnum; Class 5.0
	UL 752	1 (9 mm hand- gun)	2 (.357 Magnum)	3 (.44 Magnum)
	ASTM F1233	HG3 (9 mm handgun)	HG2 (.357 Magnum)	HG4 (.44 Magnum)
<b>Multiple Forced Entry Assault (Ballistics + Forced Entry)</b>	ASTM F1233	HG1/R1-1.4	HG2/R2- 2.3	HG4/R3- 5.0
<b>Blast Resistance</b>	ASTM F1642/ F2912	H3	H2	H1



(Top) Glass that has passed the ball drop test, required for UL 972. Photo courtesy of Kuraray. (Middle) Sample of glass that passed the UL 752 enhanced forced entry test. Photo by Midwest Glass Fabricators. (Bottom) Trosifol Spallshield CPET laminate, tested for bullet resistance. Photo by Kuraray.



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Protective laminated glass is featured on a middle school in Florida. The project features Saflex Acoustic PVB interlayer and Saflex Storm PVB interlayer from Eastman. The glass fabricator was Viracon. The architect was DAG Architects. Photo by Shawn Sandusky.

forced entry. Testing for these glazing systems involves weakening the sample by ballistic assault but not allowing the bullets to penetrate. The glazing is then tested to withstand physical impact and attack with various weapons. This glazing would carry a ballistic and forced-entry classification and would be used in very high-risk areas, where intruders may be armed with guns.

**Blast resistance:** Blast-resistant glazing can substantially reduce injury from flying glass resulting from direct blast shock waves (over-pressures). When properly designed, framed and anchored, blast-resistant glazing is capable of maintaining the integrity of the building envelope following an explosion and reducing interior damage. Blast-resistant glazing may offer some level of burglary or forced-entry resistance but without testing to burglary or forced-entry standards, how much resistance is not quantifiable. Also, this glazing is not typically bullet-resistant without being tested to a ballistic threat level.

### Active tests and standards

There are no specific tests for security glazing in schools. However, design teams can look to a number of active tests and standards for security glazing that could apply to educational facilities.

#### Security glazing testing — glass only

**UL 972** - Underwriters Laboratories Standard for Safety for Burglary Resisting Glazing Materials

- This is a mechanical test in which a 5-pound steel ball is dropped from different heights to give a consistent impact force on the glass. This is a multiple impact test.
- The purpose of this test is to evaluate glazing resistance to repeated impact as a result of attempted burglary.

**ASTM F1233** — ASTM International Standard Test Method for Security Glazing Materials and Systems

- This test gives a wide range of threat levels and uses various hand tools

and/or ballistic attack to give a resistance rating to the penetration of the glass.

- Glazing tested with ballistic attack prior to forced entry attempts is rated based on whether or not the bullet passes through the glazing.

**ANSI Z97.1 Standard** — Safety Glazing Materials used in Buildings – Safety Performance Specifications and Methods of Test

- This test is based on the force of an average size adult either walking into or running into a sheet of glass. A 100-pound swing bag is dropped from two different heights to determine the rating.

**ASTM F3006** — ASTM International Standard Specification for Ball Drop Impact Resistance of Laminated Architectural Flat Glazing

- This test evaluates the penetration of the glass categorized by the force generated by the different drop heights at which a 5-pound ball is



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[www.swmintl.com/products/film/argotec-tpu-interlayer-film](http://www.swmintl.com/products/film/argotec-tpu-interlayer-film)



- released. This is a single impact test.
- The purpose of this test is to evaluate general glazing strength for safety.

**UL 752** — Underwriters Laboratories Standard for Bullet-Resisting Equipment

- This test evaluates the ballistic resistance of glazing.

**NIJ 0108.01** — National Institute of Justice Ballistic Resistant Protective Materials

- This is a test standard that evaluates the ballistic resistance of glazing.
- NIJ Standard is not included in Table 1: Security Selection Quick Reference Summary because it does not correspond with non-Federal standards.

**Security glazing testing — glazing system (frame and glass)**

**ASTM F3038** — ASTM International Standard Test Method for Timed Evaluation of Forced-Entry-Resistant Systems

- A glazing impact test with timed assault sequences. This test method is designed to simulate a spontaneous mob using readily available hand tools as the primary threat for forced entry.

**ASTM E2395** — ASTM International Standard Specification for Voluntary Security Performance of Window and Door Assemblies with Glazing Impact

- A glazing impact test using timber missiles, followed by the striking of the glazing with a hammer 10 times at its highest rating level.
- This specification addresses the capability of window and door assemblies to frustrate and potentially delay or deter opportunistic entry by unskilled and semi-skilled intruders. This specification does not address detention facilities or window and door assemblies attacked by professional, sophisticated intruders.

**ASTM F1642** — ASTM International Test Method for Glazing and Glazing Systems Subject to Airblast Loadings

- A test method that evaluates hazards of glazing against intentional or accidental

# FAQS

Frequently asked questions regarding school security glazing requirements and applications, answered by NGA task group members.

**How do we get started?**

“The first step is a risk assessment. Determine the vulnerabilities and build a plan to address.”—Tom Niziolek, commercial director, optical and graphics, SWM International

**What is the appropriate level of security performance that should be used in my school?**

“Currently, there is not a published requirement in building codes, so there are no established test standards that may be used to help narrow down the products that should be considered. Our position is that any product offering additional security measures, such as forced entry or bullet resistance, that is added to the list of consideration should have been tested at an accredited laboratory. Additionally, a window or door assembly

purchased for school security purposes, is only as good as the weakest link. If a tested glass product is used in a window with component parts that have not been tested, it is possible that the assembly may fail during an incident. ... This is why a complete, integrated system approach is so valuable when it comes to life safety and security.”—Devin Bowman, general manager, Technical Glass Products and AD Systems

**What does it mean when a specification calls for ‘security glazing’? Is ‘bulletproof’ glass required?**

“Security glazing can be designed to deter opportunistic attacks like vandalism and burglary all the way up to forced entry and ballistic protection. It really does depend on what type of threat the client is looking to protect against. Once

this fundamental question is answered, then it is easier to answer what security glazing means, if bullet-resistant glazing is needed, and what test method and performance level is required. ... Laminated safety glass, while performing better than monolithic safety glass, can be used for low-level security glazing like someone running into the glass. However, it is not enough to delay entry for very long or provide resistance to a ballistic threat. As the threat level increases, the glass design will need to change as well. Typical changes include increasing the interlayer thickness and adding multiple layers of glass and interlayer.”—Vaughn Schauss, manager, technical consultancy Americas, Kuraray America Inc.



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- explosions, such as bomb blasts.
- The data obtained from testing under this method shall be used to determine the glazing or glazing system hazard rating using ASTM Specification F2912.

# FAQS

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## Additional considerations

**Framing:** design teams should make sure security glazing includes appropriate framing systems, rated to appropriate performance level or higher, that will be able to hold glass and resist entry. Systems must also be properly installed to ensure performance, and they should be cleaned according to manufacturer recommendations.

**Plastics:** certain glazing products may use exposed plastic surfaces on the interior/safe side. This type of glazing and the installation environment should be considered carefully, as these plastics do not have the same chemical and abrasion resistance of glass or ceramic.

**Egress:** teams should understand emergency egress requirements. Security glazing is designed to remain intact after breakage. This may increase the amount of time and effort required for firefighters and first responders to vent and clear the building during an emergency. The U.S. General Services Administration has developed a training program that addresses emergency egress through security glazing. Architects specifying systems and schools installing security windows need to be aware of the potential time needed to get through security glazing. The proper tools, education and training should be in place at any school installing security glazing. Other possible means of emergency egress for teachers and students should be clearly identified.

**Multifunctional glazing:** this article does not address other code requirements such as fire or hurricane impact. When selecting products, multifunctional glazing may be needed to fulfill all applicable codes. The glazing should be tested by a certified laboratory for all required functions such as fire resistance, impact resistance and forced entry. ■

### Do you have a recommendation for glazing that can deter entry without being bullet-resistant?

“There are many configurations of laminated glass available to address the severity and risk of attack for schools, without putting in bullet-resistant glass. We understand that cost is always a concern and it is trumped only by the protection of those in the school. In such cases, a simple laminated safety glass (ANSI Z97.1 Cat II Type I) can slow the entry of an attacker when put in common entrance areas. That can be scaled up to higher and higher levels of security glazing to give you additional time to enact the shelter-in-place protocols. The most common simple solution is a burglary-resistant glazing (ASTM F1233 Class 1) or a hurricane interlayer-based glazing that could thwart an attack for minutes. It all depends upon the threat, risk and protection level desired.”—Julia Schimmelpenninck,

industry technical leader, Customer Applications and Support Lab manager, Eastman Chemical Co.

### Can window film be used as an inexpensive option for making windows bullet-resistant?

“Window films are not a primary component to any bullet-resistant glazing. Window films prevent secondary injuries from glass shattering at a velocity that makes it hazardous to individuals on the safe side of the glass. However, the International Window Film Association agrees film is not a substitute for bullet-resistant glazing.”—Paul Mouton, director of public relations, Midwest Glass Fabricators

### Can security glazing fit into my budget?

“There are a number of retrofit and new glazing options available on the market today to satisfy a variety of performance needs from basic safety up to multiple threat,

forced entry protective glazing. Look into funding resources at a city, county, state, and even federal [level] to help.”—Niziolek

### What kind of resources are out there to help?

“Your local community law enforcement, [school resource officer], and even school district building and maintenance [officials] are good knowledge resources to start. On a national level, organizations like the American Institute of Architects and National Glass Association ... are also helpful.”—Niziolek

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# GLAZIERS

## DYNAMIC COMPANIES NAVIGATE A CHANGED ECONOMY



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Last year's report found Top 50 Glaziers toward the start of the pandemic, confronting new impacts on labor and the economy. A year on, short-term changes have become long-term adaptations, as businesses continually adjust to life and work with COVID-19.

“The coronavirus has obviously had a major impact on our economy, and I believe we’ll feel the ripple effects of this for a while,” says Ryan Woodruff, vice president of Egan Co./InterClad. “It will take some time for our economy to recover as once-viable markets become obsolete and new markets emerge.”

Like many industries, construction faces a slowdown on many fronts, and uncertainty in the future. “We feel that the pandemic will have a lagging effect on our industry,” says Joseph Marshall, president, Midway Glass & Metal Installers Inc. “We are seeing a growth in the bidding process but a slowdown in the awarding process of real estate owners to construction managers.”

“Continued requirements to adapt to ever increasing market challenges whether staff safety, scope and schedule of projects and supply chain concerns before they materialize, sets a dynamic playing field with more need for planning than ever before, and we continue to adapt,” says Bill Wilson, vice president of Business Development, Kensington Glass Arts Inc.

The Top 50 Glaziers survey and report, now in its 29th year, offers a comprehensive look at the realities facing the glass and glazing industry in North America. It presents industry performance data, identifies leading headwinds, and tracks market and product trends. And it presents a ranking of leading U.S. glazing firms. Visit [glassmagazine.com](http://glassmagazine.com) to see additional standout projects from Top 50 Glaziers and to download the in-depth Top 50 Market Report.

01

# THE LIST

Company	Additional Locations	Full-time Employees	Total Employees
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## Over \$200 million

<b>Harmon Inc.</b> harmoninc.com, Bloomington, MN	17	623	625
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<b>Enclos Corp.</b> enclos.com, Eagan, MN	15	400	400
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<b>W&amp;W Glass</b> wwglass.com, Nanuet, NY	-	200	200
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<b>Benson Industries</b> bensonglobal.com, Portland, OR	5	600	600
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## \$100-200 million

<b>Crown Corr Inc.</b> crowncorr.com, Gary, IN	3	500	500
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<b>Yuanda USA Corp.</b> yuandacn.com, Chicago	5	20	20
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<b>Binswanger Glass</b> binswangerglass.com, Memphis, TN	60	800	800
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<b>Massey's Plate Glass &amp; Aluminum</b> masseysglass.com, Branford, CT	3	200	300
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<b>Flynn Group of Companies</b> flynncompanies.com, Toronto	35	6,000	6,000
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<b>Permasteelisa North America*</b> permasteelisagroup.com, Windsor, CT	5	-	-
--	---	---	---

Company	Additional Locations	Full-time Employees	Total Employees
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<b>Steel Encounters*</b> steelencounters.com, Salt Lake City, Utah	1	-	-
---	---	---	---

## \$50-100 million

<b>Dynamic Glass</b> dynamicglass.com, Houston	3	295	295
---	---	-----	-----

<b>Pioneer Cladding and Glazing System</b> pioneercladding.com, Mason, OH	5	278	316
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<b>TSI Corp.</b> tsicorporations.com, Upper Marlboro, MD	-	225	225
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<b>Giroux Glass</b> girouxglass.com, Los Angeles	5	256	260
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<b>Above All Store Fronts</b> aboveallstorefronts.com, Hauppauge, NY	-	100	100
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<b>Cherry Hill Glass Co.</b> cherryhillglass.com, Branford, CT	-	185	200
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<b>Architectural Wall Systems</b> archwall.com, Des Moines, IA	1	105	105
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<b>SPS Corp.</b> spscorporation.com, Apex, NC	1	85	85
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## \$20-50 million

<b>Egan Co./InterClad</b> eganco.com, Brooklyn Park, MN	2	75	75
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Now in its 29th year, the Top 50 Glaziers industry ranking has the distinction of being the longest-running glass industry ranking. Companies on the list are ranked by gross sales, and submitted to Glass Magazine editors by survey. For those companies that did not submit sales, editors have estimated sales volume based on independent sources to determine the most accurate industry ranking.

It is only with industry cooperation that Glass Magazine can continue to compile the most accurate list of leading industry glaziers. If your company belongs on this list, or you want to update its information, contact Norah Dick, associate editor, at [ndick@glass.org](mailto:ndick@glass.org).

Company	Additional Locations	Full-time Employees	Total Employees
<b>Tepcoglass LLC</b> tepcoglass.com, Dallas	4	200	250
<b>Ranger Specialized Glass Inc.</b> rangerglass.com, Houston	2	-	150
<b>Haley-Greer*</b> haleygreer.com, Dallas	2	-	-
<b>Karas &amp; Karas Glass Co.*</b> karasglass.com, Boston	1	132	132 - 160
<b>Ajay Glass Co.</b> ajayglass.com, Canandaigua, NY	1	125	125
<b>Kensington Glass Arts Inc.</b> kensingtonglass.com, ljamsville, MD	4	205	205
<b>Alexander Metals Inc.</b> alexandermetalsinc.com, Nashville, TN	1	70	70
<b>National Enclosure</b> nationalenclosure.com, Ypsilanti, MI	3	34	76
<b>Crawford-Tracey Corp.</b> crawfordtracey.com, Deerfield Beach, FL	1	107	120
<b>Lafayette Metal and Glass</b> lmgny.com, Hauppauge, NY	2	120	125
<b>RynoClad Technologies Inc.</b> rynoclad.com, Ontario, CA	1	200	200
<b>ACE Glass</b> aceglass.net, Little Rock, AR	1	53	71

Company	Additional Locations	Full-time Employees	Total Employees
<b>Metropolitan Glass Inc.</b> metroglass.com, Denver	1	90	90
<b>H.J. Martin and Son</b> hjmartin.com, Green Bay, WI	2	947	947
<b>seele Inc.</b> seele.com, New York City	1	20	50
<b>Denison Glass &amp; Mirror Inc.</b> denisonglass.com, Denison, TX	-	100	125
<b>Key Glass Inc.</b> keyglass.com, Bradenton, FL	-	52	52

## \$20 million and under

<b>8G Solutions</b> 8g-solutions.com, Kansas City, MO	2	83	83
<b>AFI Glass &amp; Architectural Metal Inc.</b> AFIGlass.com, Poughkeepsie, NY	-	36	50
<b>Horizon Glass &amp; Glazing Co.</b> horizonglass.net, Denver	-	97	97
<b>AAC Glass Inc.</b> aacglassincsf.com, Hayward, CA	1	40	40
<b>Forno Enterprises Inc.</b> fornoenterprises.com, Trout Creek, NY	11	35	50
<b>Specified Systems Inc.</b> specifiedsystems.com, Canonsburg, PA	2	39	67
<b>Pikes Peak Glass and City Glass Co.</b> pikespeakglass.com/cityglasscompany.net, Colorado Springs, CO	1	95	95
<b>Glazing Concepts Inc.</b> glazingconceptsinc.com, Corona, CA	-	55	55
<b>Synergi LLC</b> synergillc.com, Elkridge, MD	2	76	150
<b>Element13 Facades</b> element13facades.com, Denver	-	4	20
<b>Aurora Glazing Solutions</b> auroraglazing.com, Vancouver, BC	1	57	57
<b>Midway Glass &amp; Metal Installers Inc.</b> midwayglass.com, Carlstadt, NJ	-	35	35
<b>O'Nan Glass &amp; Window</b> Lexington, KY	-	25	35

\*Company information, including gross sales, is an estimate and is not confirmed by the company.

# Adapt

## TOP GLAZIERS STRUGGLE WITH DECREASED SALES

Last year's Top 50 Glaziers Report saw glazing companies grappling with the first months of the pandemic. This year, glazing companies report diminished sales for 2020, falling from \$3.8 billion in total sales in 2019 to \$3.1 billion in 2020. Fifty-three percent of reporting companies posted 2020 sales that were lower than 2019, compared to 40.4 percent of companies in 2019.

Despite sales decreases, companies' backlogs show some health, as a majority, 65 percent, reported having a backlog of a year or more.

Unsurprisingly, reported profit margin and bid levels sharply decreased in 2020. Thirty percent of responding companies reported lower profit margins in 2020 compared to 2019, when only 16 percent reported lower margins. Similarly, 42 percent of respondents said bid levels were lower in 2020, a stark increase from the 2 percent of companies reporting lower bid levels the previous year.

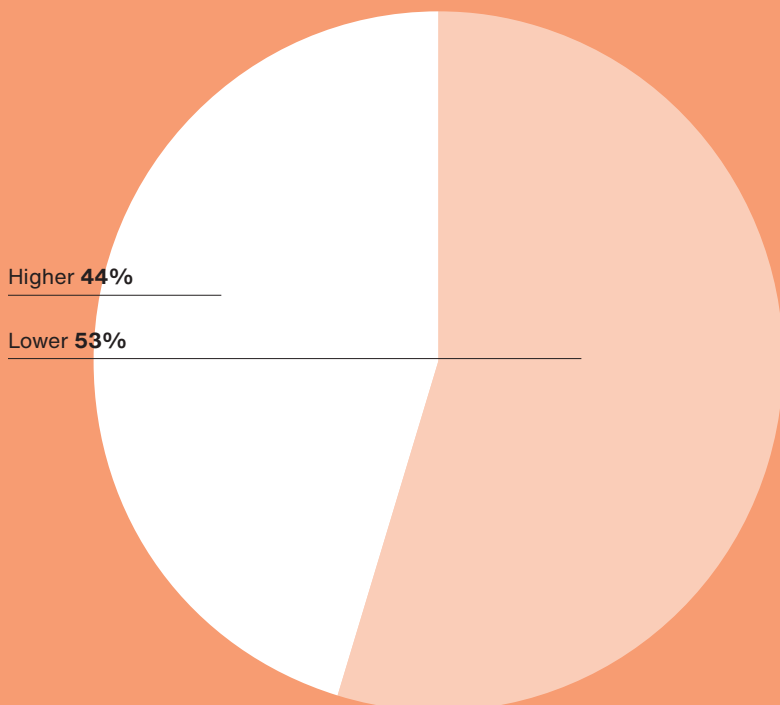
Last year's report did not analyze growth by region, given the instability of the market at the time. Responses collected this year were mixed regarding which geographic markets showed the most growth in 2020. A plurality of glaziers, 24 percent of respondents, selected

the Northeast as the top region for growth in the past year, and the same number said it would be the top region in 2021. Respondents attribute its growth to several reasons, including an increase in health care spending, the development of Amazon's second headquarters in Arlington, Virginia, and a growing multifamily market.

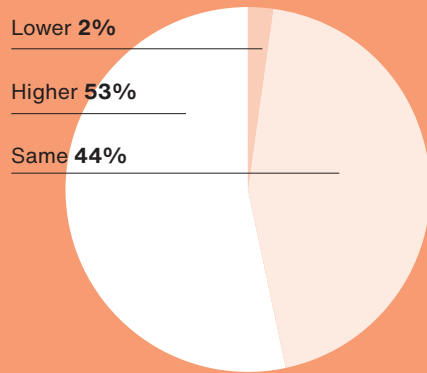
Survey results suggest that the Southeast and West may also be growth areas. Thirty-seven percent of respondents ranked the Southeast first or second for growth in 2020, with another 37 percent saying the same for the West. Thirty-six percent of respondents ranked the Southeast in first or second for growth in 2021.



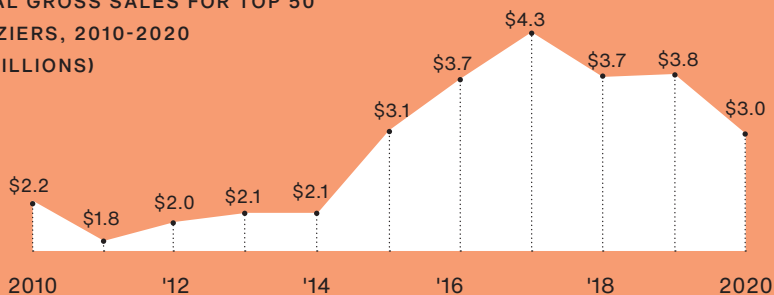
HOW DID GLAZIERS 2020 SALES COMPARE TO 2021?



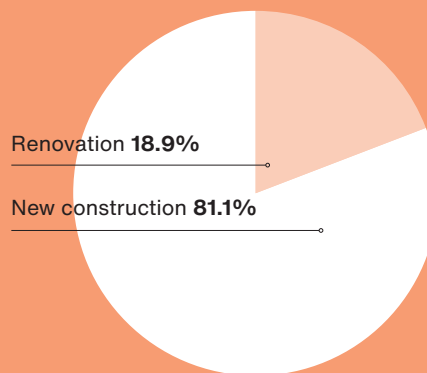
HOW DID COMPETITION FOR PROJECTS IN 2020 COMPARE TO THE PREVIOUS YEAR?



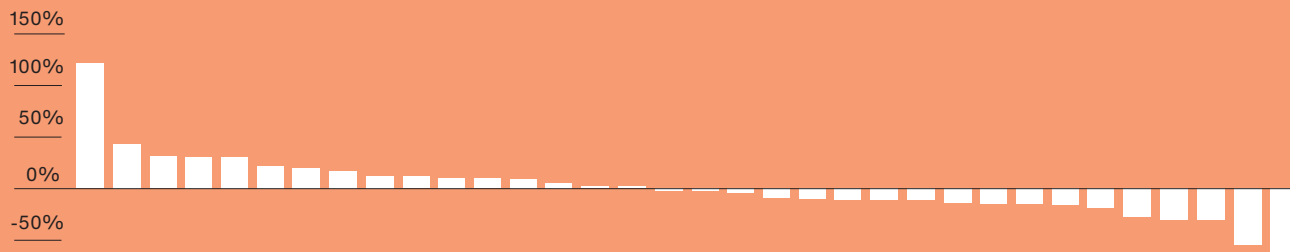
TOTAL GROSS SALES FOR TOP 50 GLAZIERS, 2010-2020 (IN BILLIONS)



WHAT PERCENTAGE OF YOUR COMMERCIAL BUSINESS IS NEW CONSTRUCTION?



YEAR-OVER-YEAR % CHANGE IN SALES FOR REPORTING COMPANIES, 2020-2021

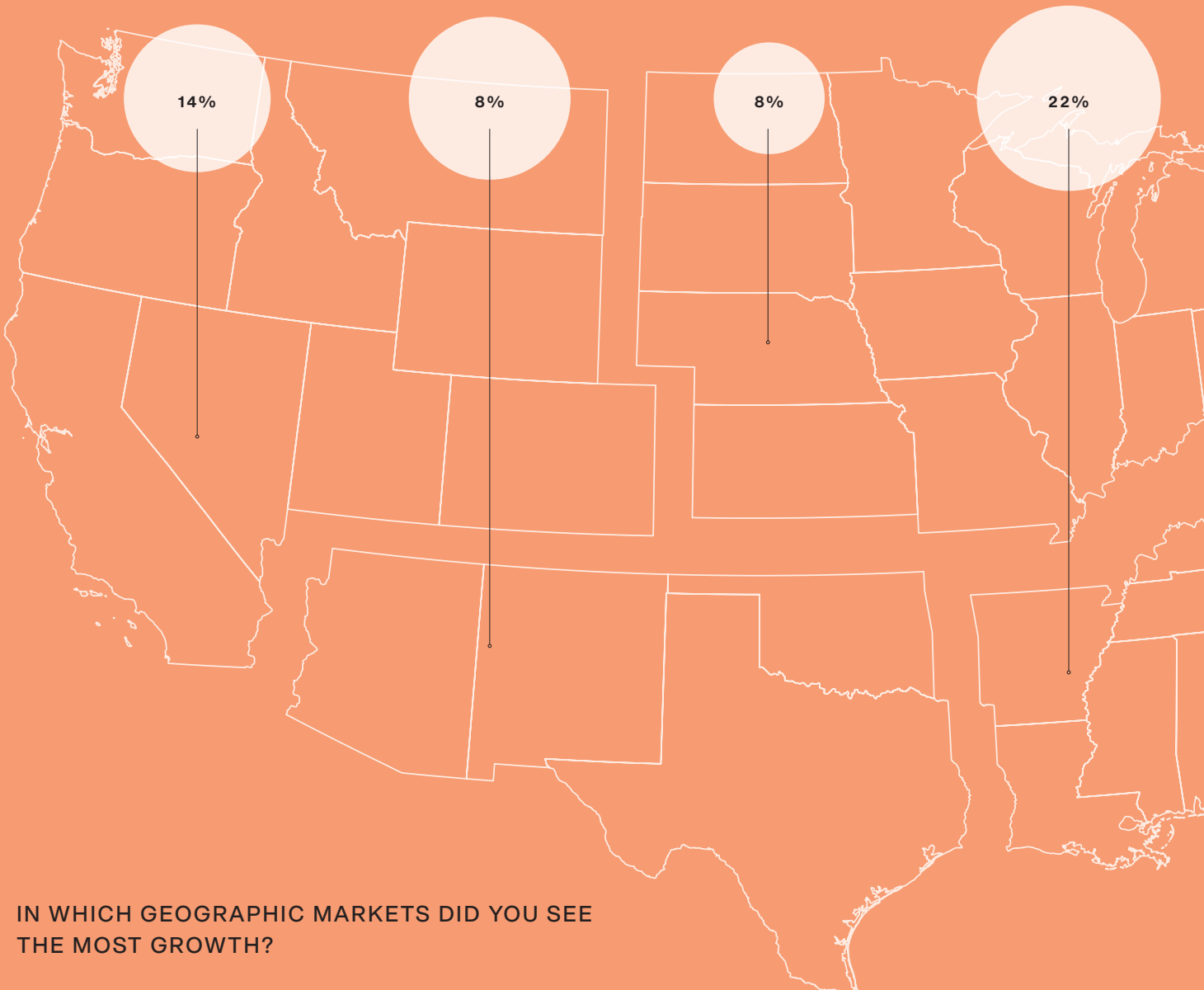
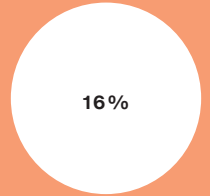
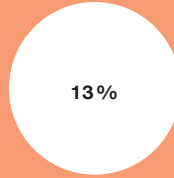
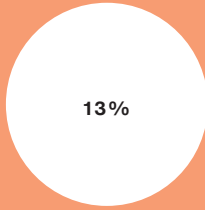
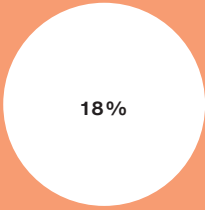


WEST

SOUTHWEST

MIDWEST

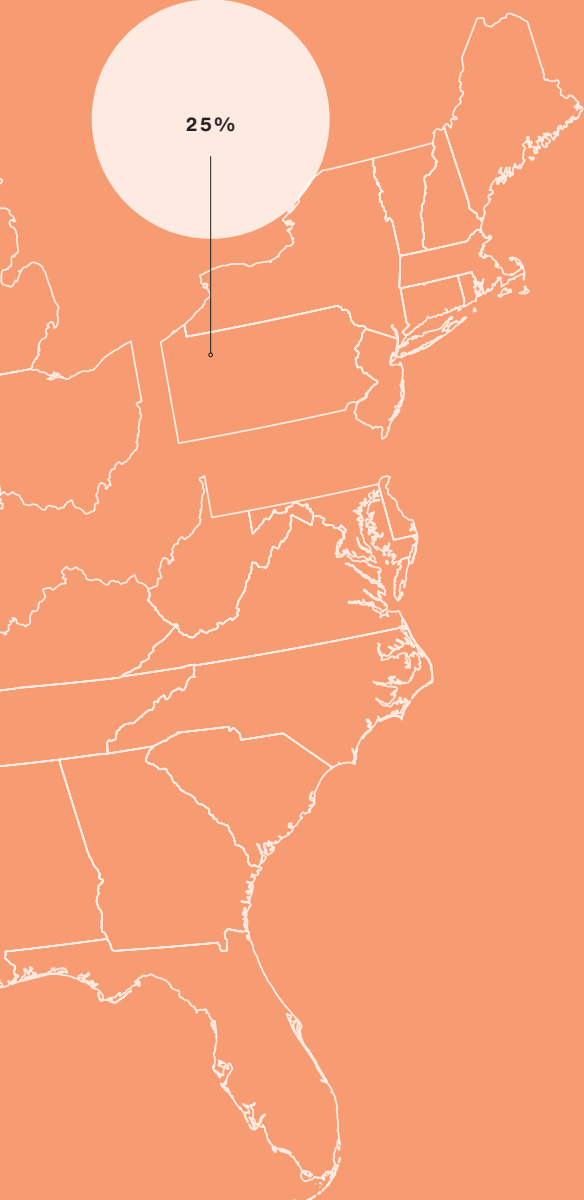
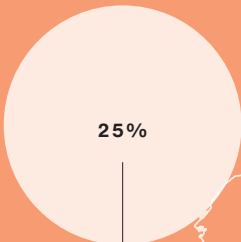
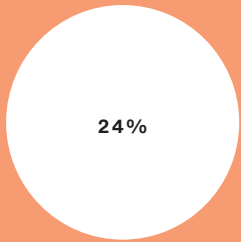
SOUTHEAST



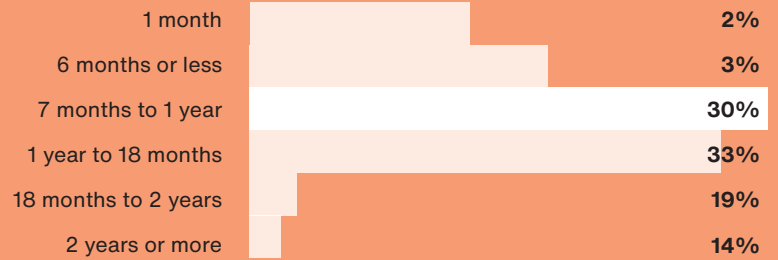
IN WHICH GEOGRAPHIC MARKETS DID YOU SEE THE MOST GROWTH?

- 2020
- 2021 PROJECTION

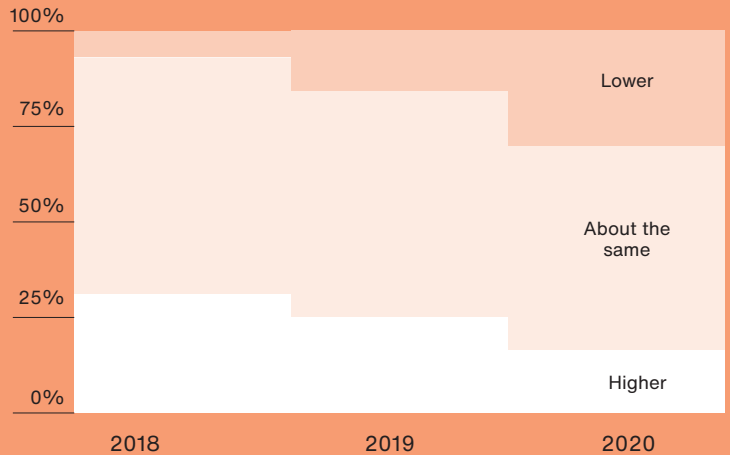
**NORTHEAST**



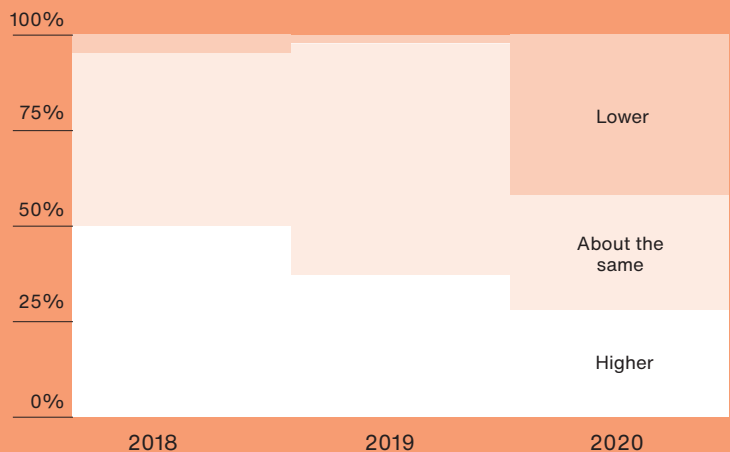
**HOW DEEP IS YOUR BACKLOG?**



**HOW DID PROFIT MARGINS COMPARE TO THE PREVIOUS YEAR?**



**HOW DID BID LEVELS IN 2020 COMPARE TO PREVIOUS YEARS?**



# Change

The market segments that Top 50 Glaziers work in showed little change in 2020. The office segment, despite uncertainty over building trends in future, made up 31 percent of work for Top 50 companies in 2020, only slightly down from 33 percent in 2019. Retail and hotels trended predictably low, considering how the pandemic has affected those market segments.

Looking at products, 40 percent of companies say they fabricate curtain wall in-house. Challenges in bringing fabrication in-house included quality control and material sequencing, as well as procuring the necessary labor. Only a few glaziers,

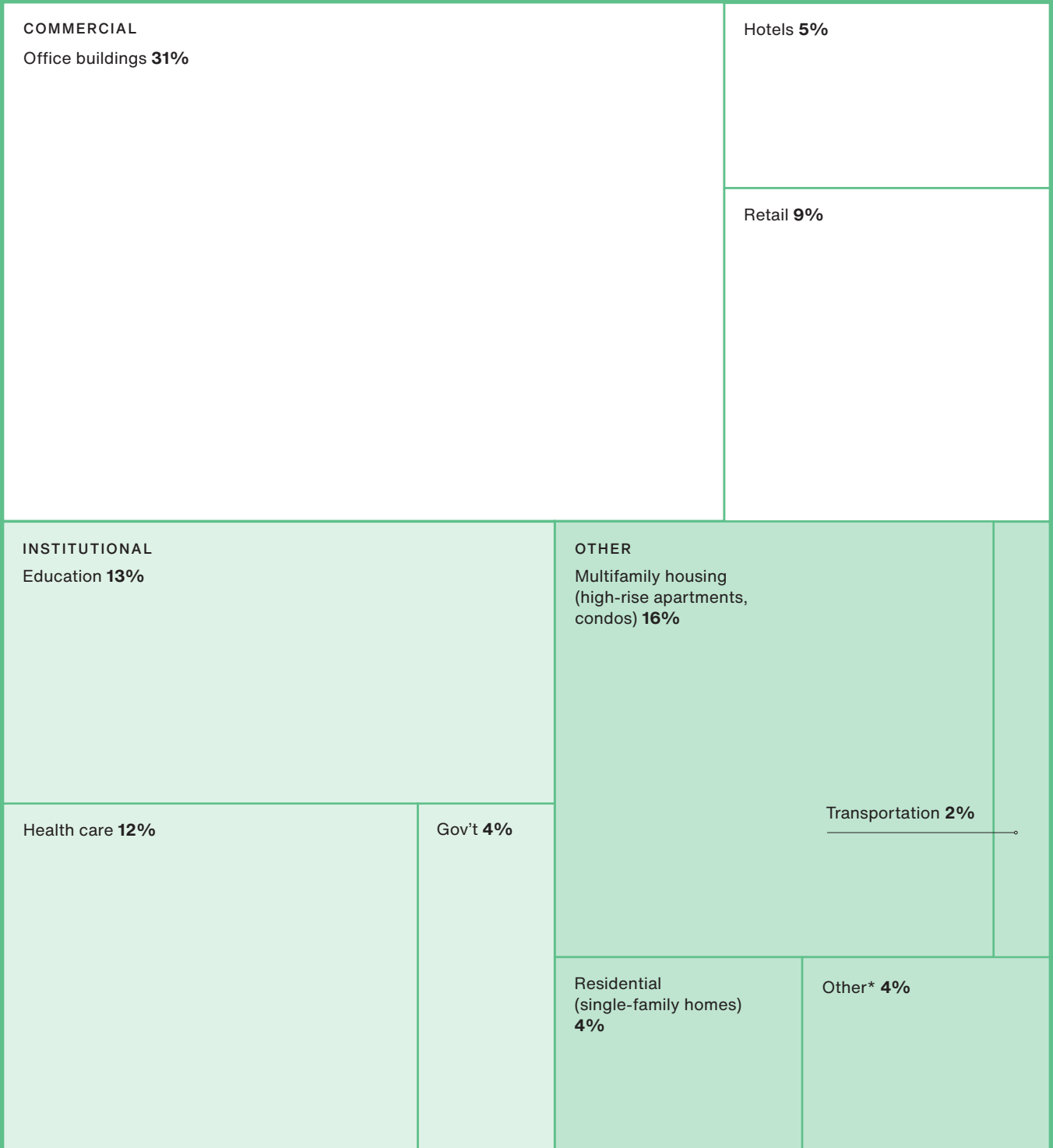
9 percent, said they fabricate glass in-house; for those that did, respondents reported fabricating a range of glass types, including heavy tempered glass, insulating glass units and mirror.

Survey responses also suggest the continued growth in specialty glazing, as a majority of responding companies reported working on projects with specialty glass products. Curved and bent glass, as well as jumbo glass, represented a majority of respondents' answers; 42 percent of respondents also selected bird-friendly glazing, suggesting the continued growth in this product type.

In terms of project delivery, nearly all respondents participated in design assist during 2020. Meanwhile, only 56 percent said they participated in a more traditional design-bid-build project during the year, indicating continued movement toward more collaborative design processes.

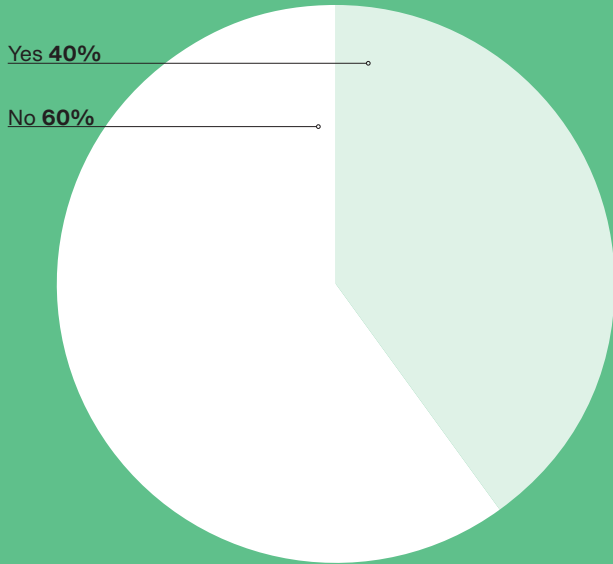
Companies continue to invest in software, with 60 percent of respondents saying they purchased software systems in 2020. Respondents reported using a range of software for the manufacturing floor and office, including AutoDesk products and Bluebeam.

WHAT PERCENTAGE OF YOUR BUSINESS IN 2020 FALLS INTO THE FOLLOWING CATEGORIES?

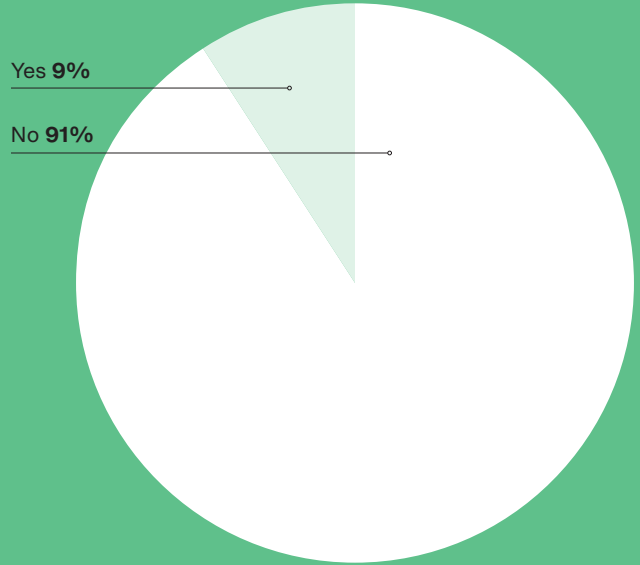


\* Entertainment centers, stadiums

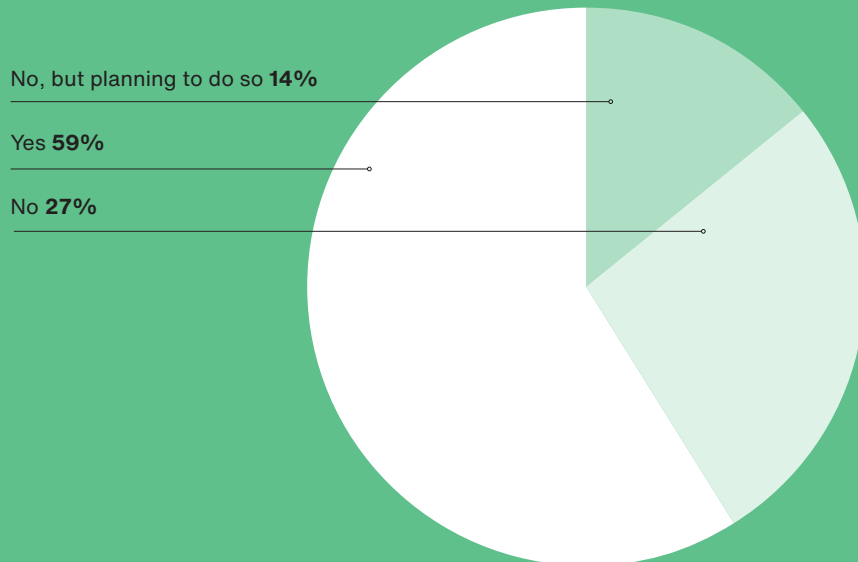
ARE YOU FABRICATING UNITIZED CURTAIN WALL IN-HOUSE?



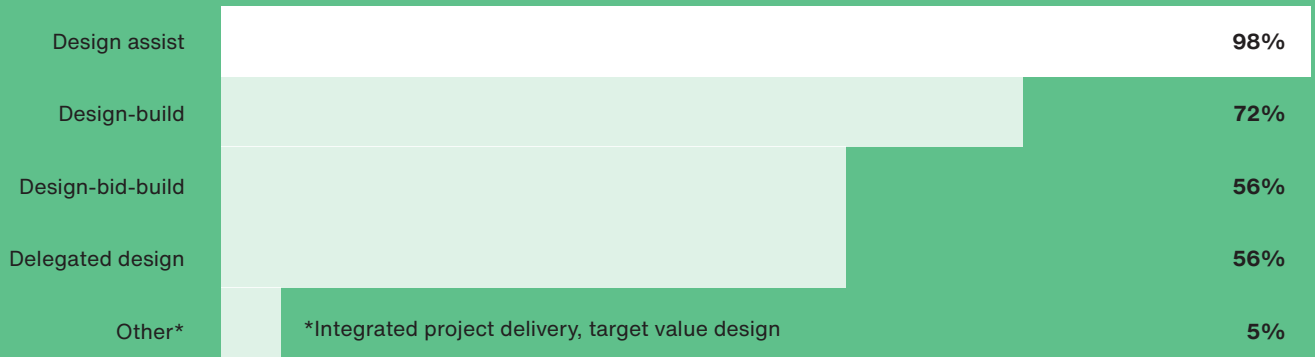
ARE YOU FABRICATING GLASS?



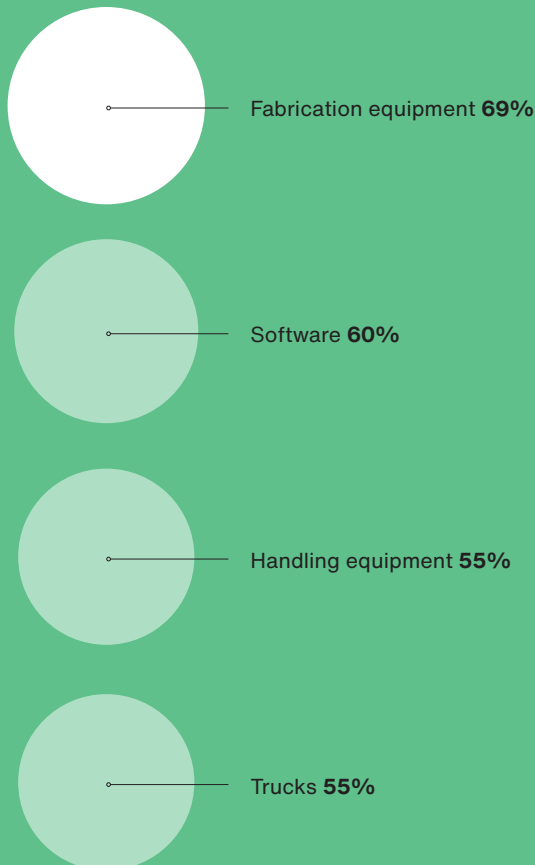
IS YOUR COMPANY DOING ANY 3D MODELING/BIM?



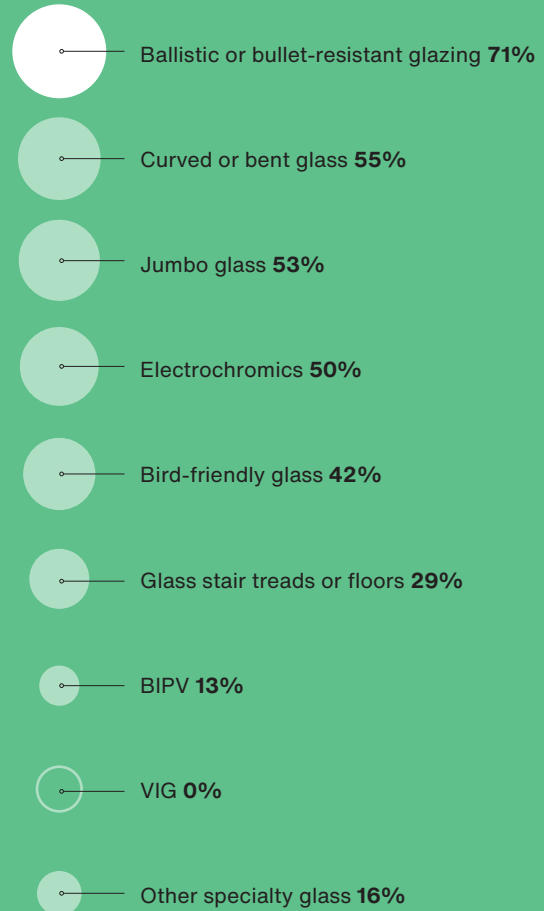
WHICH OF THE FOLLOWING PROJECT DELIVERY METHODS HAVE BEEN USED ON A PROJECT YOUR COMPANY PARTICIPATED IN DURING THE PREVIOUS YEAR?



HAS YOUR COMPANY MADE CAPITAL INVESTMENTS IN THE PAST YEAR? (CHECK ALL THAT APPLY)



HAVE YOU WORKED ON A PROJECT IN THE PREVIOUS YEAR WITH ANY OF THE FOLLOWING SPECIALTY GLASS PRODUCTS? (CHECK ALL THAT APPLY)



Though increased vaccination has encouraged many in the industry that 2021 will see an easing of the pandemic's restrictions, a majority of respondents reported major impacts in the past year from the pandemic, and 56 percent of respondents say COVID-19 will be a major headwind in 2021.

Survey responses show the varied fallout of COVID throughout the year, from the instability of labor to a disrupted supply chain. While a minimum of companies reported closing locations, about a third reported layoffs, and over half reported a decrease in sales and labor issues as major difficulties.

Half of respondents also reported supply chain issues as an impact, and 46 percent of respondents said it will continue to

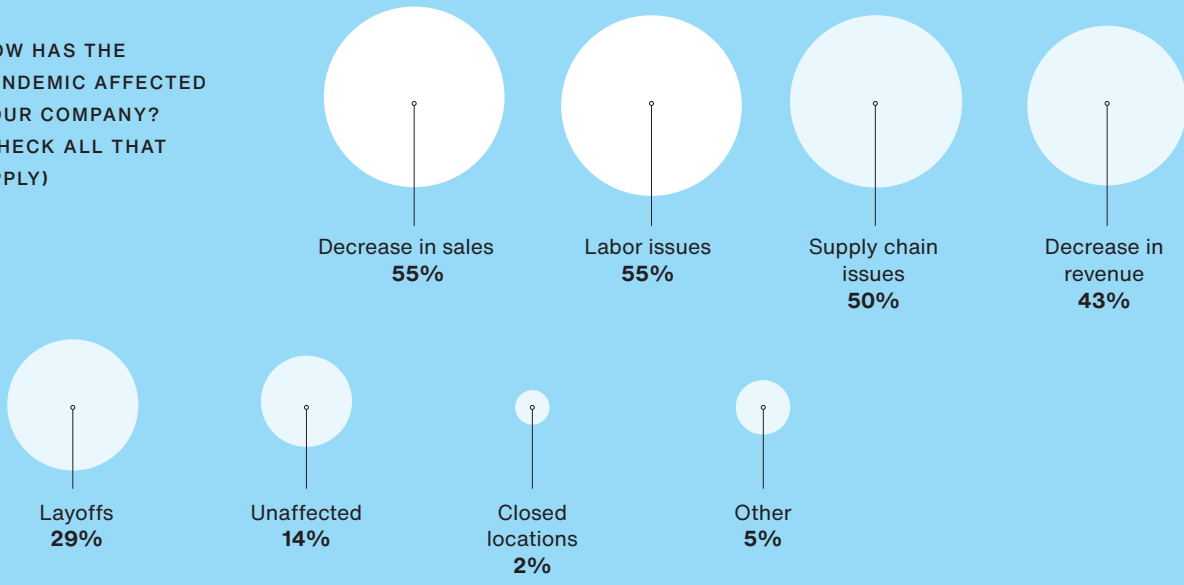
impact the industry into 2021. "Material prices are fluctuating and are expected to impact old bids as well as new ones," says Jon Clark, director of sales at SPS Corp. "We're already seeing an increase in cost for commodity items essential to our products," says Ray Crawford, president, Crawford-Tracey Corp.

Labor issues have, of course, only been exacerbated by the pandemic, and glaziers and field labor remain the positions most difficult to fill, according to a majority of respondents. Training labor is companies' major issue, after recruitment, say respondents, with a significant majority, 81 percent, reporting in-house training programs and training with an experienced employee.

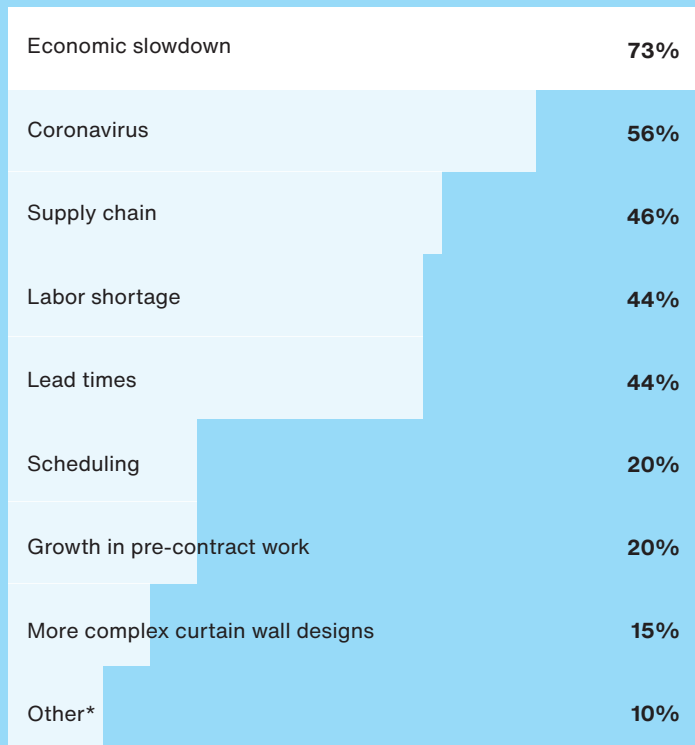
# Acclimate



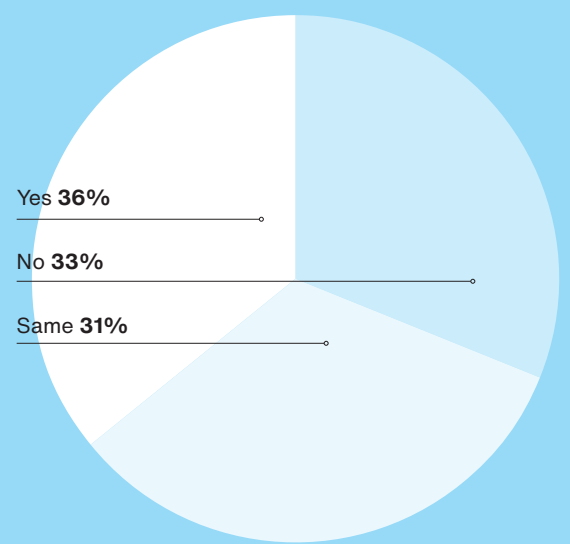
HOW HAS THE PANDEMIC AFFECTED YOUR COMPANY? (CHECK ALL THAT APPLY)



WHAT WILL BE THE MAJOR HEADWINDS IN 2021? (CHECK ALL THAT APPLY)



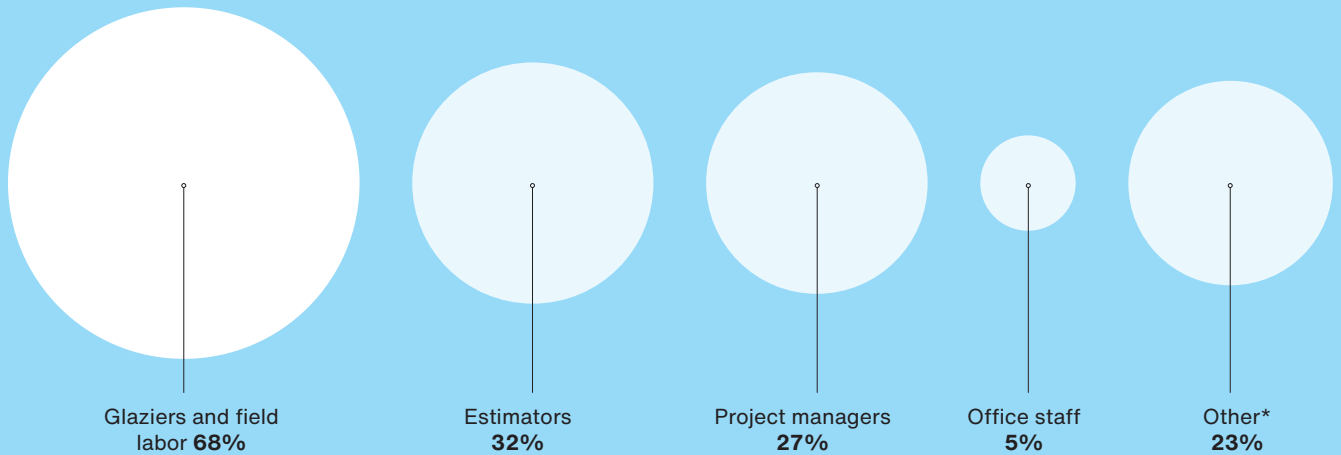
HAVE YOU HAD MORE DIFFICULTY FINDING WORKERS IN 2020/2021 COMPARED TO THE PREVIOUS YEAR?



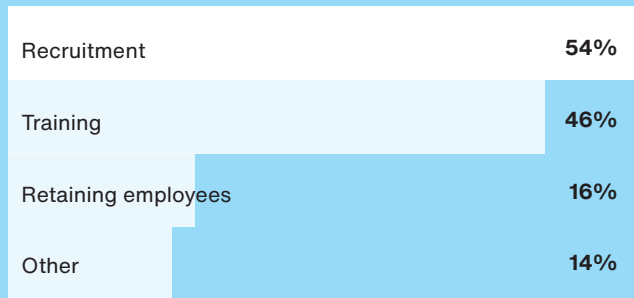
\*Lack of hard bids, low project budgets, maintaining revenue streams

IN FINDING LABOR, WHICH POSITIONS WERE THE MOST DIFFICULT TO FILL? (CHECK ALL THAT APPLY)

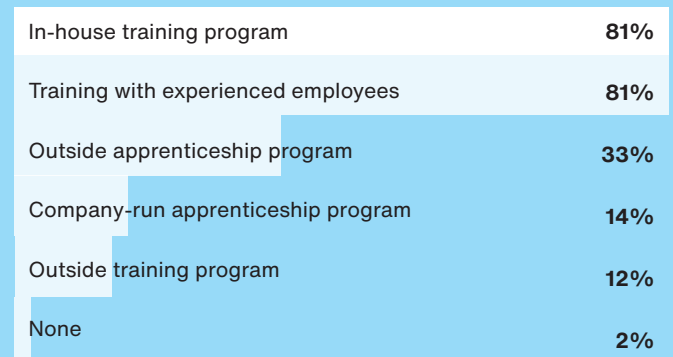
\*Shop employee, draft technician, shop labor, fabrication workers



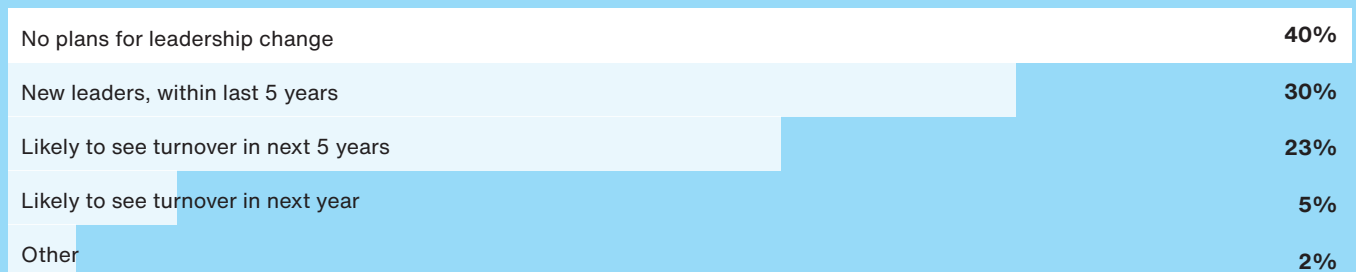
WHAT ARE YOUR MAJOR LABOR CHALLENGES? (CHECK ALL THAT APPLY)



HOW DOES YOUR COMPANY TRAIN NEW EMPLOYEES? (CHECK ALL THAT APPLY)



THE INDUSTRY IS EXPERIENCING A MAJOR TURNOVER IN LEADERSHIP, AS MANY COMPANIES MOVE TO THE NEXT GENERATION. WHICH OF THE FOLLOWING BEST DESCRIBES YOUR COMPANY'S LEADERSHIP?



## 8860

### Mortise Latching Device

No Visible Hardware on the Back!

Look no further when you have an exit device application requiring a high quality reliable mortise locking solution.

- ANSI/BHMA GRADE 1 – UL/ULC Listed for UL305 Panic Hardware
- Suitable for Narrow, Medium, and Wide Stile Doors
- Standard Door Widths 36", 42", 48"
- Field Sizeable from 48" to as Narrow as 30"

Lock backsets available in 31/32", 1 1/8", 1 1/2"

## KRM300

### Keyed Removable Mullion

- Compatible with both series 3700 & 3600 exit devices
- Provides a sturdy and secure latching point
- Mullion can be removed with key to allow access of the full width of the entrance
- Snap the mullion back into the secure mount no key needed



## MEL3000

### Motor Driven Electric Latch Retraction Retro Fit Kit

24vDC 1 Amp Motor Drive

These Retro Fit Kits give your high traffic egress doors superior access control. Ideal for hospitals, campuses, and auditoriums.

For use with FCBP's 3100, 3600, 3700 & 8860 Series Exit Devices



## 8760

### Rim Latch Exit Device

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Our Rim Latch Exit Device like all our exit devices can be electrified for added access security. Also compatible with our SM500 Electric Strike.

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- Standard Door Widths 36", 42", 48" 4
- Field Sizeable from 48" to as Narrow as 30"

## 8660

### Concealed Vertical Rod Exit Device

No Visible Hardware on the Back!

An easy to install CVR two point locking device. Developed for use with aluminum narrow stiles as a single or paired application. Perfect for high traffic areas.

- ANSI/BHMA GRADE 1 – UL/ULC Listed for UL305 Panic Hardware
- Standard Door Widths 36", 42", 48"
- Field Sizeable from 48" to as Narrow as 30"

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You'll not be pushed aside because your requirements are too small – or too big. FCBP provides **every** customer trust, confidence and unsurpassed know-how. That's why more and more OEM's, locksmiths, and integrators are finding First Choice so easy to deal with. And why we become their FIRST CHOICE.

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There are an estimated 52,000 glaziers working in the United States and the field is poised for growth, according to the U.S. Bureau of Labor Statistics. In the next decade, BLS anticipates the occupation will gain more than 2,000 additional jobs, growing about 4 percent.

Despite the growth outlook, overall construction employment took a hit during COVID-19, falling 10.9 percent in April 2020 alone. While the industry recuperated some of those losses in the remainder of 2020,

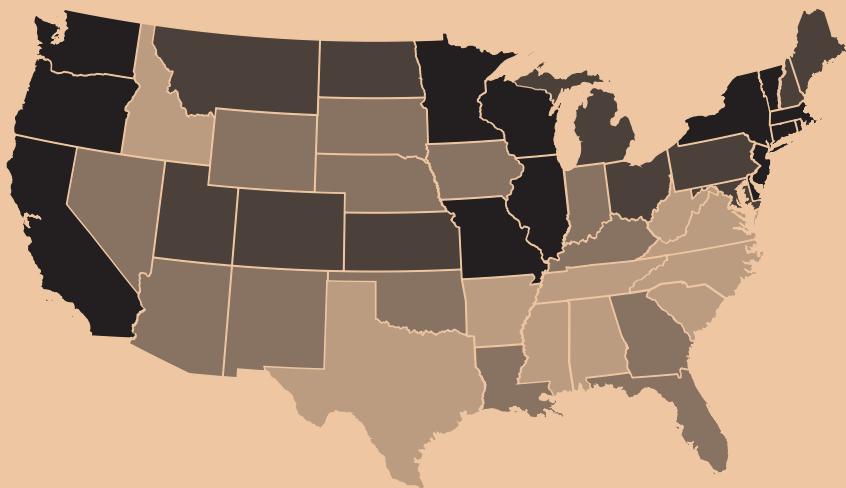
employment levels remained below pre-pandemic levels in 44 states as of March 2021.

“Most states are still far from recovering the construction jobs lost a year ago. The overall economy is recovering, but huge price spikes and ever-lengthening delivery times threaten to set construction back further,” according to Ken Simonson, the chief economist for the Associated General Contractors of America, in a March 26 AGC release.

Source: Occupational Employment Statistics Survey, published May 2020, from the Bureau of Labor Statistics.

# Industry Benchmarks

ANNUAL MEAN WAGE OF GLAZIERS, BY STATE



- \$22,000-\$40,530
- \$40,950 - \$47,180
- \$47,680 - \$54,900
- \$56,260 - \$73,220

STATES WITH HIGHEST GLAZIER EMPLOYMENT

- 1 Florida—6,040
- 2 California—6,020
- 3 Texas—5,690
- 4 Arizona—2,530
- 5 New York—2,440

EMPLOYMENT LEVEL

52,190

ANNUAL MEAN WAGE

\$50,970

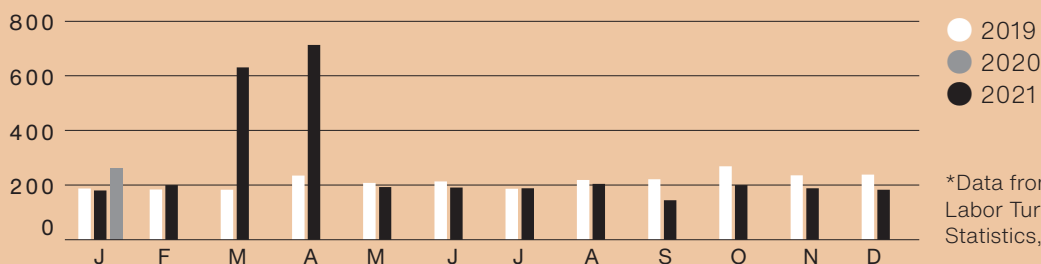
MEAN HOURLY WAGE

\$24.50

JOB OUTLOOK

+4% by 2029

RATE OF CONSTRUCTION LAYOFFS, 2019-2020\*



\*Data from the Job Openings and Labor Turnover Survey, Bureau of Labor Statistics, level in thousands





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# TRAINING

# THE

# NEXT

# GENERATION

A LOOK AT HOW GLAZIER  
APPRENTICESHIP PROGRAMS  
CAN HELP SOLVE LABOR,  
WAGE AND QUALITY ISSUES  
BY KATY DEVLIN



**F**inding and keeping skilled labor is the top challenge facing U.S. glazing contractors. In response, a growing number of companies and industry organizations are looking to apprenticeship programs to bridge the skills gap and train the next generation.

“If we want to attract people to the industry, we have to invest in them. Apprenticeship programs tell new hires that this is not just a temporary construction job, it is the start of a long-term, profitable career,” says Jenni Chase, director of content, education and training at the National Glass Association.

Apprenticeships combine paid on-the-job training with classroom learning. Registered Apprenticeship Programs must be validated by the U.S. Department of Labor or by a State Apprenticeship Agency. Per the DOL, approved programs must include five components: payment (wages generally escalate as the apprentice progresses through the program), on-the-job learning, classroom learning, men-





APPRENTICES AT CITY GLASS CO./ PIKES PEAK GLASS. (TOP) FROM LEFT TO RIGHT, ZACH ROBERTS, BRANDON GLAZE, STANLEY COLBERT, MICHAEL MARTINEZ, JOSH MONTANO. (TOP RIGHT) JAKOB WELLS. (RIGHT) ZACH ROBERTS AND MICHAEL MARTINEZ.

torship and credentials. “All Registered Apprenticeship Programs guarantee that an apprentice will receive a portable, nationally recognized credential upon completion,” according to the DOL.

In the glazing industry, apprenticeship programs run three or four years, depending on the administrator. Many long-running glazing apprenticeships run through the trade unions. Non-union programs are also available from statewide glass associations, individual glass companies, and apprenticeship program administrators like the

Associated Builders and Contractors and the Associated General Contractors of America.

To meet DOL classroom learning requirements, the National Glass Association offers the NGA Glazier Apprentice Curriculum. Developed in cooperation with contract glaziers, full-service glass companies, and glass and glazing technical experts, the curriculum includes online courses on MyGlassClass.com, manuals and books, and OSHA 30-hour certification, providing more than 430 hours of learning.

## Resources

U.S. Department of Labor

- Resources for administrators and apprentices [apprenticeship.gov](http://apprenticeship.gov)

National Glass Association

- Apprenticeship curriculum [glass.org/apprenticeship](http://glass.org/apprenticeship)

### ONLINE:

Visit [glassmagazine.com](http://glassmagazine.com) for an example of an approved glazing apprenticeship program.

**PLUS:** Great training programs also exist outside of the apprenticeship track. Read profiles of glass company training programs at [glassmagazine.com](http://glassmagazine.com).

## Why start an apprenticeship program?

### 1. Address the skilled labor shortage.

The primary driver for new industry apprenticeship programs is the continued labor shortage. “We need more young people. It’s our challenge—not only in the glazing trade, but in all trades,” says Mark Applegate, general superintendent, Pikes Peak Glass in Colorado Springs, Colorado.

“Experienced glaziers are continuing to retire, and with the push toward more formal education through four-year colleges, there is a lack of people coming out of school and going into construction trades,” says Chase. “People don’t know that they can build a career as a glazier. And even if they do catch wind [of the glazing trade], they are coming in completely untrained.”

### 2. Recruit and retain.

Apprenticeship programs can be a powerful recruitment tool for the industry. They allow workers to get paid while they learn a trade—an incentive for new recruits. “It allows an option for people who don’t want to go to college, who want to learn a trade,” says Angie Peters, residential operations manager for City Glass Co., which developed an in-house apprenticeship program with its sister company, Pikes Peak Glass.

“Some kids are meant for college. But for others, an apprenticeship program allows them to show their families, their friends, that they’re still working toward an education, that they’re continuing the education process differently,” says Tom Hall, training manager for Salt Lake City’s Steel Encounters, which has been a leading force in developing the Utah Glass Association’s apprenticeship program.

Apprenticeship programs also assist with retention. “Turnover is a huge problem. New people sometimes cycle in and out within weeks or months,” Chase says. “By getting new employees into an apprenticeship program, you’re showing them that you care about their future. And in turn, you’re asking them



UTAH GLASS ASSOCIATION'S APPRENTICESHIP CLASS OF 2022.

to commit to the trade, the training and your company.”

### 3. Compete for government projects.

Some jurisdictions require that contractors working on public projects employ apprentices. “In certain states, you aren’t able to bid on some jobs if you don’t have a state-approved [apprenticeship] program,” Chase says.

This was a key driver for Dallas Glass & Window of Salem, Oregon, which received final approval for its apprenticeship program in March. “Oregon has a new house bill that requires an apprenticeship program to bid for public works projects,” says Blain Harris, operations manager. The new requirement made an apprenticeship program “make or break” for Dallas Glass, Harris says. “When the economy slumps, we have

to be able to get into public work.”

Prevailing wage requirements are also a factor for some companies. “On government work, if you don’t have an approved program, you have to pay a full Davis-Bacon [prevailing] wage to all workers onsite, even to someone that has two days on the job,” says Applegate. However, apprentices can be paid apprentice wages for public works projects. This allows companies to pair apprentices with experienced glaziers onsite, without paying a labor premium, Applegate says.

### 4. Teach specialized skills... consistently.

Developing an apprenticeship program allows companies to provide broad-based glazing education in addition to specialized training in skills unique to their operations. They also provide

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standardized, well-documented training. “You can train people with consistency, which helps ensure high-quality work,” Chase says.

“Glass and glazing is such a highly specialized trade,” says Brandon Hood, human resources manager for 8G Solutions, Riverside, Missouri, which developed its own apprenticeship program. “It helps to have an in-house personnel training program where our employees can continually learn—learn company culture and values, and learn a plethora of information about everything glass. We have our apprentices learning curtain wall, learning storefront, but also learning how to cut glass.”

“Our companies cover the whole spectrum of glass work,” adds Applegate. “We do residential—shower doors and mirrors—and we do new construction. ... We need the full spectrum of training.”

Steel Encounters incorporated life skills training into the curriculum for apprentices in the UGA program, says Hall. “We have a session on banking—how to avoid getting into bankruptcy. We’ve had therapists come in to cover how to have hard discussions. We are trying to teach skills that will help them get through life,” he says.

### 5. Grow new company leaders.

The curriculum included in an apprenticeship program doesn’t have to be limited to new recruits. 8G, for example, uses its program to train both new and existing employees. “We really look at this as a way to train up new leaders—the next foreman, the next superintendent, the next project managers,” Hood says. “We want to show people that your career doesn’t stop here. We need people who are developed, who are experts.”

## Where to Start

### 1. Understand the local requirements.

The first step for any company or organization that is pursuing an apprenticeship program is to reach out to the State Apprenticeship Agency or

the USDOL to understand what will be required to set up a program. More than half of U.S. jurisdictions run a State Apprenticeship Agency, while all others rely on the USDOL. Visit [apprenticeship.gov](http://apprenticeship.gov) to determine the approval agency in any given jurisdiction.

“My biggest advice would be: understand the entirety of what is currently operating and required in your state,” says Harris. “Talk to your state representatives, apprenticeship and training committees. They want to help. They were our best friend in the process.”

“Without the Department of Labor, you’re not going anywhere,” Hood adds. “The program won’t get off the ground without consulting from them, getting standards approved, getting the program approved.”

### 2. Talk to someone who has done it.

Peters recommends that interested parties get in touch with organizations and companies that have existing glazier apprenticeship programs. Experienced administrators can share information on developing the on-the-job training schedules, and companies working within the same state or federal requirements can provide additional support. “We reached out to other companies who are doing the federal program to understand the requirements,” Applegate says.

NGA is also there to help. “We have worked with groups to set up glazier apprenticeship programs in Connecticut, Utah, Oklahoma, Missouri, New Mexico and Oregon, and have learned a lot along the way,” Chase says. “In the past, the classroom work component was a huge barrier. Now that we’ve solved that problem, the approval process is a bit easier.”

### 3. Know that you can do it alone, but you don’t have to.

In most jurisdictions, companies can develop their own internal apprenticeship program. (Some states require individual companies to team up with another company or organization to co-develop a program.) Developing an internal program gives a company additional control over the curriculum

and management. However, it also requires the company to act as program administrator.

Companies can also look to state-wide organizations to develop programs. The new Utah Glass Association, for example, formed in part for the purpose of launching a glazier apprentice program. Having the association run the program means that member companies can access the benefits of the apprenticeship training without taking on additional administrative responsibilities.

### 4. Promote the program.

Once a program is approved, companies must turn their attention to promotion and recruitment. 8G’s Hood recommends getting involved with local organizations and schools to reach potential apprentices.

“Go to different labor programs within your city. Go to individuals who might be graduating with a construction management associate’s degree. You might have to go to high schools. Let them know they can enter an apprenticeship program and three years out of high school be making \$29 an hour as a journeyman,” he says. “A lot of people really get interested when they find out they don’t have to spend \$120,000 on a four-year college.”

### 5. Make it a company-wide project.

As apprentices progress through a program, celebrate and publicize achievements. Public acknowledgement motivates apprentices, aids in retention and helps build community. “We have a training board where we highlight when someone has finished something,” Peters says. “It’s amazing. You’ll see employees high five. You’ll hear lead guys telling apprentices to keep going. It builds camaraderie.”

### 6. Remember why you’re doing it.

“Starting a program can seem daunting. Just keep focused on the fact that this is for our trade and for our employees,” says Steel Encounters’ Hall. “This is a way to truly better their lives. This is a way to strengthen the industry and to better our employees’ lives.” ■



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# PRODUCTS

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## SOLUTION: PALISADES™ S100 SLIDING DOOR

The CRL Palisades S100 Sliding Door features a sophisticated design that makes a visual statement using remarkable simplicity. Ultra-slim 1 <sup>5</sup>/<sub>16</sub>-inch panel rails and stiles create a minimal and uniform frame that produces uninterrupted views while letting daylight flow freely to enliven interiors. With a maximum frame height of 13 feet and panel width of 7 feet, the Palisades S100 delivers expansive scale and an elegant, all-glass look.

### Operation

Despite its large sliding panels, the CRL Palisades S100 Sliding Door provides effortless, one-handed operation. Panel loads are evenly distributed across the bottom rolling components resulting in a fluid, frictionless glide. The precision-engineered stainless-steel track and wheels further facilitate panel movement.



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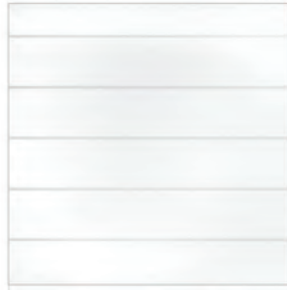
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### Performance

The CRL Palisades S100 Sliding Door is purposefully designed to enhance aesthetics while offering exceptional performance. Its CW40 Performance Grade rating makes the system well-suited for exterior applications where high loads, limits on deflection, and heavy use are expected. In addition, specialized seals provide superior resistance to air and water infiltration. Other notable performance features include a 0.38 U-factor and a Sound Transmission Class, or STC, rating of 33.

### Versatility

Versatility is a cornerstone of the Palisades S100 Sliding Door. It can be customized for a wide variety of interior and exterior applications in residential or commercial environments. Twelve configurations are available with either flush or raised sills and double or triple tracks. Standard finishes include black bronze anodized, satin anodized, and black or white powder coat. Custom RAL colors are also available.



02



03

01

**01. Bird-friendly glass**

Guardian Glass North America now offers Guardian Bird1st Etch glass. The products include Threat Factor scores, which indicate the percent of times in which birds will not avoid collision, to quantify collision-avoidance effectiveness. Bird1st Etch glass is available on Guardian UltraClear low-iron glass and standard clear. Sizing is 96 inches by 130 inches on 6-millimeter-thick float glass through the Guardian Select Fabricator network. 855/584-5277 | GUARDIANGGLASS.COM

**02. BIPV glass**

Vitro Architectural Glass launched Solarvolt building-integrated photovoltaic glass modules, which combine the aesthetics and performance of Vitro Glass products with CO<sub>2</sub>-free power generation and protection from the elements for commercial buildings. Solarvolt BIPV modules can be used to enhance various components of commercial building exteriors, including balustrades and balconies, overhead glazing and skylights, façades and opacified spandrel glass, all while passively generating solar power. Solarvolt BIPV modules can be used with virtually any Vitro Glass product. 855/887-6457 | VITROGLAZINGS.COM

**03. Conductive glass**

Zytronic, a U.K.-based company that develops capacitive technology for touchscreens, released Electroglaz, a bespoke lamination of non-conductive and conductive transparent glass. The arrangement allows power to be transferred across two or more individual layers within the laminate and tapped/extracted at the required locations to power multiple low-power devices, which use 50 volts or less. Potential applications include LED-lit display cases and shelving units for museums, art galleries and high-end retail stores, say officials. +[44] 0191-4145-511 | ZYTRONIC.CO.UK

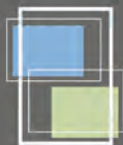
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## PRODUCTS



01



02

### 01. Rolling door

Basco Shower Enclosures introduced the new Rotolo Lux bypass rolling door. Basco's goal was to create a European rolling door that offers a combination of ultramodern looks, performance, and minimalistic design in both ¼-inch and ⅜-inch heavy glass. Available in Matte Black, Brushed Nickel, Oil Rubbed Bronze and Chrome finishes, the Rotolo Lux hits all current bathroom trends. The product features dual bypassing glass panels, a mitered corner towel bar and a modern header with snap-lock easy installation. 800/452-2726 | [BASCOSHOWERDOOR.COM](http://BASCOSHOWERDOOR.COM)

### 02. Window slider

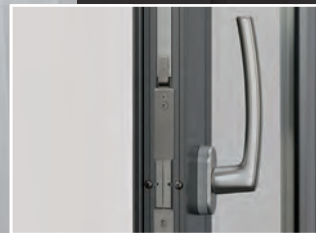
Unicel Architectural Corp. added the QuickGlide to its list of operators available for Vision Control. The QuickGlide slider features a slim design which blends in with the glass of the unit and provides precise and effortless control of Vision Control integrated cord-free louvers, say officials. The operator is ideal for interior 1-sided operation applications with a 2-inch air space, and applications include interior and exterior windows, doors and other openings in health care, commercial and educational environments. 800/668-1580 | [UNICELARCHITECTURAL.COM](http://UNICELARCHITECTURAL.COM)





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## PRODUCTS



01



02

### **01. Color interlayers**

Satinal released Strato Colour, color interlayers for glass lamination. The interlayers are available in four colors: Comfort Bronze, Sky Gray, Local Light Blue and Nature Green. The line shares features from the company's Strato Clear range, including anti-burglary, adhesion to glass, acoustic insulation and UV-resistance properties, the last of which shields up to 99 percent of UV rays. Due to the quality of Satinal's EVA film, the colors have durability over time, say officials.

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### **02. Antimicrobial coating**

Privacy Glass Solutions is now offering an antimicrobial coating, which can be added to the company's propriety lever mechanism options, including its Vistamatic vision panels. This addition adds an extra layer of protection and peace of mind, say officials. The coating has undergone significant testing to ensure its effectiveness, say officials, and will be implemented for the company's daily range of product offerings.

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**NSG Group**

NSG Group announced several officer and senior management appointments. *John Mercer*, currently executive officer, chief procurement officer, will transition to executive officer, special project. *Shoji Miyanomoto*, currently corporate officer, managing director, Architectural Glass Japan, will be senior corporate officer, head of Architectural Glass Asia. *Kenjiro Hira*, currently business support controller, Architectural Glass Asia, will be corporate officer, managing director, Architectural Glass Japan. *Takashi Suzuki*, currently senior corporate officer, head of Architectural Glass Asia, will be corporate officer, head of sales, Architectural Glass Asia. Finally, *John Wilgar*, currently category director energy, non-float direct materials and supplier development procurement, will be Head of Procurement.



Hensler

**C.R. Laurence**

C.R. Laurence named two new senior leadership members. *Ben Hensler* was appointed senior vice president of sales for the company's United States operations. He brings more than 20 years of sales leadership

experience in B2B distribution within private equity-owned and large public companies. *Steve Whitcomb*, senior vice president of operations for CRL, brings more than 25 years of experience as a CEO and senior leader in the building products, distribution and construction products industries.

**Saint-Gobain**

*Pierre-André de Chalendar*, chairman and chief executive officer of Saint-Gobain, will be stepping down from his role as CEO, and will be replaced by *Benoit Bazin*, currently chief

operating officer, according to a statement included in the company's latest earnings report. Chalendar will remain in his role as chairman.

"I am delighted to be soon handing over the executive role to Benoit, who has in-depth knowledge of the Group, has shown his leadership in the different strategic and operating roles he has held," says Chalendar.

**Ergo Robotics**

Jerry Nudi and Bart Knotts, co-founders of Glens Falls, New-York-based Ergo Robotic Solutions, promoted *Ryan Nudi* to the position of president of Ergo. Prior to joining Ergo in 2018, as head of administration and logistics, Ryan worked with Ayco, a Goldman Sachs company, headquartered in Saratoga Springs, New York, for five years.



Clutchey

**YKK AP America**

YKK AP America promoted *Derick Clutchey* to director of branch sales. Clutchey is now responsible

for expanding sales and ensuring service excellence throughout the company's 10 branch locations across the U.S. In his new role, Clutchey will focus on growth initiatives and customer satisfaction within YKK AP's branch business. He will have full responsibility for overall branch sales and their oversight, as well as support strategy development and execution with emphasis on business growth.



Roberts

**Fenestration and Glazing Industry Alliance**

The Fenestration and Glazing Industry Alliance hired *Amy*

*Roberts* as its new director of Canadian and technical glass operations. Roberts will be training with Marg Webb, FGIA glass products and Canadian industry affairs director, prior to Webb's retirement later

in 2021. Roberts has more than 20 years of industry experience in both residential and commercial window manufacturing, as well as glass and insulating glass manufacturing, according to an FGIA statement.

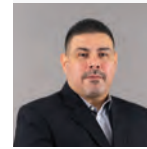
Roberts will be working from her home in British Columbia, Canada.



DePalma

**Frameless Hardware Co.**

The Frameless Hardware Co. appointed *Tony DePalma* to the position of director of business development, and welcomed *Jesse Dorado* as brand manager, architectural hardware.



Dorado

Prior to his

current role, DePalma served as vice president of product group sales at C.R. Laurence. During his tenure with CRL, DePalma managed architectural hardware DSS sales teams and, working directly with then-CEO Don Friese, pioneered the company's business development department.

Dorado has 28 years of experience as a glass and hardware specialist, and will oversee technical support, specification consult and estimating services for the architectural hardware division.



Wilson

**FeneTech Inc.**

Responding to the needs of its expanding software development and growing customer base, FeneTech Inc.

Vice President of Engineering Craig Morris announced the promotion of *Brett Wilson* to quality Assurance group manager.

Wilson joined FeneTech in 2011. During his nearly 10 years with FeneTech, he has demonstrated the ability to expand his knowledge of the software and shown his

commitment to quality and FeneTech's mission statement: to provide the best products, service and support.



Holland

### Vitro Architectural Glass.

Vitro Glass named *Emarie Holland* strategic account manager for the Southern U.S., and appointed *Randy Walters* strategic account manager for the Northeast region.

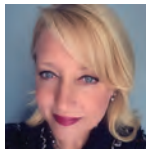


Walters

In her new position, Holland will provide sales and service support to glass fabricators and glazing contractors in the residential and specialty construction markets. Based in Burkburnett, Texas, she will serve customers throughout Texas, New

Mexico, Arkansas, Oklahoma and Louisiana.

In this new role, Walters will provide sales and service support to window manufacturers and specialty glass fabricators to meet the needs of their building projects. Based in Bethlehem, Pennsylvania, Walters will be responsible for servicing customers in eastern Pennsylvania, New York and all of New England.



Wegener

### ODL Inc.

ODL Inc. added *Celeste Wegener* as vice president of product and brand management.

Wegener brings more than 20 years of successful product and brand leadership to ODL. Her experience includes senior positions with corporations including Steelcase and Meijer. Wegener will lead ODL's

product management and channel marketing teams.

### Syracuse Glass

Syracuse Glass Co. announced that after 30 years of dedicated service, *Tim Kelley* will transition to retirement. *Steve Legg* joined Syracuse Glass and will be taking the reins in the position of architectural glass sales manager from Kelley. Legg is joining Syracuse Glass after spending the last decade with Guardian Industries in various sales management roles.

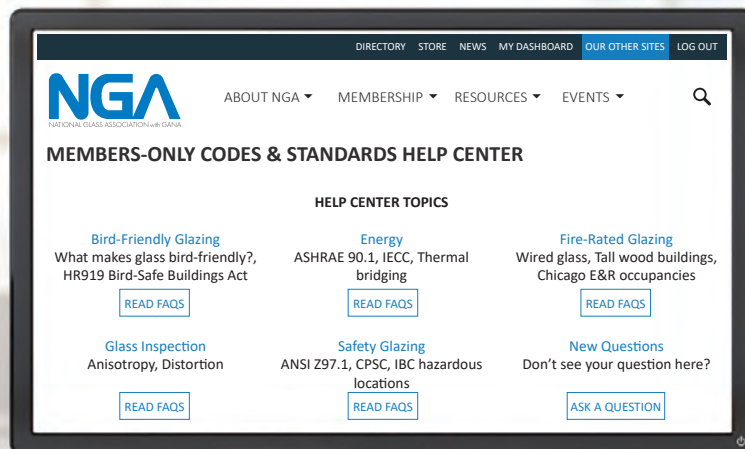
### Morse Industries

Morse Industries welcomed *Marc Scerba* as the company's Northeast regional sales manager. Scerba returns to the company after a year away, and has previously worked at Morse for over 10 years in the sales department.

Scerba brings his extensive knowledge of the industry, say

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officials, and will be working closely with the Morse team to ensure that all needs and expectations are exceeded.



McCord

**Soft Tech**

*Jim McCord* joined Soft Tech as business development manager, based out of Pennsylvania. The company also welcomed *Bruce A. Brecht* as business development manager to the North American sales team.



Brecht

McCord began his career in the building materials industry right after graduating college. During this time, he gravitated toward the fenestration industry, selling well-known “Lumberyard” channel industry names such as Andersen, Marvin and Loewen. Brecht has over 40 years' experience

in the building products industry, specializing in fenestration for the past 25 years. He has worked with well-known organizations such as The Weathershield Companies, Pella Commercial, Kawneer, Crystal Windows, Intus Windows and Rehau.



Hudgins

**Bavelloni America**

Bavelloni America welcomed *Ryan Hudgins* as territory sales manager. Hudgins is responsible

for the following states: Illinois, Indiana, Kentucky, Ohio, Michigan, western Pennsylvania, Tennessee, West Virginia and Wisconsin.

**Southern Aluminum Finishing**

Southern Aluminum Finishing appointed a new general manager for its original location in downtown Atlanta, *Matthew Webb*, an industry



Webb

veteran who brings more than 20 years of professional experience to his new post. At SAF's Atlanta branch, Webb will oversee the company's sheet and extrusion distribution operations at that location, along with SAF's eastern anodizing line.

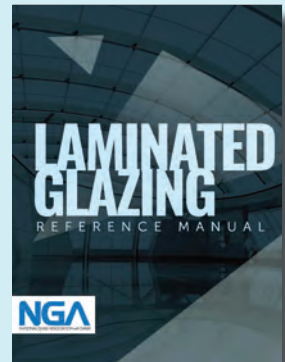
**Glass 3 Enterprises**

Officials from Glass 3 Enterprises Ltd, a U.S. and Canadian supplier and sourcing provider for commercial architectural glass, announced Graham Architectural Sales as the company's newest manufacturer representative.

*Susan Graham*, owner of Graham Architectural Sales, will be representing G3E's full line of custom architectural glass products. ■

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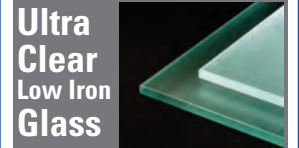


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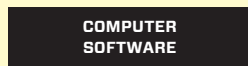
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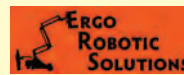
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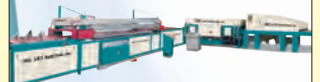


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Companies from all parts of the glass and glazing industry have implemented innovative, out-of-the-box ideas to improve business from the ground up. Here's an Idea showcases these sometimes small behind-the-scenes ideas that can make a big impact on a company's bottom line. If you have an idea that you would like to share, contact Norah Dick, [ndick@glass.org](mailto:ndick@glass.org).

## HOW TO ENSURE A QUALITY INSTALL

There is only one mantra in the construction industry, says Charles W. Cook, a clinical professor at Drexel University and the narrator of the documentary *The Quest for Quality: A Certified Solution*. “On time, within budget, meeting standards of quality, and doing it all safely.”

The documentary, which premiered in February, is a collaboration between the Architectural Glazing Institute and Drexel, and investigates how “standards of quality” can and should be defined for glass installation, as well as how the glass industry supply chain can work to anticipate conflicts and challenges.

### Certification and training

As discussed by many representatives of the glass industry interviewed for the documentary, installation can be a pain point in construction. “There’s a lot of buildings in the United States that don’t work well, because things weren’t installed properly, and there was a rush to finish to get a building occupied. Then all the little things that need to get done, get missed,” says Ellis Guiles, president, Graboyes Commercial Window and Glass Solutions.

Solutions to this issue may involve training and certification programs, given how complex installation processes have become. “Individual training is important because there are a lot of different technologies out there, and a lot of different systems, even within glazing communities,” says Dana Lands, senior



associate, WJE Associates.

Certification, such as the North American Contractor Certification Program for Architectural Glass and Metal Contractors, or NACC, is also an option. Paul McIntyre, owner of Synergy Glass & Door, testifies to the usefulness of certifying glaziers. “This certification has taken me light years from where we used to be,” he says. “It has put checklists in place that we have to meet before the product leaves my shop.”

### Anticipating conflicts

Cook uses the example of Eureka Metal & Glass’s work on the Comcast Tower Lobby, located in Philadelphia, as a case study to show how anticipating conflicts can help installers achieve success. Terry Webb, president of the company, says that the team realized early in the project schedule that there would be an issue with their scope.

“Shortly after we started the design phase, we realized there would be a

challenge because we would be installing cleated glass on a wall with a ¼-inch dry joint above, therefore installing glass below an already-installed piece would be a problem,” Webb says.

Though facing a unique problem, recognizing the issue early in the process allowed the team to start problem-solving. “Early on, we understood this would be a challenge, as we have noticed numerous errors [in other projects] caused by addressing jobsite conditions too late in the process,” says Webb.

Ultimately, after weeks of problem-solving with his team, Webb was able to propose a different type of attachment system in order to remove individual pieces if breakage did occur. Cook uses the case study to illustrate the distinct benefits of thinking ahead. “If we look far enough ahead we can resolve conflicts when they’re minor impediments, rather than the cause of chaos on the project schedule,” he says. ■





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