

WHAT'S NEXT?

The uncertain road ahead for the economy, construction and global glass manufacturing

Annual Forecast: Building for 2021 P. 54
World of Glass Update P. 70

Vaccines

Shutdown

Unemployment

Pandemic

New float lines

Job growth

Recovery

Fiscal stimulus

Office vacancies

Project delays

Hot holds

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“

WE ARE EXPECTING THE ECONOMY TO CONTINUE TO GROW. ... [BUT] UNTIL WE GET A WIDELY DISTRIBUTED VACCINE OR THERAPEUTIC, THERE WILL BE CAUTION.

”

ANNUAL FORECAST, P. 54

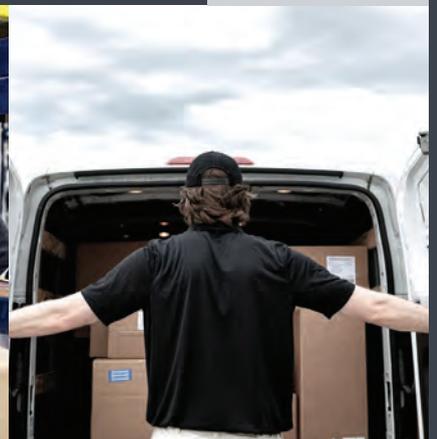
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GLASS MAP

Searchable map and database of float and fabrication locations

INSTALLATION DEMO

Video demo of a solo hinged tub screen installation

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GLASSBLOG



GLOBAL GLASS

6 Reasons to Make 2022 the Year of Glass

By Katy Devlin



REFLECTION

2020 Year in Rearview

By Pete de Gorter, DeGorter Inc.



CODES

The Battle Continues

By Max Perilstein, Sole Source Consulting

PROJECT NEWS



Featured in Glass Magazine Weekly and on [GlassMagazine.com](https://www.glassmagazine.com). To submit projects, write Norah Dick, ndick@glass.org. **Pictured:** The Central Library in Alberta, Canada, which features a notable glass-and-metal façade of Solarban 60, Solarban 72 and Starphire Ultra-Clear glasses by Vitro Architectural Glass.

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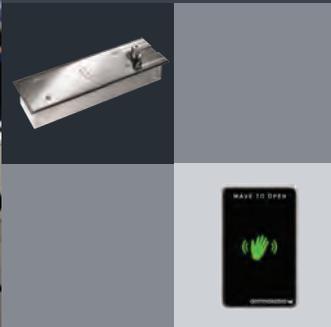
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SuperLite® II-XL 90 with Starphire Ultra-Clear® in GPX® Architectural Series Aluminum Doors

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in GPX® Architectural Series Framing and
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Prepare for What's Next



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

If 2020 taught us anything, it is to expect the unexpected—to learn to thrive despite uncertainty and find opportunity in the face of extraordinary challenges. Economic forecasters project an uneven and unstable recovery in 2021 (see page 54 for more), while acknowledging that continued uncertainty will present additional and perhaps unknown challenges.

So, how can glass companies prepare for what's next? I asked some of Glass Magazine's expert contributors to weigh in, and they offered insights on everything from legal and contract best practices to labor concerns. Some key takeaways:

1. Maintain flexibility

Matt Johnson, Gary Law Group

Delays are a big concern; full cancellations less so. I am telling clients that flexibility remains a key operating dynamic for 2021. It appears that markets and regions will respond and restart unequally, regardless of vaccine accessibility. Flexibility will be a business-essential to managing risks that will appear with shifting labor, materials, lockdowns, and compliance requirements throughout the coming year.

Project addenda were added to many contracts in 2020 to address performance, payment, and excuse due to COVID-19. Refining those terms in new and coming agreements may help

ensure financial and performance flexibility, and likely prove among the most essential project-risk mitigation points in 2021.

2. Find opportunities for savings and growth

Marco Terry, Commercial Capital LLC

Deploy efficiency improvements that can lead to savings, better services, and higher client satisfaction. And keep a careful watch on your company's finances. Make sure your credit and collections departments are running smoothly.

Look for organic growth opportunities by either expanding services, deploying new lines of business, or considering projects outside your area of comfort. These efforts can also help diversify your revenue base, which improves financial stability. Additionally, recessions provide growth opportunities through mergers with other companies or outright acquisitions.

3. Keep up communications

Max Perilstein, Sole Source Consultants

We will still be virtual for a while, so don't lose sight of best practices that you may have installed at the start of the pandemic: ramped-up networking, an optimized website, and social media (if you use it) tuned up for maximum brand exposure.

Proactive communication is a major key during challenging times. Those who do it best at each step of the process will reap the benefits during the tough times and be best positioned as we emerge out of it all.

4. Strategically address labor variability

Joe Erb, Quanex Building Products

From a business perspective, I think successful companies will shift from the "firefighting" we saw in 2020, in immediate response to the pandemic and the associated labor challenges, to something more strategic. Implementing durable, high-performance products and production strategies that are less impacted by labor variability can help drive more dollars to the bottom line. Evaluating our responses to 2020 disruptions, reassessing, and then implementing solutions to become more resilient to future disruptions like COVID will be key.

5. Collaborate with industry partners

Tim Finley, T.Fin Building Solutions

Installer/vendor relationships matter. As more competition arrives to chase the same work, the value created together is key. How can you approach a given key project together to make sure you have all aspects covered, identified the pros and cons and put your best proposal forward? Pricing is always going to be a topic, especially now. So, together, how can you arrive at the best solution? ■



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YOUR ASSOCIATION AT WORK

NEED-TO-KNOW INFORMATION FROM THE NGA

NGA WELCOMES NEW BOARD MEMBERS AND OFFICERS

In fall 2020, the National Glass Association announced four new board members who will begin their three-year terms immediately, as well as a new slate of board officers and returning board members for the 2020-21 term.

Joining the board are Denise Bardwell Baker, Spring Glass & Mirror, Spring, Texas; Chris Dolan, Guardian Glass, Auburn Hills, Michigan; Silas Koonse, Koonse Glass Co. Inc., Columbia, Missouri; and Courtney Little, Ace Glass, Little Rock, Arkansas.

Board officers for the 2020-2021 term are chair, Cathie Saroka, Goldray Glass, Calgary, Alberta, Canada; chair-elect, Guy Selinske, American Glass & Mirror, Prior Lake, Minnesota; treasurer, Doug Schilling, Schilling Inc., Galion, Ohio; and immediate past chair, Chris Bole, Pikes Peak Glass Inc., Colorado Springs, Colorado.

Returning board members include Ron Crowl, FeneTech, Aurora, Ohio; Brian Hale, Hale Glass Inc., Placentia, California; Tim Kelley, TriStar Glass Inc., Catoosa, Oklahoma; Rick Locke, Windows, Doors & More Inc., Seattle; and Jim Stathopoulos, Ajay Glass, Canandaigua, New York. ■

CODE REVIEW AND GSA UPDATE TO LEAD NGA GLASS CONFERENCE AGENDA

Two sessions at the upcoming NGA Glass Conference will look at the future implications of the latest codes and standards development, including a unique perspective from the General Services Administration, one of the largest commercial real estate lessors nationwide.

The conference will be held virtually on Feb.9. Members and non-members are welcome and encouraged to attend, and architect CE credits are available. Register at glass.org.

Program Highlights*

(*as of press time; subject to change)

In-depth technical and code review

Have codes and standards questions? Use this opportunity to ask hard questions and ponder the next six to 12 months of your R&D and sales tactics. Get the facts, see future projections and learn the obstacles that impact glass and glazing.

Glazing design for GSA building requirements

The General Services Administration owns and leases over 376.9 million square feet of space in 9,600 buildings in more than 2,200 communities nationwide. Get an in-depth look at the glass and glazing requirements of the GSA, including applications for bird-friendly, protective glazing, security glazing, energy and daylighting.

6th annual Fun Run/Walk

The Fun Run/Walk is a highlight of the NGA Glass Conference and will continue to be a way for

CONTINUED ON PAGE 16

INSTALLING COMPANY MEMBERS SHARE AND COMPARE CHALLENGES AND SOLUTIONS

In November, NGA hosted a peer networking hour for member installing companies on Thursday, where registrants discussed labor and training, and the economic outlook.

“With the pause on in-person events this year, NGA wanted to offer an online space dedicated to our contract glazing and full-service glass company members to meet, share

and compare challenges and solutions,” said Nicole Harris, NGA president & CEO. “The discussions were lively and productive, and the feedback points to hosting peer networking for members on an ongoing basis.”

Individuals distributed among three concurrent breakout groups held a variety of positions within their contract glazing

and full-service glass companies, including president, vice president, business development, client relations, project managers and estimators, and ranged from long-time veterans to those new to the industry. Companies varied in size from five employees to over 500 employees.

CONTINUED ON PAGE 16



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YOUR ASSOCIATION AT WORK

CODE REVIEW AND GSA UPDATE TO LEAD NGA GLASS CONFERENCE AGENDA

attendees to encourage each other and engage in friendly competition.

Volunteer celebration happy hour

Join for good conversation and to recognize peers for their contributions to the association and the industry. Awards will be given out to recognize volunteers' virtual engagement over the past year. ■

INSTALLING COMPANY MEMBERS SHARE AND COMPARE CHALLENGES AND SOLUTIONS

Five key takeaways

1. Retaining quality employees and developing employees remains a top concern, for which some incorporate in-house training programs supplemented by NGA's MyGlassClass.com curriculum.
2. There is a heightened focus on succession planning.
3. Company leaders have overall optimism on the flow of new work and new opportunities for diversification.
4. Participants are seeing an active bidding environment, including an increase among general contractors.
5. Companies are using history to project the future—"we've been through a downturn before"—to assess what lessons learned apply now and in the next two years. ■

CALL FOR PHOTOS

The NGA's Advocacy and Technical team is looking for project photos highlighting decorative glazing incorporating the use of color, texture and a wide range of applications for the new Decorative Glazing Manual.

For the new Commercial Fenestration Systems Manual, the NGA is seeking photos of window wall, storefront, curtain wall, unitized system, spandrel, entrances and different types of framing, as well as specific project details such as

curtain wall anchoring. The manual will also require photos illustrating intermediate shading with tinted glass, coated glass, ceramic frit, integrated film, shades or blinds, and dynamic glazing as well as photos of louvers and operable vents.

Photos will be credited on an acknowledgement page within the manual. Contact Amber Johnson, ajohnson@glass.org, with questions or to submit photos.

MARKET WATCH

REMODELING SPENDING CONTINUES GROWTH TREND IN 2021

4.1%

Forecasted annual growth rate
for home remodeling in Q1 2021

For glass shops working in the residential market, home remodeling will continue to be an active segment throughout 2021.

Spending on home improvements and repairs increased during the pandemic, rising from \$325 billion in first quarter 2020 to a projected \$332 billion in the fourth quarter, according to the Leading Indicator of Remod-

eling Activity, LIRA, published by the Remodeling Futures Program at the Joint Center for Housing Studies of Harvard University.

The LIRA forecast shows moderate increases in spending in home remodeling throughout 2021, beginning with 4.1 percent annual growth in the first quarter, with softening gains of 1.7 percent by the third quarter. ■

In Market Watch, the NGA presents a quick glance at one economic indicator for glass industry leaders to track as they look to identify opportunities for growth and potential challenges ahead.



GLASS INFORMATIONAL BULLETIN

How to Use—and Not Use—EPDs

This document is intended for the architectural, engineering and construction community involved in the selection, specification and review of life cycle environmental impacts of building components. It has been observed in the marketplace that professionals are trying to compare Environmental Product Declaration values, and the purpose of this document is to highlight challenges in comparison. The practice of comparing EPDs is not encouraged, nor always appropriate, and could lead to misleading conclusions.

Flat Glass EPD

It is important to understand how to properly read, interpret and utilize the data that is published in the NGA industry-average Flat Glass EPD. This is especially critical when attempting to compare this data to manufacturer-specific flat glass EPDs, as well as the EPDs of other materials and systems.

NGA and its member companies created the industry-average Flat Glass EPD to better understand their glass products' environmental performance from cradle-to-gate. The NGA EPD conforms to the NGA Product Category Rule, or PCR, for Flat Glass, published by NSF in September 2020, which describes the format and requirements for conducting life cycle assessments, known as LCAs, and creating EPDs for flat glass products. The Flat Glass PCR

CRITICAL CHARACTERISTICS

When comparing EPDs, at a minimum ensure the following are identical:

Product Category Rule (PCR)	Declared unit*	System Boundary (Use and end-of-life stage assumptions)
EPD methodology and assumptions	Data quality such as variability in data sets and broad error margins in data	Allocation methods
Variability in assessment software tools used	Program Manager (Program Operator)	Data sources (GABI version, for example)
Manufacturer-specific vs industry wide	Facility-specific vs multiple facilities	Suppliers/Supply chain
	Age of the EPD	

*Comparison of EPD results on a mass basis is insufficient; the technical performance of the product should be considered.

GLASS INFORMATIONAL BULLETIN—HOW TO USE—AND NOT USE—EPDS

requires that EPDs include the following disclaimer advising against comparisons:

“This EPD was not written to support comparative assertions. Even for similar products, differences in declared unit, use and end-of-life stage assumptions, and data quality may produce incomparable results. It is not recommended to compare EPDs with another organization, as there may be differences in methodology, assumptions, allocation methods, data quality such as variability in data sets, and results of variability in assessment software tools used.”

Caution against comparison

In general, EPDs may be used to inform and comply with the requirements of green building rating systems and legislative actions. The purpose of an EPD is to provide information on a number of environmental impacts of the product over the life cycle, either cradle-to-gate or cradle-to-grave.

EPDs typically rely on estimations of impacts, therefore the accuracy will differ for any particular product line and reported impact. EPDs are not meant to be comparative assertions and may not be comparable or have limited comparability. There is a tendency to want to compare EPDs at face value, but it's not always appropriate to do so. According to clause 5.5 of ISO 21930:2017: Comparability of EPDs for construction products:

“Comparison of construction products using an EPD shall be carried out in the context of the construction works. Consequently, comparison of the environmental performance of construction products using the EPD shall consider all the relevant information modules over the full life cycle of the products within

the construction works. Such a comparison requires scenarios in the construction works context. The provisions of ISO 14025:2006, 6.7.2 on comparability shall apply. The information provided for any comparison shall be transparent to allow a clear understanding of the limitations of comparability.”

This is reinforced in MIT Concrete sustainability Hub - Critical Issues When Comparing Whole Building & Building Product Environmental Performance:

“Only compare building products in the context of a whole building. With regards to building products, unless the thermal properties, such as thermal conductance and thermal diffusivity, and envelope permeability are exactly the same, use of the products under comparison would cause different operational energy consumption (as described above in System Boundaries). Therefore, we again assert that building products can only be compared in the context of a building.”

LEED v4.1

In acknowledgement of the challenges associated with comparing EPDs, proposed LEED v4.1 option 2 attempts to address this by limiting comparisons to be made using an individual product EPD and demonstrating measurable improvements in different versions of that EPD. This is in contrast to LEED v4.0, which compared an EPD to an industry average EPD. The proposed version of LEED v4.1 states:

“To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically, and socially preferable life-cycle impacts. To reward project teams for selecting

products from manufacturers who have verified *improved* environmental life-cycle impacts.” (quoted from LEED v4.1 page 167, emphasis added)

Critical characteristics

EPDs are developed, particularly those in accordance with ISO 14025, with critical characteristics that are unique to that published document. Extreme caution should be used when comparing EPDs and the resulting global warming potentials (GWPs). Significant differences may exist in some attributes, even for similar products. Comparing EPD values with differences in the critical characteristics can yield large errors between the values and should be considered. When comparing EPDs, at a minimum, ensure the critical characteristics are identical (see checklist on previous page).

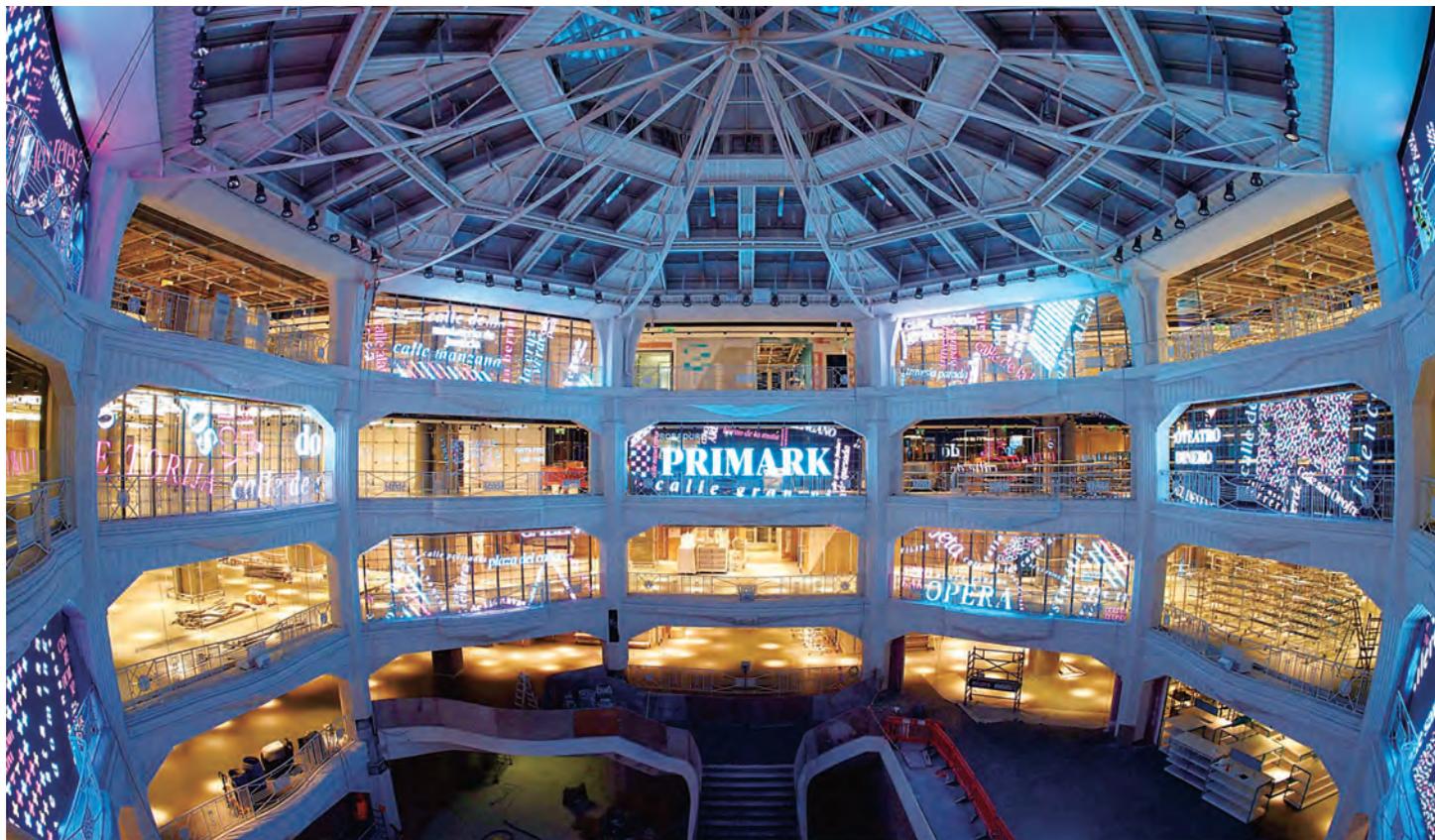
Conclusion

EPDs allow consumers or design professionals in the building and construction industry to make better-informed decisions about the environmental impacts associated with the building material products chosen for building projects. Proposed assessment methods such as the one found in the (currently) proposed LEED v4.1 are considered to be more appropriate and would mitigate misinterpretation of the data and their potential environmental impacts. ■



ONLINE

Visit glass.org to download the NGA glass technical paper on general EPD education and to access all available GIBs and glass technical resources.



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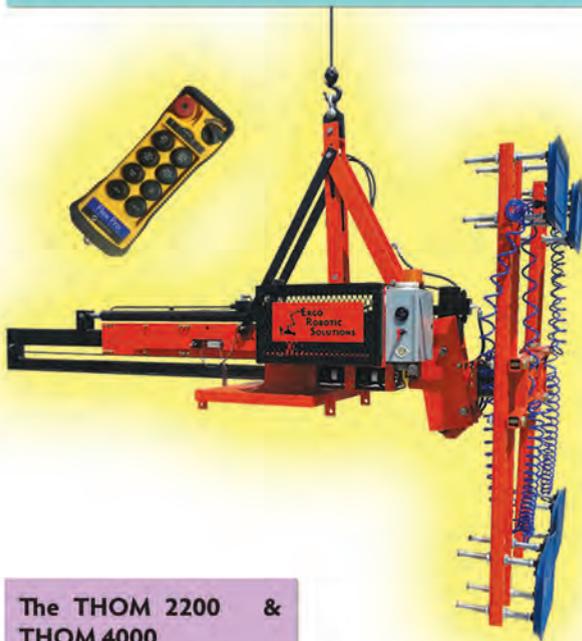
The GL1200 This model is capable of working with a payload 1200 pounds at a height of 13 feet. It falls between the GM800 and the GM2000-12 in capacity, and is very heavy duty.

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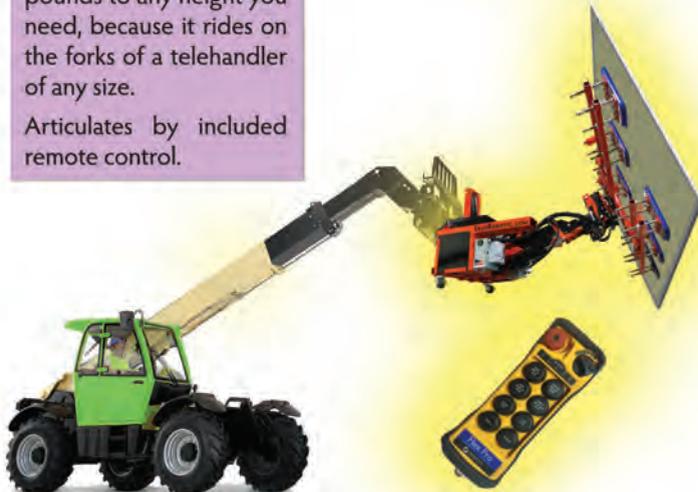


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Future Remains Unclear for Xinyi's Canadian Float Plant

The future of Xinyi Glass's Canadian float plant remains uncertain. Xinyi selected Stratford, Ontario, Canada, as the potential site of its first North American float plant, but the project has received pushback from residents on a variety of issues. A citizens' group has filed a complaint with a third-party investigator regarding alleged lack of transparency in how the proposed construction site was re-zoned. Debate on the city's cost-sharing agreement with Xinyi on infrastructure updates has been deferred as of this writing.



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NSG Group Starts Furnace at New Plant, Invests in Research and New Products

NSG Group's new 500,000-square-foot facility, located in Luckey, Ohio, started operation. The plant will have a melting capacity of 600 tons per day and will produce glass using the company's advanced online coating technology.

The Group also introduced Pilkington SaniTise, a transparent coated glass. Naturally activated through UV exposure from daylight, the pyrolytic coating provides antimicrobial properties and activity against enveloped viruses on the glass surface. NSG Group is also exploring new

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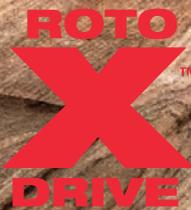
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researching opportunities, including a partnership with the University of Cambridge. The Group is working with the University's Fluids in Advanced Manufacturing team to establish a way of printing conductive materials onto wide areas of curved glass surfaces. Additionally, C-Capture Limited and Pilkington UK were awarded funding through Innovate UK's Sustainable Innovation Fund to test the applicability of their carbon-capture technology in glass manufacturing.

Pulp Studio Adds Capacity, Doubles Output of Laminated Glass

Pulp Studio added equipment and capacity to its laminating department, effectively doubling the daily output in the company's 150,000-square-foot facility, say company officials. The scheduled updates began in March and included a remodel and rehabilitation of Pulp Studio's autoclave assets used for glass lamination.

Hegla Corp. Opens New Headquarters

After a construction phase of about one year, Hegla Corp. officially opened its

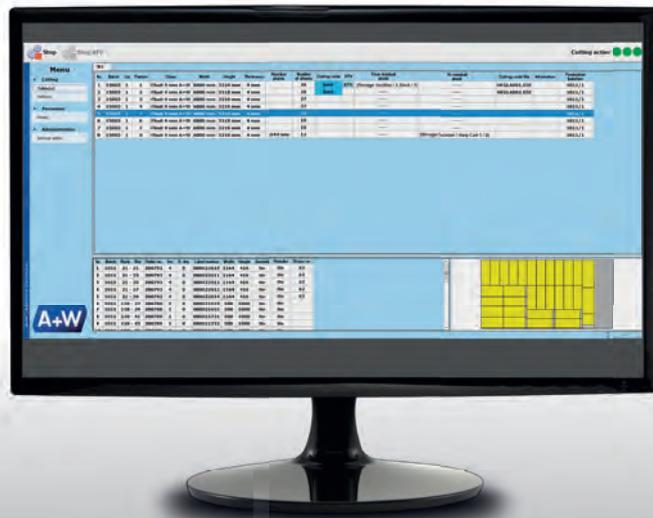
new headquarters in Stockbridge, Henry County, Georgia. The relocation to the new business facilities had become necessary both to create space for the growing number of employees and to realize a local production site in the U.S., say company officials.

Salem Distributing Co. Rebrands

Salem Distributing Co. carried out a rebrand and divisional restructure. Salem Distributing Co. evolved into Salem Fabrication Technologies Group Inc. This name change is intended to better represent the company across all industries in which it offers

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NEWS TO KNOW

machinery, tools, supplies, equipment and services. Under Salem Fabrication Technologies Group, two distinct divisions will continue to focus on technology and fabrication solutions in the glass industry. The first division, offering tooling, surfacing supplies and equipment solutions, will be known as Salem Fabrication Supplies. A second division will entirely focus on glass fabrication machinery and technical services. HHH Tempering Resources, which was acquired by Salem in July of 2019, will become HHH Equipment Resources.

Flynn Group of Companies Sign Letters of Intent with Two Companies

Flynn Group of Companies signed letters of intent with Noorda BEC Inc. and AARA Construction Inc., to combine operations.

Noorda has over 400 dedicated employees, working out of offices in Salt Lake City; St. George, Utah; and Boise, Idaho. Noorda is led by Chris Noorda, who has grown the company over the past 50 years.

AARA has over 40 dedicated employees, and an outstanding reputation in architectural metals, say company officials. AARA is led by Jerry Spores, who has been a part of strategically growing AARA over the last 40 years.

Şişecam Completes Merger of its Subsidiaries

Şişecam successfully completed its merger of its main subsidiaries, Türkiye Şişe ve Cam Fabrikaları A.Ş. – Anadolu Cam Sanayii A.Ş., Denizli Cam Sanayii ve Ticaret A.Ş., Paşabahçe Cam Sanayii ve Ticaret A.Ş., Soda Sanayii A.Ş. and Trakya Cam Sanayii A.Ş. The process was initiated on Jan. 30, 2020; the official application to Turkey’s Capital Markets Board was approved on July 23, 2020.

Apogee Enterprises Announces Extension of Term Loan

Apogee Enterprises Inc. amended its credit agreement to extend the maturity

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NEWS TO KNOW

date of its unsecured \$150 million term loan facility from April 5, 2021, to June 25, 2024, which is the same maturity date as the company's unsecured \$235 million revolving credit facility.

The company currently has no outstanding borrowings on its revolving credit facility. Under the terms of the amendment, the company expects to reduce its annual interest expense by approximately \$0.5 million, driven by a 75-basis-point reduction in the term loan facility's LIBOR-floor.

FlexScreen Completes Distribution Partnership with Saint-Gobain ADFORS

FlexScreen, manufacturer of the flexible window screen, partnered with Saint-Gobain ADFORS, manufacturer of high-performance construction and industrial materials. This global partnership grants Saint-Gobain ADFORS exclusive rights to sell FlexScreen products within the retail and dot-com channels. FlexScreen is built with high-performance spring steel and damage-resistant frames, and offers residential and commercial consumers an efficient and effective method for installing window screens, say company officials.

Horn Glass Industries Expands into Brazil

With a new subsidiary in Brazil, the German glass plant manufacturer Horn Glass Industries AG is expanding its local availability in South America, say officials. The new subsidiary, Horn Glass Brazil Ltda., expands the Horn Group and is now the contact for the glass industry throughout South America. Headquarters for the subsidiary are in São Paulo. The Brazilian subsidiary is supported by specialists from Germany. In addition, thanks to the new location in South America, the parent company from Germany can serve the glass industry even more effectively in sales, project management and services, say officials. ■

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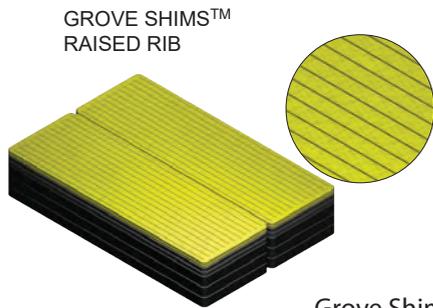
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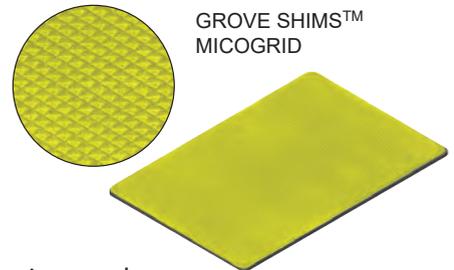
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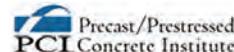
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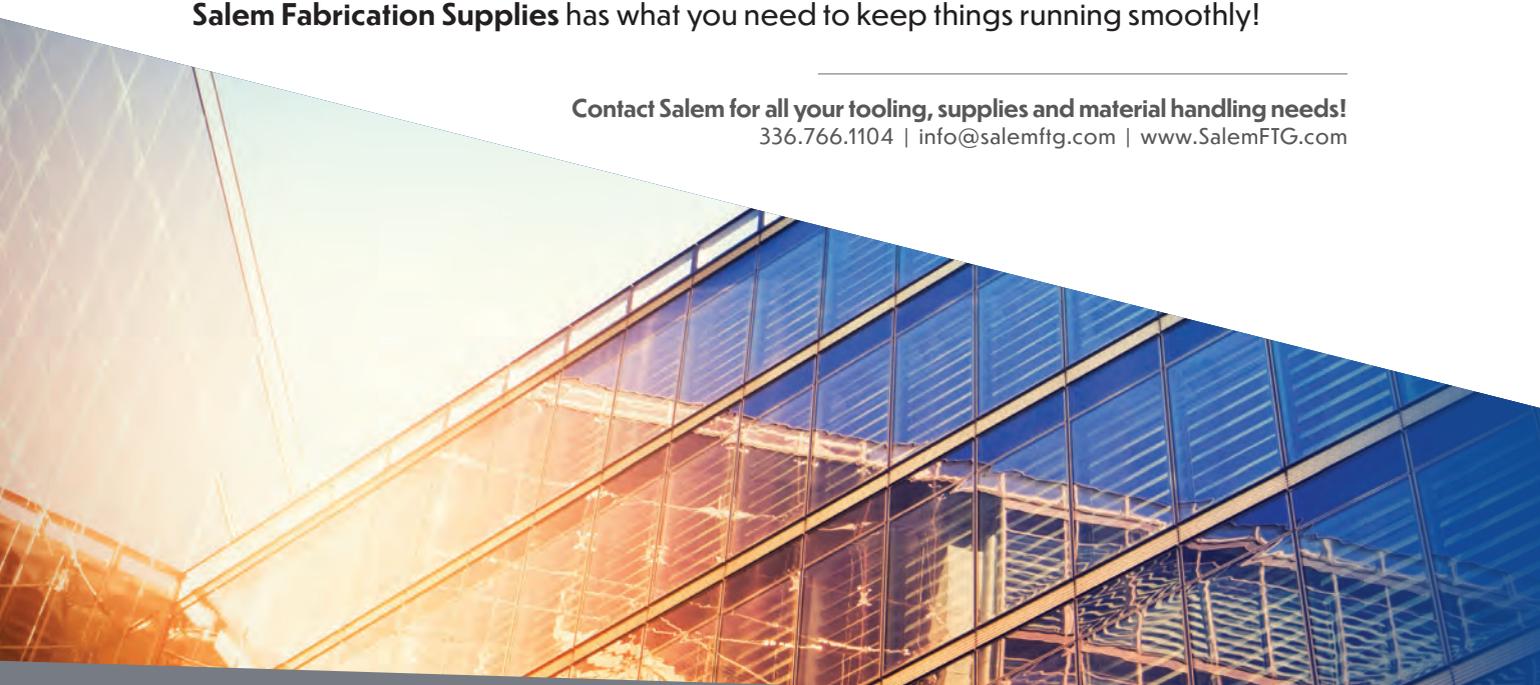
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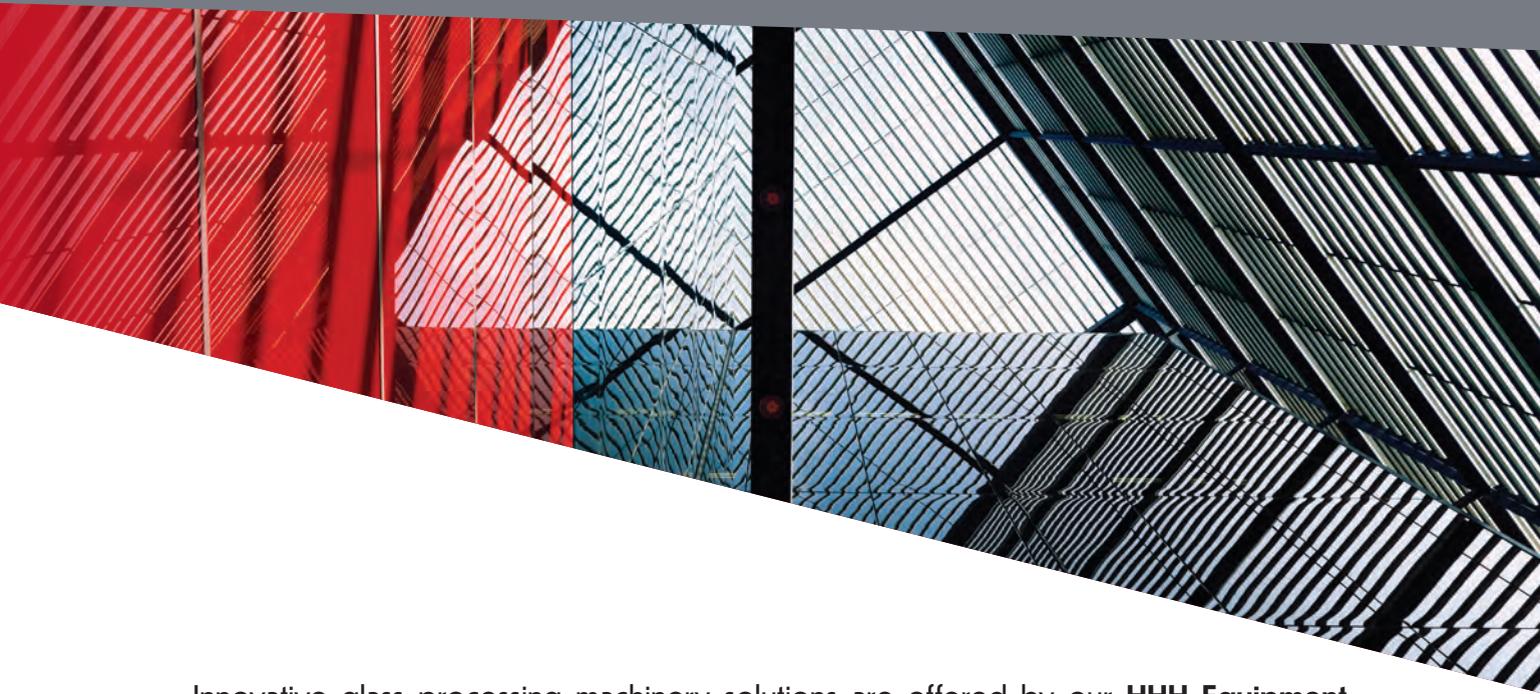
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A COMMON VOCABULARY

Differences in term definitions can put glaziers at risk. Find out how to avoid confusion. **BY MATT JOHNSON**



Did you know that the United States has had two measurements for “foot” since 1959—the International Foot and the U.S. Survey Foot? In 1959, the relationship of the foot to the meter was made more exact than it had been when imperial measures were tied to meters in 1893. When that happened, the older “Surveyor’s Foot” was left in place, a few microns longer than the redefined “International Foot.”

While measures that small may not seem to matter, disagreements over the proper foot have led to real and expensive problems. The National Institute of Standards and Technology notes that failures to specify the appropriate foot have led to professional liability claims, land sale and project delays, boundary disputes, and increased overhead

due to having to manage the miniscule measurements.

Glazing terminology can often prove just as complex and the measures equally small. And, similar to situations with differing foot measurements, expensive problems arise when two parties are not operating from a shared understanding of what terms mean, especially in specifications and contracting.

Some examples:

“High performance” is often a potentially problematic term. Normal considerations of high-performance glazing systems relate to good U-value, solar heat gain coefficient and visible transmittance. But what about performance grading or design pressure for operable units? How about reflective conditions and coatings? Interior usage and daylighting?

Regularly used terms like high performance often have embedded design and performance considerations that make detailed specification essential to a successful project and risk avoidance.

Another legally problematic term is “code.” The failure to define code leads to debates about which code controls and what was required of a trade.

Equally, requirements for specific installation methods, materials and hardware selection can be embedded within a generic agreement to meet code. Look no further than egress and ADA claims to see examples.

Lazy use of the term “completion” can also lead to delay and withholdings. This is especially true when an owner’s concept of complete does not meet the trade’s assumptions of substantial completion.

Differing definitions

In looking to manage these risks, it is

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INSIGHTS | LEGAL

first important to know your audience and not assume that you both are working from a common vocabulary. Owners, architects and general contractors each bring different levels of understanding about glass and glazing to projects. While there is no need to prepare a dictionary for clients, it can prove helpful to have standardized bid and contract addenda that address materials, scopes of responsibility and post-completion considerations. Each is an effort to clearly establish what glaziers bring to a site and what they do not. Offering these early in a project's life or bid cycle can help identify potential misunderstandings and opportunities for negotiation.

It can be that differences are not discovered until work is underway. Where differences in terminology lead to in-project issues, it is crucial to identify these issues and use the change order process or get a written modification. When identified but left unaddressed or undocumented, term debates often spawn delays in payment, completion issues and retention difficulties. Legal claims for breach of contract are the natural consequence. Using the change order process or securing a modification of the work agreement gives the parties an opportunity to come together and reset understandings about terminology. It also offers an opportunity to address costs arising from initial misunderstandings without involving the courts.

Terminology differences can also spawn risk after completion. This often comes up in situations where warranty or remediation agreements are unclear. For example, what is included in a warranty that offers "labor" can mean different things to different parties. Another example is the failure to specifically define the starting point for "years" of coverage in remedial-work agreements and warranties. In both examples the failure to be specific prevents easy evaluations of what obligations exist at a project. This, in turn, leads to legal debates and potentially expensive, unanticipated work years after completion—work that could have been avoided by more carefully selecting words and defining what they mean.

Manage risks

Specific language matters throughout a project's life, but the starting point for managing this risk requires looking for and addressing vocabulary/terminology issues early in a project. If project issues do come up, document and address them as soon as possible.

As for the "foot," after 60 years the United States is finally addressing the issue. The U.S. Survey Foot will no longer be recognized as of Jan. 1, 2023. Mark your calendars now. ■

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



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MANAGEMENT

DIVERSIFY YOUR WORKFORCE

An industry panel discusses how companies can examine their current workforce and take steps to take to encourage diversity, inclusiveness and more open communication in the workplace
BY LAURIE COWIN

Network. Talk with your employees. Conduct surveys. Get your employees engaged. Measure where you are. Set goals, then establish steps to reach them.

These are just a few of the suggestions from participants on the Women in Construction panel during GlassBuild Connect in September about how to recruit a more diverse workforce. The joint session from NGA and National Association of Women in Construction included the following panelists:

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 CIT, NAWIC national president,
 Charles Construction Services

LAULINE MITCHELL
 NAWIC vice president, BBI
 Construction

DOREEN BARTOLDUS
 NAWIC president elect, Jacobs
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NATALINE LOMEDICO
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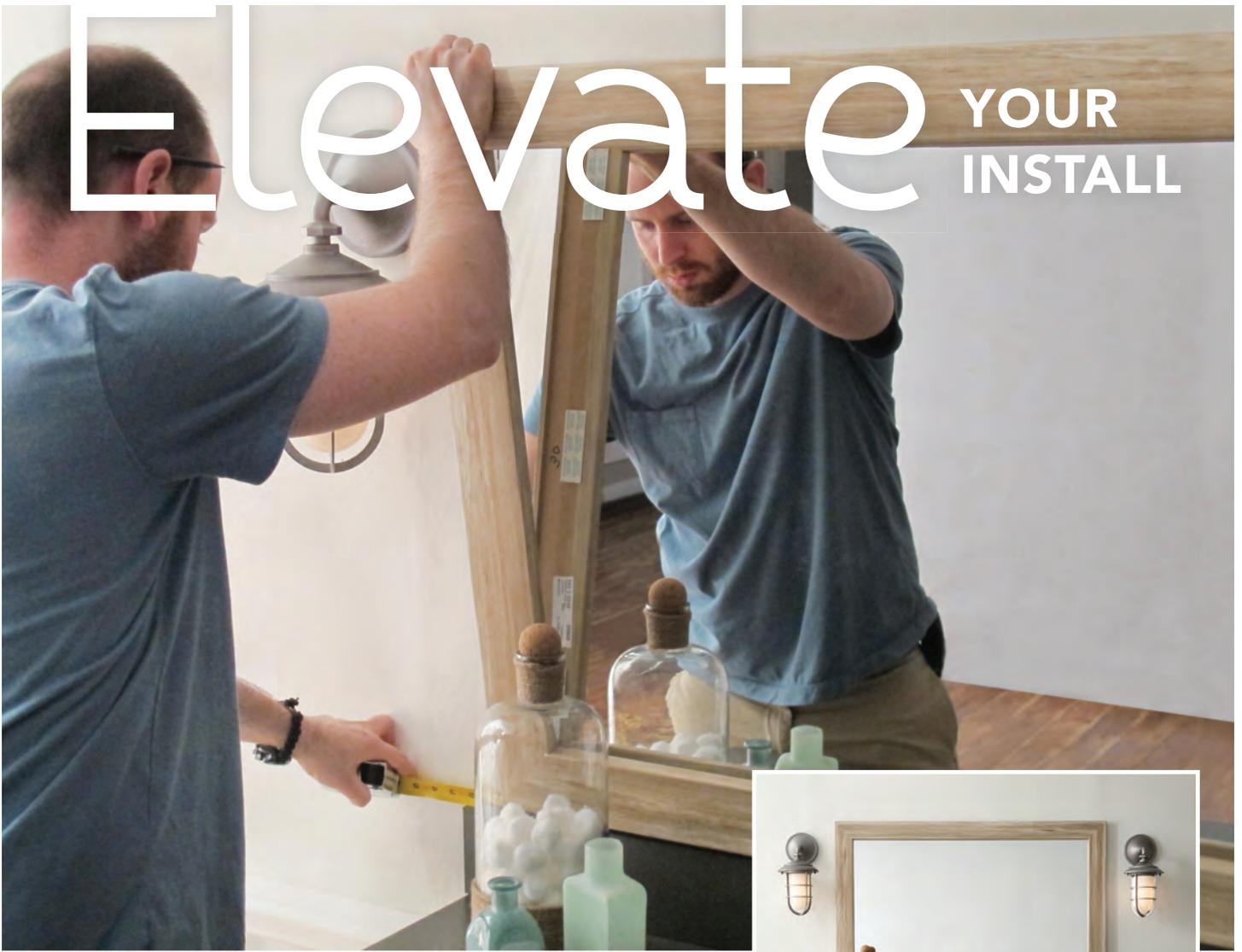
DIANA SAN DIEGO
 VP of marketing, SAFTI First
MODERATOR: KATY DEVLIN
 associate publisher and editor-in-chief,
 Glass Magazine

Recruitment and retention
 “What gets measured gets managed,” says Mitchell. “If you’re interested in truly changing hiring practices, you have to take a moment and be honest about what you’ve done in the past and where you want to go and talk about the steps to get there.”

Several panelists recommended casting a wider net when hiring and perhaps even looking at anonymous resumes. “A lot of hiring happens because people know people, which is good in some ways, but it also means people often hire those who think like them,” says Bartoldus.

Hiring isn’t the end goal, however. Retention is also a significant challenge

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”

for employers. “Once you get folks there, you can’t forget they are different,” says Mitchell. “They need to be valued and heard like everyone else is. There has to be a culture of respect and that comes from the top.”

San Diego adds it doesn’t stop after the interviews. Continually investing in employees and training is critical, and will lead to more quality staff. “If they see this is a company that invests in people, it’ll encourage more to come,” she says.

“Retention is just as or more important that recruitment,” says Lomedico. “You can’t let them fall into the trap of, ‘I’m a woman and no one will notice me.’ Make them feel valuable and focusing on ‘We need you because this is what you’re going to bring and what you can get out in return.’ ... Check in and make sure people grow and have the opportunity to grow.” Giroux Glass, for example, assigns each non-union employee with a buddy who is not a supervisor or a peer in the department. The buddy checks in to

Women and the Second Shift

Companies quickly pivoted to flex time and remote work amid the COVID-19 pandemic; the permanence of that flex time and remote work may be a lasting legacy. Despite the flexibility many employers offer, panelists agreed many women are still working the so-called “second shift” at home, particularly in light of schools and daycare centers closing and moving to virtual formats that require parental supervision.

“There’s additional stress on women right now, and that’s a concern,” says Bartoldus. The data supports that strain. McKinsey surveyed more than 40,000 North American workers in September and found one in three are considering leaving the workforce of scaling back her career because of the pandemic. Child-care was the most-cited reason behind the career considerations.

U.S. Department of Labor statistics showed in September alone, 865,000 women left the workforce or were laid off nationwide, compared to 216,000 men. Some economists have gone so far as to call this a “she-cession,” reports the Chicago Tribune.

San Diego said the shift from office work to work at home happened overnight. “We were here on a Monday, and Tuesday we weren’t,” she recalls. As things start to normalize, she anticipates figuring out this new method of working, what tools everyone needs and considerations to make for those with families. “People get fulfillment from work and don’t want work to suffer nor their family life,” she says, adding it could take months or even the better part of a year, to find the balance. “Giving that kind of support to all employees helps with retention and with helping your employees succeed, which helps your company succeed overall.”

“If people don’t feel like they have peace in their home or personal lives they won’t be very productive anyhow,” says Lomedico. “If that’s not incentive enough for companies to offer flexibility, I don’t know what is. It’s about having that balance and giving them the ability to be the parents they want to be and be productive for the company.”

Although a stressful situation for women in particular, Mitchell encourages women to look at it as an opportunity. “As women, we are jugglers,” she says. “Here’s an opportunity for us to step up our game and push back at home and the office when you feel like you’re doing more than is equitable. You might be heard better now than at other times. This is a great time that might allow us to shine even more.”

ensure the new employee feels heard and discuss future goals.

Panelists also recommended examining company culture to ensure it’s inclusive. For example, if the annual summer picnic is a golf outing, but most women don’t golf, re-think the yearly outing to something that appeals to more of the company.

Developing relationships with local universities and career centers also can be a boon. San Diego often has interns

in different departments, which she cites as being especially beneficial on the technology side of the business. “Technologies move quickly,” she says. “I always learn from any new person we bring in. I have to be more open to those types of things. It makes the experience broader for everybody in our organization. Be in touch with local career centers. It’s old school, but that’s where your talent pool is coming from.”

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How to ally

Even if employees are not directly in charge of hiring, they can be better allies. Bartoldus says to be supportive; be an advocate, mentor and teacher; be supportive; and put an end to any harassment they might see in the office or on the jobsite. “We’re okay if you’re chivalrous,” she says.

Mitchell adds, “We value ‘mallies’ [male allies],” also echoing Bartoldus’ sentiment of speaking up if you see a woman’s comment being ignored at the table. Lomedico and San Diego encourage companies to “show you’re listening” and seek someone else’s ideas; that will only help you.

Encourage women to network, too. “What a beautiful thing to be able to network and hear from others,” says Lomedico. “Networking is an incredible way to encourage other women. Help them with introductions to the right people.”

Resiliency in a cyclical industry

Those in the construction industry often consider it to be a particularly resilient industry and group of people. Although housing is poised for strong growth, the commercial construction outlook is bleak for the coming years. Resiliency, says Lomedico, is a choice. “At the end of this you can say, ‘Now you know how strong you are,’” she says.

Bartoldus also promotes honest communication with employees and what the outlook is for the company, so if they need to look elsewhere for employment they can.

“The precipice is calling,” says Mitchell. “Our industry is very cyclical. Spend some time and you’ll see the patterns and understand what happens and how they develop. Our industry will self-correct and adjust as the rest of society does ... you have to remain persistent. You can’t let your dreams go. Just work harder, keep digging and keep going until you get where you want to be. Resiliency is a lovely thing, and hopefully it’ll come back, but you have to shape yourself into the vision you have for yourself. Encourage people to dig deep and think about what you want and how to achieve that with the current surroundings.” ■



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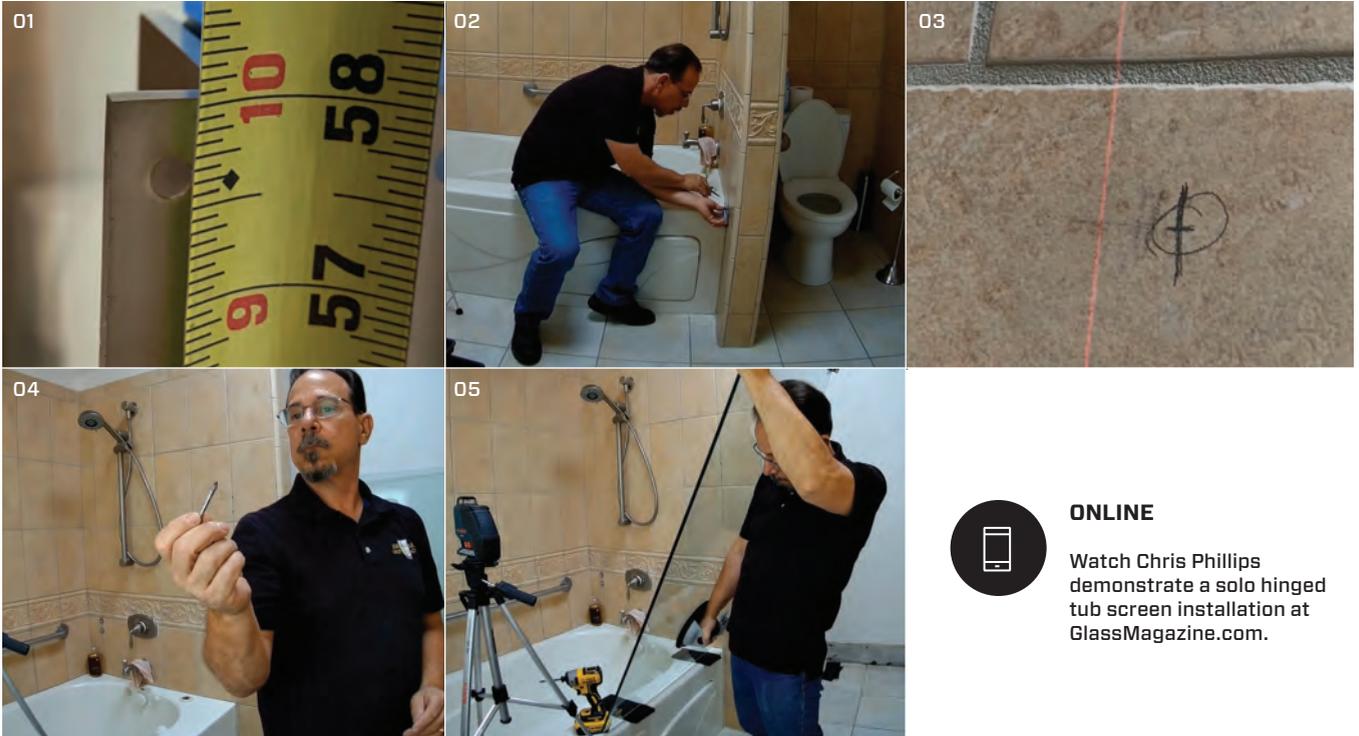
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SOLO HINGED TUB SCREEN

BY CHRIS PHILLIPS

Installing a glass hinged tub screen with only one installer can be difficult to complete. The center of gravity is high, making it harder to balance the glass and attach the screws without help.

The following presents a step-by-step guide to completing a solo hinged tub screen installation, paying special attention to the tools and gadgets that make it possible.



ONLINE

Watch Chris Phillips demonstrate a solo hinged tub screen installation at GlassMagazine.com.

01. Make sure the hinges are pre-installed on the shower glass. Start by measuring up from the floor to the center of the top hole in the backplate.

02. Locate the centerline of the glass and mark the location at the base of the tile. Shoot a plumb line where the mark for the centerline was

made and measure the distance from the tub to the hinge hole on the wall. The distance from the center of the glass to the center of the hole is $\frac{3}{4}$ inch.

03. Be sure to account for the $\frac{3}{4}$ inch offset when marking for the screw hole. And, don't forget to account for the gap at the bottom of the door.

Tool tip: A laser level makes it easy to mark the hole location.

04. Drill the hole into the tile. Try to run the screw in the hole in advance. This will let you know whether there is wood behind the tile.

Tool tip: Spear-point-type tile bits are great for starting the holes.

05. Create two stacks, each of two $\frac{1}{4}$ -inch rubber pads, and set on the tub deck. The pads create $\frac{1}{2}$ -inch spacing from the top of the tub deck. Carefully lift and set the glass in place on the rubber pads on tub deck. Slowly slide the glass into place.

Continued on page 48



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TOOLBOX

Laser level // Spear-point tile bit // Hard rubber pads // Suction cup lift handle // 6-inch masonry bit // “T-handle” ratchet tool



06. Line up the holes in the wall and hinge and insert a screw. Now that the first screw is in place, the installer is free to work on securing the remaining screws. Use the laser to line up the hinges to ensure they are plumb.

07. Drill remaining holes through the hinge holes, and insert and fasten remaining screws.

Tool tip: Use 6-inch masonry bits, which allow drilling without scratching the hinges.

08. Adjust the blocking from ½ inch to ⅞ inch. To do this, replace the ½-inch rubber pad stacks under the glass with ⅞-inch stacks.

09. Loosen the hinges around the glass to allow the glass to settle

by ⅞ inch. A ⅞-inch gap is desired for ideal performance.

10. Securely re-tighten the hinge screws around the glass. Use a ratcheting “T-handle” to further tighten the hinge around the glass.

Tool tip: The “T-handle” tool provides maximum torque and helps prevent the glass from slipping.

11. Add the door sweep. ■

Chris Phillips is owner of Showcase Shower Door Company, founder of GlassGadget.com, and administrator of the Shower Door Professionals group on Facebook. He can be reached at chris@glassgadget.net.



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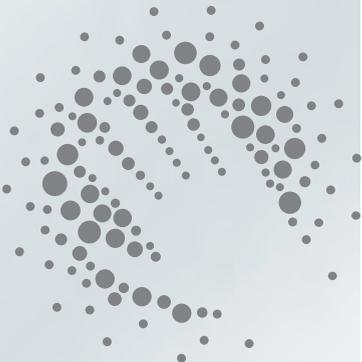
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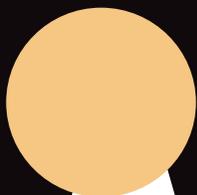
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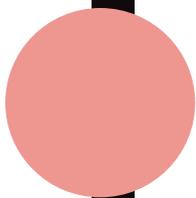
A

The Annual Forecast

Slow



Climb



Long,

By Katy Devlin

The pandemic disrupted the U.S. construction industry in 2020. What will 2021 hold for industry companies as the market and the overall economy continue to recover?

Glass Magazine's Annual Forecast is based on information and projections from the Dodge Construction Outlook 2021 webinar from Dodge Data & Analytics, with additional survey data from the Associated General Contractors of America and the National Glass Association.

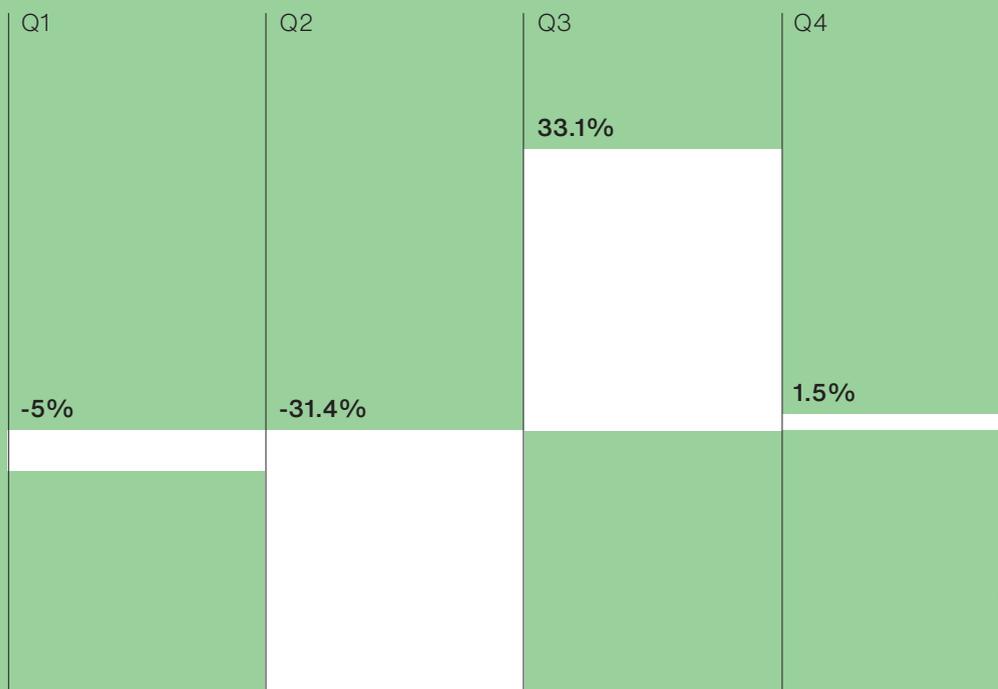
- 1 Big Market Indicators **PG. 56**
- 2 Headwinds for Construction **PG. 58**
- 3 Spotlight on Commercial Building **PG. 60**
- 4 Institutional's Mixed Recovery **PG. 62**
- 5 Residential Ups and Downs **PG. 64**
- 6 Eye on the Glass Industry **PG. 66**

The Annual Forecast

1 Big Market Indicators

SIGNS OF SLOWING RECOVERY AND LABOR CHALLENGES EMERGE ACROSS U.S. ECONOMY

2020 U.S. GDP growth (annualized percent change)



Source: Bureau of Economic Analysis/Dodge Data & Analytics

Annual GDP

2019

2.3%

2020*

-4.4%

2021*

2.8%

Historical perspective

The precipitous drop of 31.4 percent in 2nd-quarter GDP marked the largest decline in U.S. history—more than three times the previous record of 10 percent that occurred in the first quarter of 1950.

The largest drop in GDP during the Great Recession occurred in the fourth quarter of 2008, when it fell 8.4 percent. Annual GDP growth during that time was 0.1 percent in 2008 and -2.5 in 2009.

From the experts

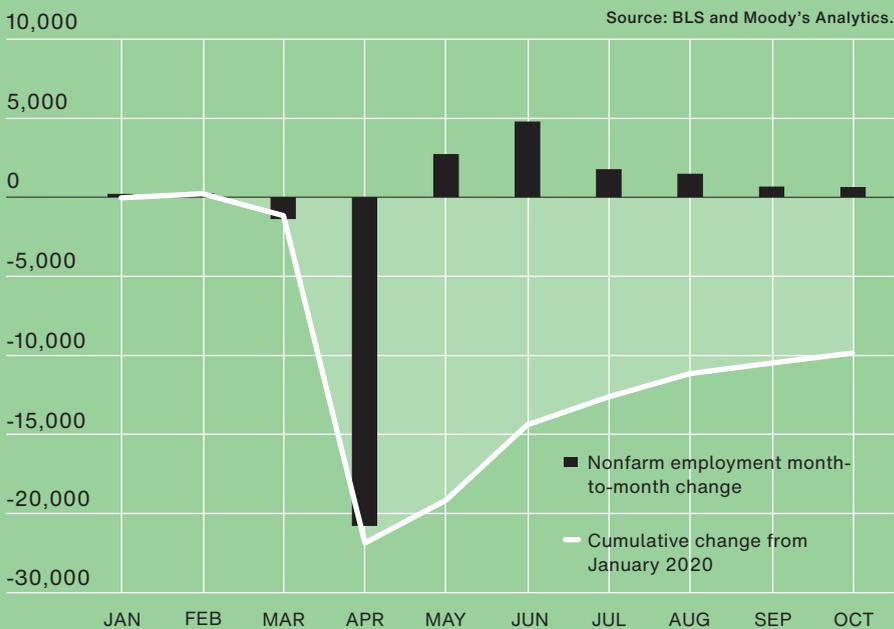
“We have been adding jobs in recent months, but at a slower pace of growth than what we had before. ... At this pace, it’s going to take several years to get back to employment we had earlier [in 2020].”

—Cris deRitis, deputy chief economist, Moody’s Analytics, during the Dodge Outlook Conference.

*forecast

Changes to nonfarm employment in 2020

(in thousands)



By the Numbers

975K

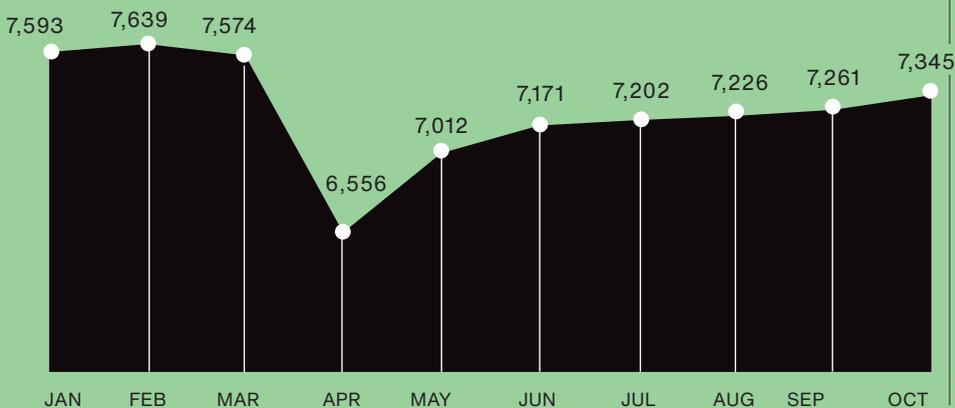
975,000 construction workers lost their jobs in April 2020 alone.

-3.8%

While construction employment rebounded beginning in May, by October it was still down nearly 300,000 jobs—or 3.8 percent—from its February levels.

2020 Construction employment

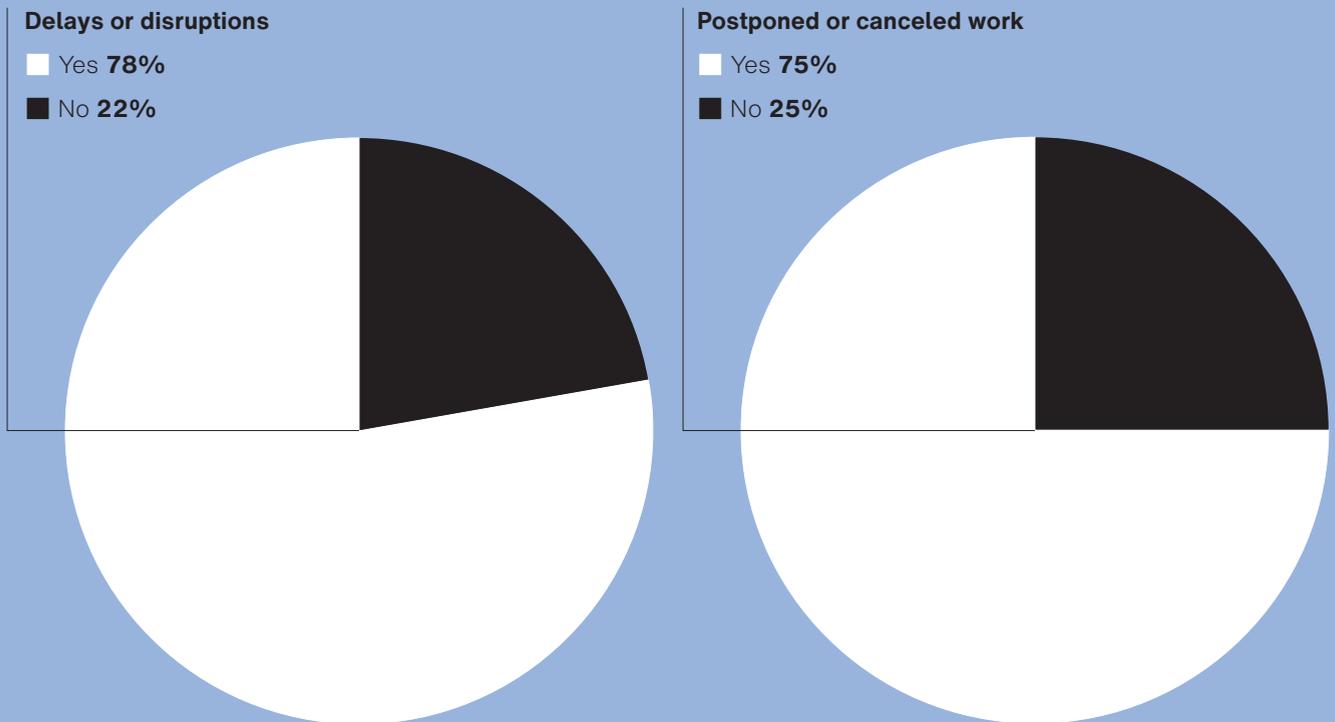
(in thousands)



2 Headwinds for Construction

PROJECT CANCELLATIONS, MATERIAL PRICES AND SUPPLY CHAIN STAND IN THE WAY OF RECOVERY

Have you had project delays, postponements or cancellations?



Source: AGC of America, October 2020 survey

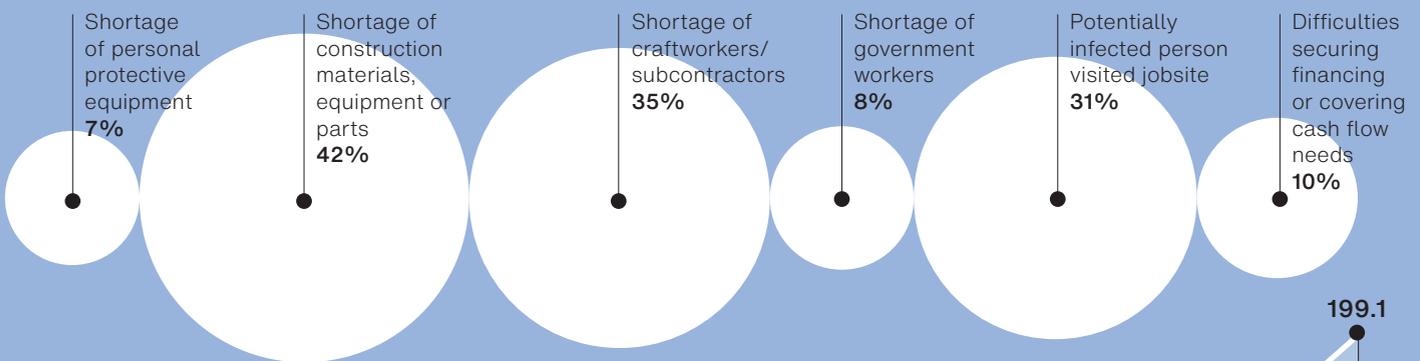
Delays, disruptions and cancellations

“Construction firms are experiencing widespread project deferrals and cancellations, along with disruptions to ongoing work and few new project awards, as the economic damage from the pandemic drags down industry employment in metro areas across the nation,” according to officials from the Associated General Contractors of America, reporting on the results of an AGC survey in October.

According to the survey, 78 percent of contracting firms have experienced delays or disruptions to projects, and 75 percent said an owner has postponed or canceled work on an upcoming project.

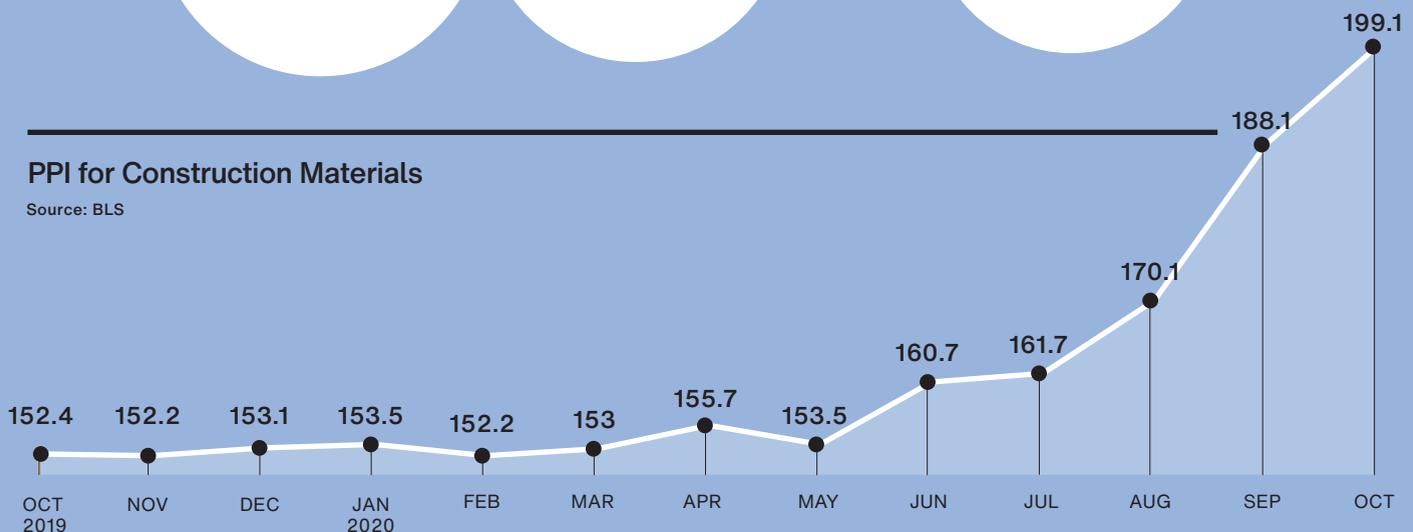
What was the reason for project delays, postponements or cancellations?

Source: AGC of America, October 2020 survey



PPI for Construction Materials

Source: BLS



Supply chain interruptions

For companies that reported project delays or disruptions in the AGC survey, the most common reason cited (by 42 percent of respondents) was “shortage of construction materials, equipment or parts.” Additionally, a majority of respondents—54 percent—say they have been notified by suppliers that their deliveries will be late or canceled.

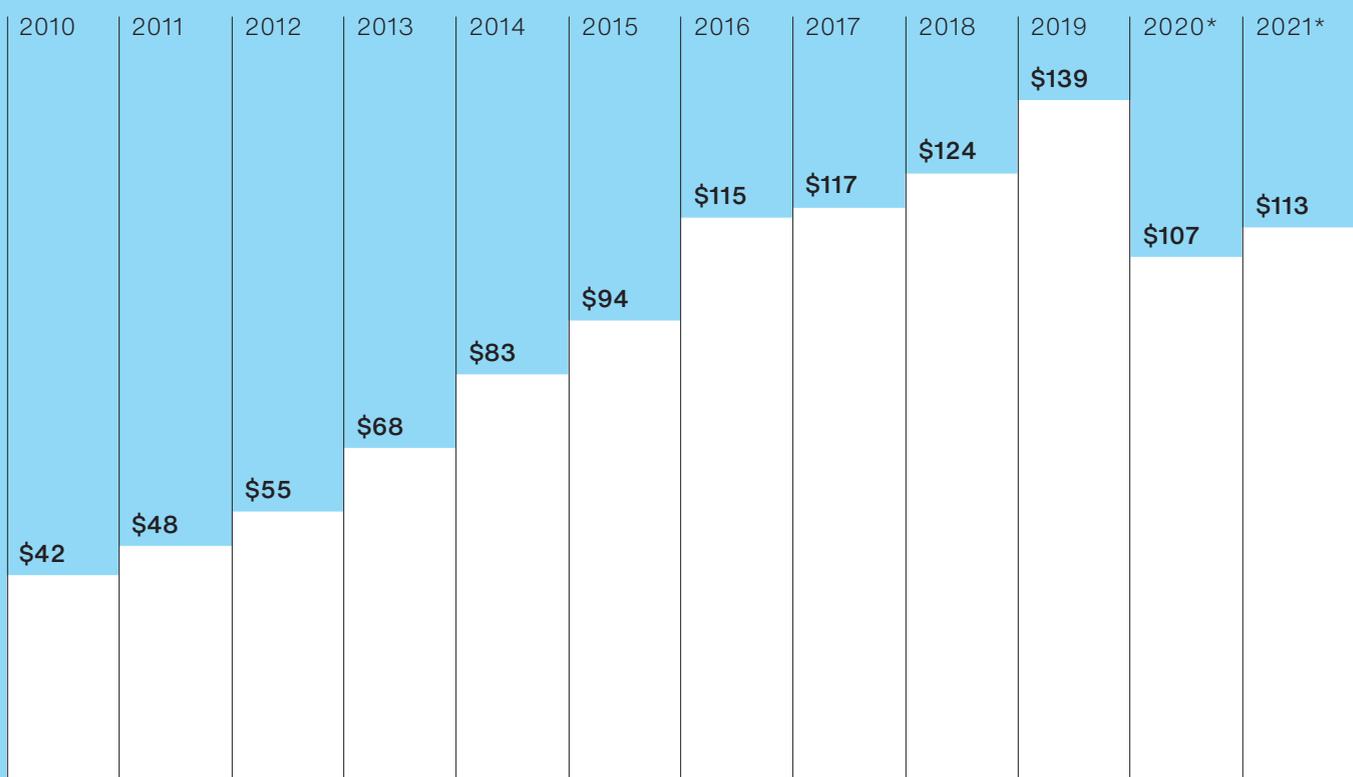
Material price inflation

The industry is also seeing rising material costs. The producer price index for construction materials accelerated at a much faster rate than consumer prices in 2020. Between October 2019 and October 2020, PPI for construction materials increased 31 percent.

3 Spotlight on Commercial Building

SECTOR SEES BIG HITS TO OFFICE, RETAIL AND HOTEL STARTS IN 2020

Commercial building starts (billions of \$)



*forecast

Tough 2020, mixed recovery in 2021

It was tough to find much good news in the commercial construction sector in 2020. Commercial construction starts dropped an estimated 23 percent to \$107 billion (690 million square feet) during the year, according to the Dodge Outlook.

“Total construction took a big hit as bans on construction took effect [early in the pandemic]. As time passed, we saw improvement. ... While we continue to make modest

progress, it seems for every step forward we take a step back,” says Richard Branch, chief economist, Dodge Data & Analytics.

Office

Office starts dropped 22 percent from 2019 to 2020, falling to \$42.4 billion and returning to 2017 levels. 2021 should see slight expansion of 5 percent for the segment.

“The pandemic turned the office market on its ear. Workers have

shifted out of [cubicles] and into our dining rooms, and a good portion have not returned to the office,” Branch says. Currently, only 25 percent of office employees have returned to the workplace full-time. However, Branch says he questions whether the work-from-home trend will continue at such a high rate once employees can return safely.

“I’m not 100 percent convinced that work from home will be as widespread as people think. Will

By the Numbers

231%

Commercial construction expanded for 9 consecutive years—2010 to 2019—in which starts grew from \$42 billion to \$139 billion, a 231 percent increase.

The Amazon Effect

16-18%

Amazon represented 16 to 18 percent of total market share for warehouse construction in 2020, according to Dodge Data.

Source: Dodge Data & Analytics

Commercial starts by segment (billions of \$)



Hotel Spending

2019	2020	2021
\$18.1	\$9.7	\$9

firms be keeping people home permanently? I think there are many small companies or many types of jobs, such as banking, finance, that will stabilize the market," he says.

Retail

Starts fell 25 percent in 2020. They are expected to rebound 7 percent in 2021 to \$13.3 billion, putting them at just below 2011 retail spending levels. "It's bad news for retail. We're going to see bankruptcies rise until early

2021, which will push vacancy rates up and suppress starts," Branch says.

Hotel

The hotel market took the greatest hit among commercial building segments in 2020, dropping 46 percent from \$18.1 billion in 2019 to \$9.7 billion in 2020. The segment won't fare much better in 2021, with an additional 7 percent decline projected. "This is another sector dramatically affected by

the pandemic. ... The prospects for future hotels, the prospects for travel, are pretty dim," Branch says.

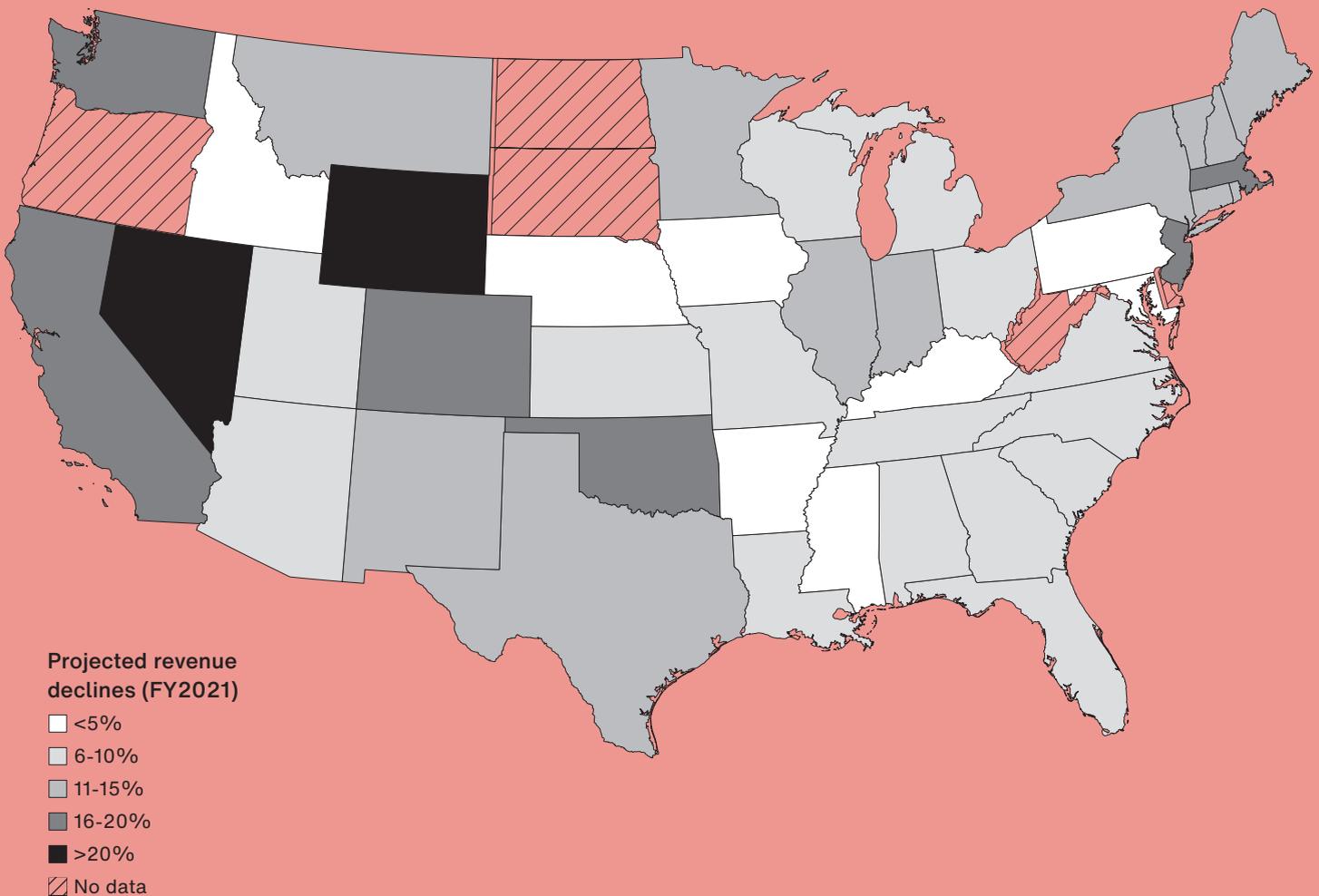
Warehouse

The only commercial building segment to see gains in 2020 was warehouse building, growing 2 percent to \$30.7 billion. The sector will grow another 8 percent in 2021, according to forecasts. Notably, warehouse construction has grown eight-fold since 2010.

4 Institutional's Mixed Recovery

A LASTING HIT TO GOVERNMENT AND EDUCATION? MEANWHILE, OPTIMISM IN HEALTH CARE

Source: National Conference of State Legislatures

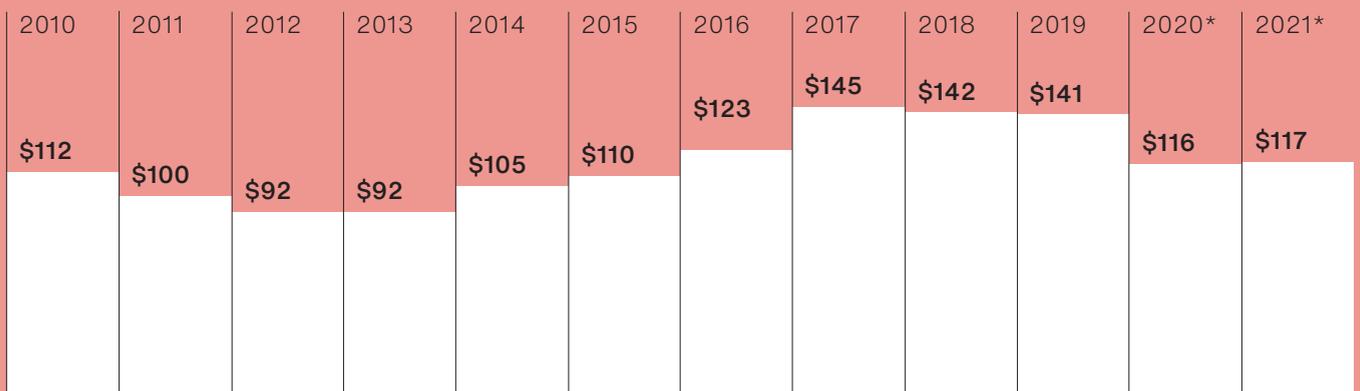


State budgets to take big hits in 2021

The coronavirus and its economic and health impacts decimated many state budgets, which will translate to a falloff in government building spending. More than 20 states are expected to see budgets drop by more than 10 percent in 2021. Nevada and Wyoming are projected to be hit hardest, with cuts of at least 20 percent.

Institutional Building Starts (in billions of dollars)

Source: Dodge Data & Analytics



*forecast

Education Spending (in billions of dollars)



Healthcare Spending (in billions of dollars)



Building Starts

Spending on public buildings dropped 20 percent in 2020, according to estimates, and will slide another 1 percent in 2021.

Meanwhile, transportation spending fell 24 percent in 2020. However, that segment is expected to regain some of those losses in 2021, with a projected 11 percent increase in spending.

Education

Education spending is expected to end 2020 at \$56.7 billion, down 10 percent from 2019. 2021 will present more contraction, with the segment losing another 3 percent in spending. The sector peaked in 2018 at \$63.6 billion and has been falling since.

Health care

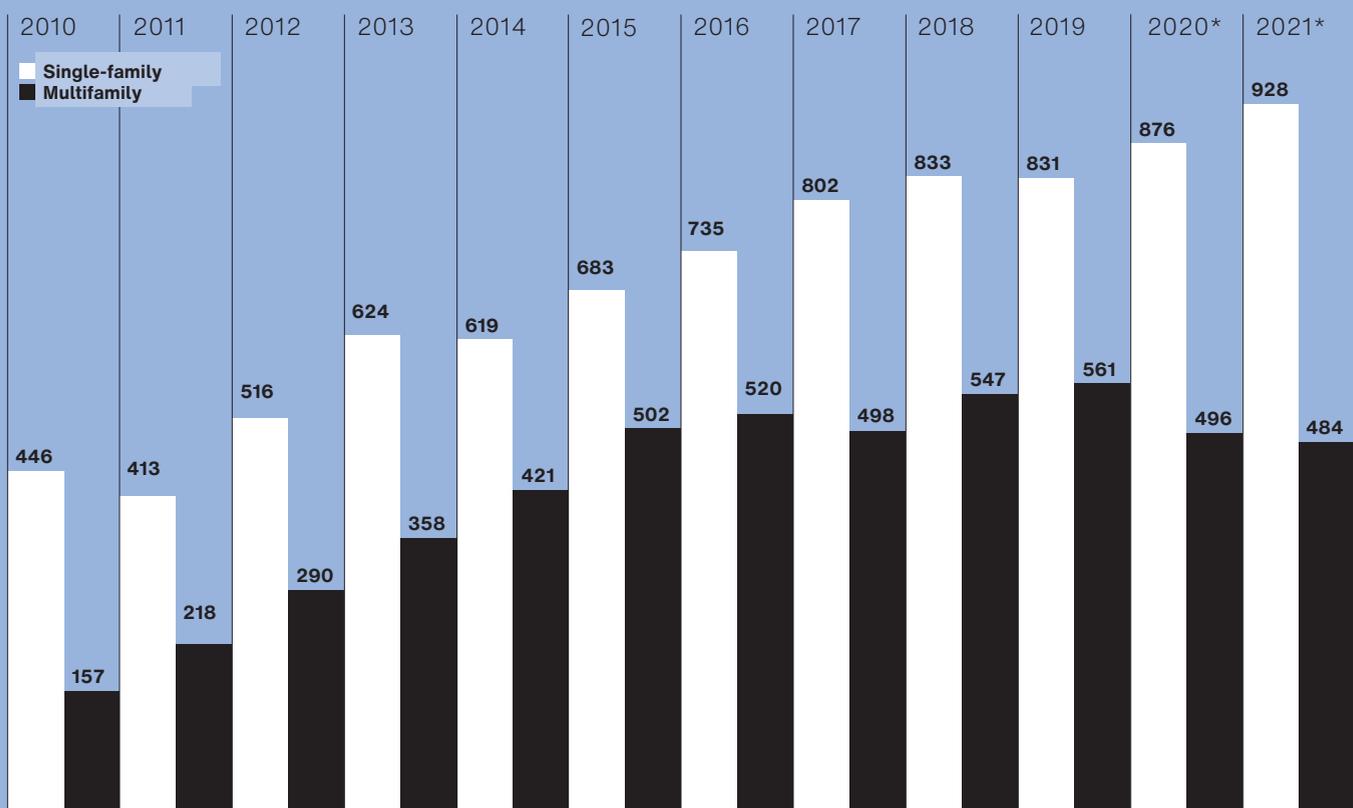
Health care may be one of the few bright spots in construction for 2021. While it suffered a 9 percent decline in starts in 2020, falling to \$25.8 billion, it is expected to rebound 8 percent in 2021 to \$28 billion, roughly returning to its 2019 levels.

The Annual Forecast

5 Residential Ups and Downs

BIG LOSSES FOR MULTIFAMILY, WHILE SINGLE FAMILY CONTINUES GROWTH TREND

Residential Construction Starts (in thousands of units)



Source: Dodge Data & Analytics *forecast

Single-family gains

Single-family housing is a rare bright spot for the U.S. construction market in 2020 and 2021, with spending gains of 4 percent in 2020 and 7 percent in 2021. “Private residential took a hit early on [in the pandemic] but since has rounded the corner,” says deRitis. “Private residential construction employment is above what it was in January. It is a source of strength.” The news is less good for the other half of the residential equation: multifamily.

Multifamily slide

Multifamily construction is projected to see double-digit declines in 2020, with starts falling an estimated 12 percent in 2020 to 496,000 units. Contraction will continue in 2021, with another 2 percent decline to 484,000 units.

“The multifamily market is exhibiting weakness due to issues in the labor market,” Branch says. “In the labor market downturn, which age group is hit the hardest? It’s the younger side of the demographics. That’s your traditional rental side of the market.”



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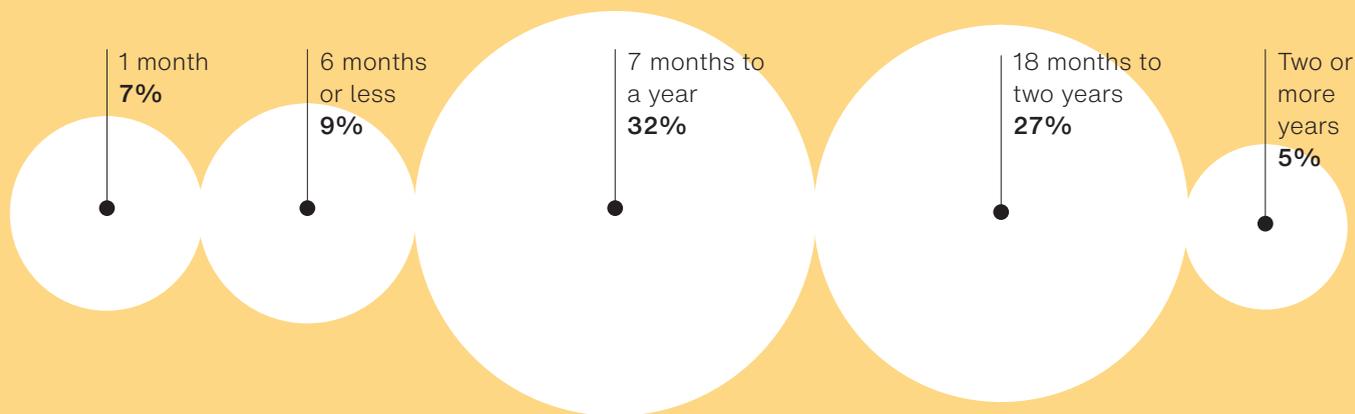
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6 Eye on the Industry

GLASS COMPANIES ENTER 2021 WITH STRONG BACKLOG, REBOUNDED PRODUCTION

How deep is your backlog?

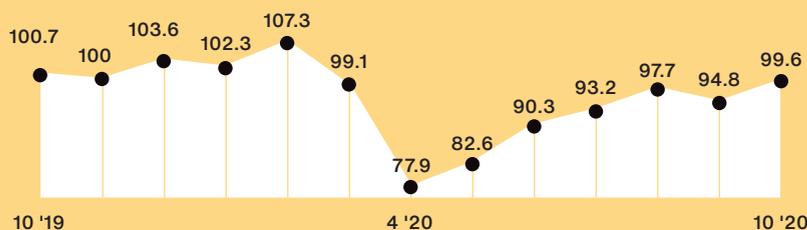
Source: NGA industry survey



Industrial Production Index: Glass and glass products

(Index 2012=100, seasonally adjusted)

Source: Federal Reserve Economic Data, Economic Research Division



Health of the Industry survey

“FLUSH WITH CAPITAL AND PROJECTS”

Industry survey

In a fall 2020 National Glass Association survey of glass industry companies, most firms report financial security and optimism about managing throughout a slower market in the coming year.

The survey asked respondents to rank their organization's financial health on a scale. The resulting average shows that industry companies

report they are "flush with capital and projects."

Despite the major slowdowns in construction in 2020, most industry companies enter 2021 with healthy backlogs. About 65 percent of survey respondents reported backlogs of 7 months or more—27 percent have backlogs of 18 months to two years, and 5 percent have backlogs of two years or more.

Glass Production

As was the case across manufacturing, glass production took a steep hit with the onset of the pandemic. Industrial production of glass and glass products (all types) fell 27 percent from February to April 2020. However, the sector rebounded during the remainder of the year and by October was only 1 percent below year-ago levels.



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SNAPSHOT:

- 1 North America welcomes new plant, sees one line shutdown
- 2 Overcapacity leads to plant closures in Europe
- 3 China dominates global production, but many lines sit idle
- 4 Research partnerships unveil next steps in glass manufacturing

Financial impact, potential recovery

As of publication, most companies that release financial results reported year-over-year decreases for sales and revenue. Nevertheless, several companies' interim reports have shown easing financial indicators since the first quarter of the fiscal year, a time that coincided with many manufacturing disruptions due to the first wave of COVID-19.

During the pandemic, major players in the industry continued to make major business decisions. Şişecam completed a merger of its main subsidiaries in October, in order to increase the company's competitiveness globally, according to Ahmet Kirman, CEO. By contrast, Saint-Gobain sold its stake in Sika, a Swiss construction chemicals manufacturer, after a long-contested buyout.

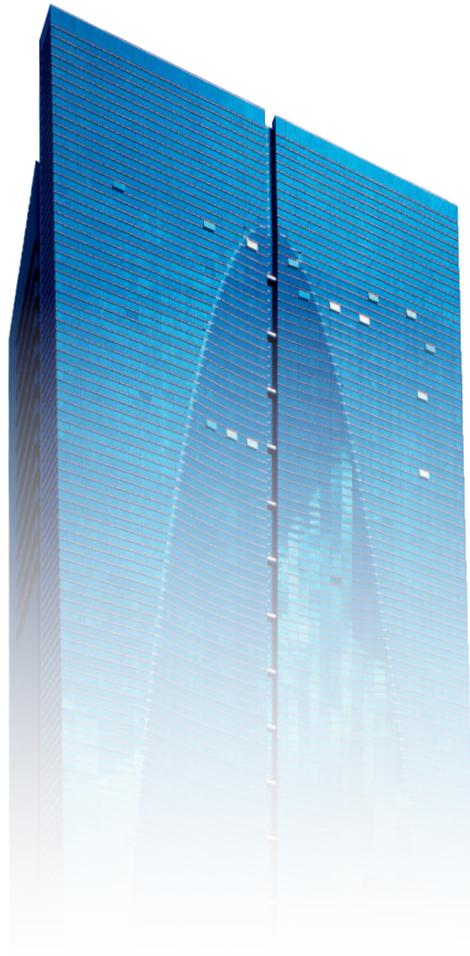
A snapshot of the major movements in glass manufacturing in the Americas can be found on pages 72-73, and a global snapshot can be found on pages 74-75.

Despite the crisis, glass manufacturing continued to expand and innovate during this time. An account of the industry's research and development work can be found on pages 76-77.

Last year's float glass update told a story of relative stability for the industry. This year's report, of course, finds a different, uncertain future—by the time it is published, the world will have experienced the COVID-19 pandemic for roughly a year.

Like the rest of the glass industry, float glass manufacturers across the world faced economic and manufacturing reversals in early 2020 as the pandemic led to partial or complete shutdowns. "The primary challenges for us have been flexibility. COVID-19 created a lot of upheaval in terms of customer demands and changing delivery schedules, so adapting to those demands on the fly was probably the greatest challenge we faced as a result of the pandemic," says Nathan McKenna, director of marketing and innovation for Vitro Architectural Glass.

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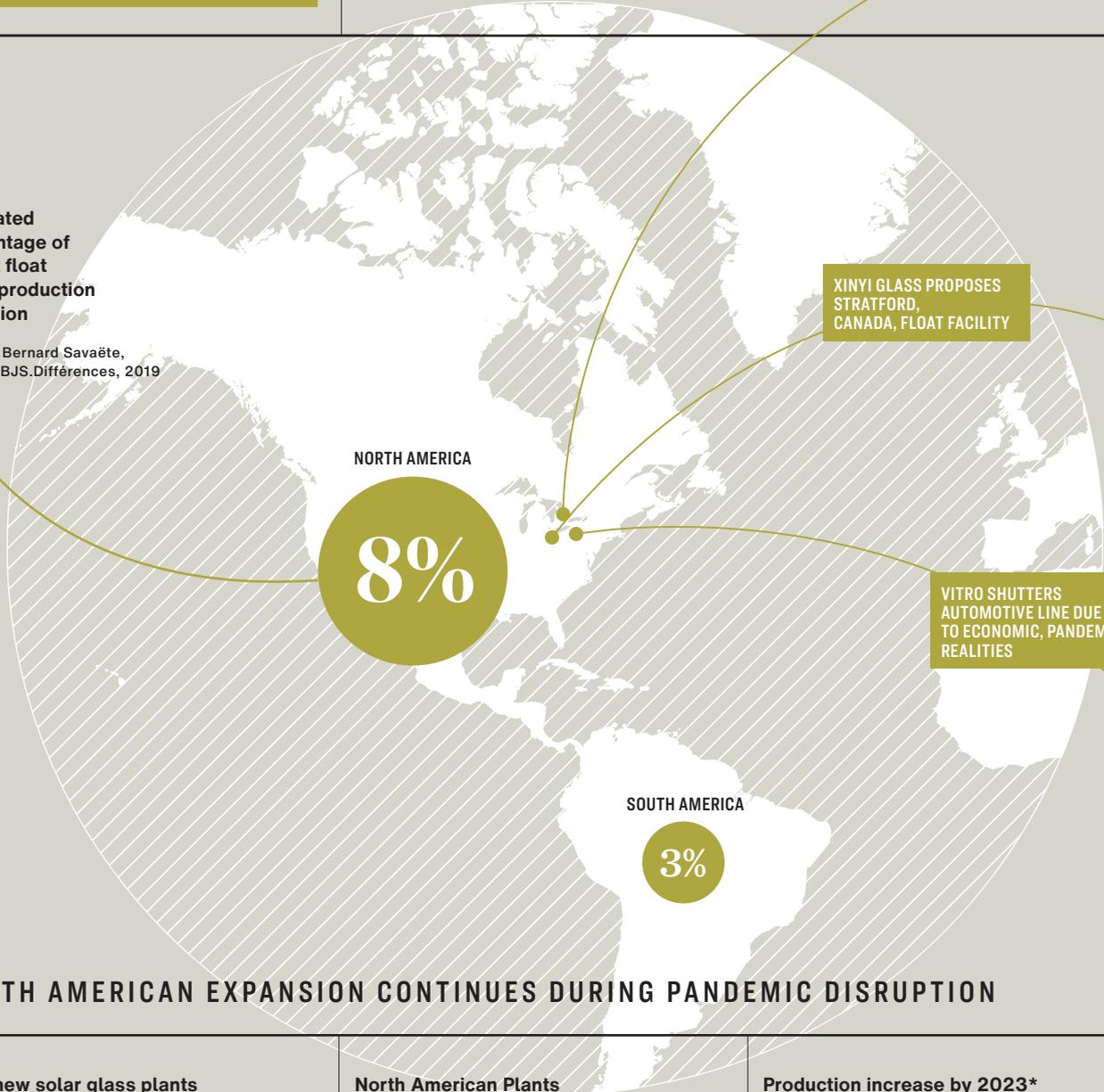
01

The Americas

NSG GROUP STARTS NEW NORTH AMERICAN FLOAT PLANT FOR THE SOLAR GLASS MARKET

Estimated percentage of global float glass production by region

Source: Bernard Savaète, head of BJS.Différences, 2019



NORTH AMERICAN EXPANSION CONTINUES DURING PANDEMIC DISRUPTION

Total new solar glass plants

One

North American Plants

28

Production increase by 2023*

1.1%

*forecast

Investment and strain

Last year's report saw the end of Xinyi Glass Canada's plans to locate its first North American float plant in Guelph-Eramosa, in Ontario, Canada. Xinyi's plant, proposed to the city in 2018, was eventually rejected by the local council due to concerns regarding water usage.

Since then, Xinyi has identified a new location, Stratford, also located in Ontario, as the potential new site for its \$400-million float facility. After two public online meetings with city residents, who again raised concerns regarding the plant's environmental impact, as well as how the zoning of the proposed site, residents staged a protest regarding the plant. As of this writing, the future of the plant's construction remains unclear.

NSG/Pilkington's new float glass facility, built in Luckey, Ohio, started its furnace in early November 2020. The 500,000-square-foot facility will produce transparent conductive oxide coated glass for the solar market, and will supply First Solar, located in nearby Lake Township, which manufactures Series 6 thin-film solar panels.

The opening is part of the NSG Group's continued investment in the solar market. The company also opened a new furnace at a production facility in Ho Chi Minh City, Vietnam, to supply the solar market. In the company's second quarter fiscal report, NSG officials cited robust sales in the solar glass market as one of the factors in improving financial indicators.

Vitro closed one of its two float production lines at its automotive facility in Meadville, Pennsylvania. In an official statement, Vitro leadership said the decision was due to the drop in demand from U.S. automotive manufacturing and compounded by the broader economic impacts of the pandemic.

Growth and recovery

Continued growth, and recovery from the 2008 Great Recession, is predicted by "Global Flat Glass - Demand and Sales Forecasts, Market Share, Market Size, Market Leaders," a comprehensive report from market research firm Freedonia Group. The report shows recovery in demand and production of flat glass for North, Central and South America in the next few years. North America will experience a total 1.2 percent increase in compound annual growth between 2018 and 2023 with regards to flat glass demand (Fig. 2), according to the report, and a 1.1 percent increase in production for the same time frame (Fig. 3).

FIG. 1 Global Architectural Fabricated Flat Glass Demand by Market & Region

(millions of dollars)

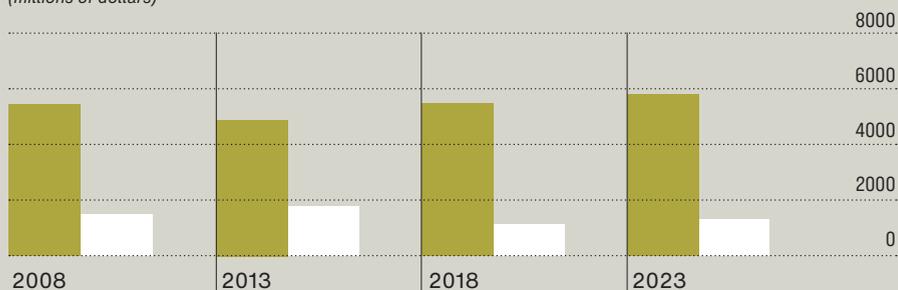


FIG. 2 Global Flat Glass Demand by Region (million square meters)

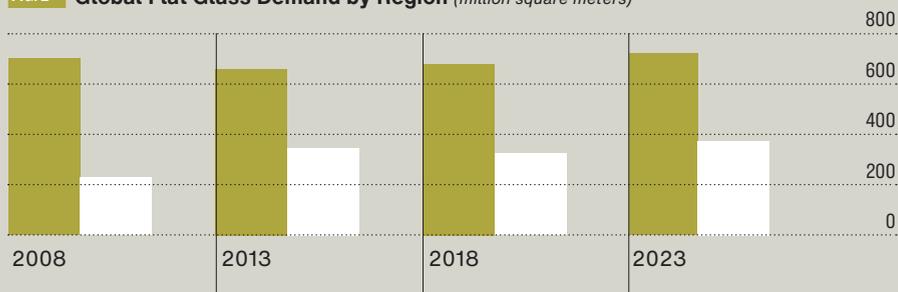
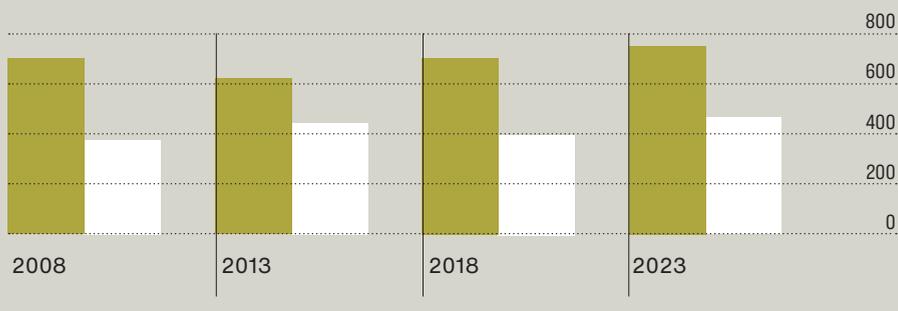


FIG. 3 Global Flat Glass Production by Region (million square meters)



■ North America
 ■ South America

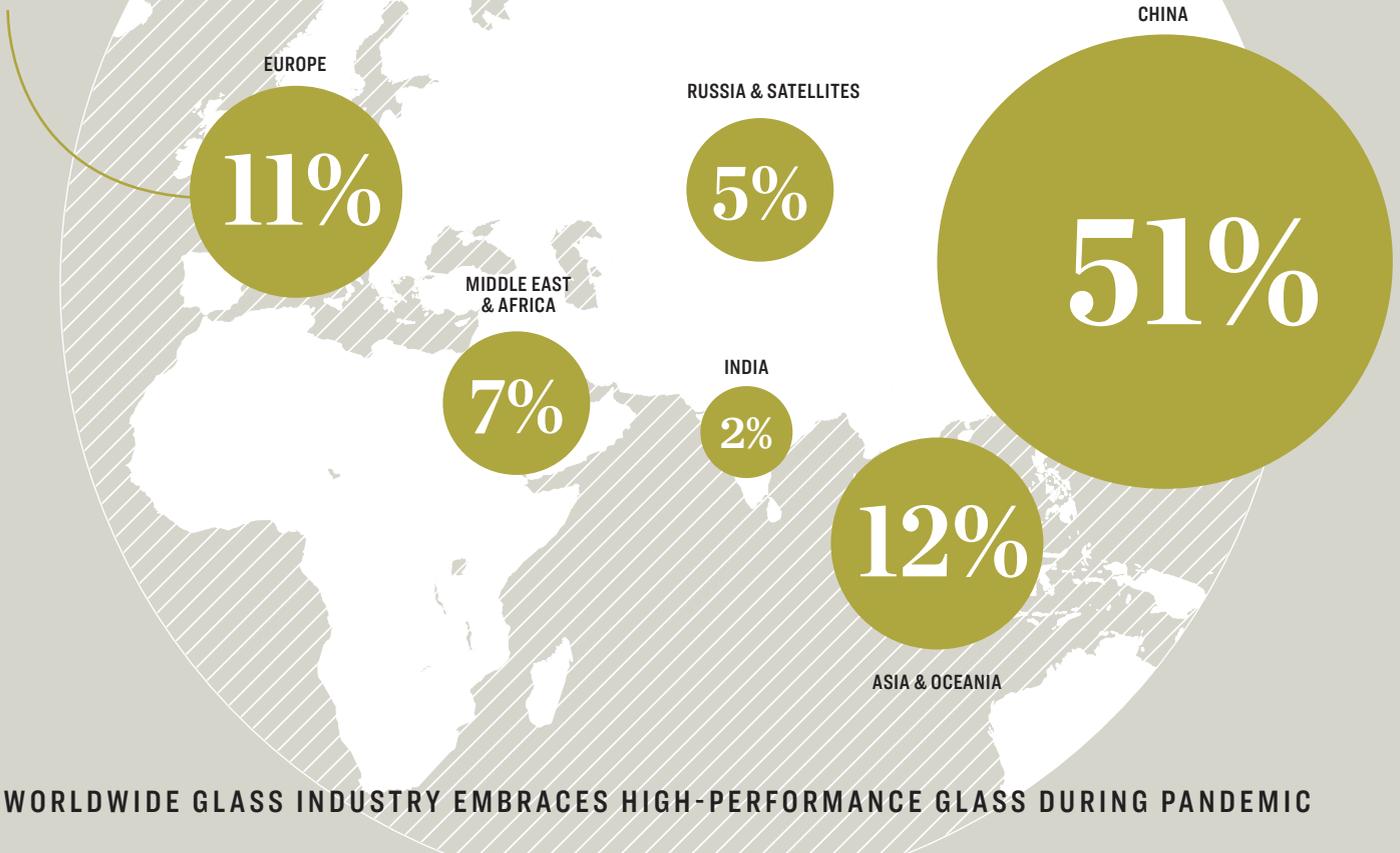
Source: Freedonia Group

02

Global Glass

Estimated percentage of global float glass production by region

Source: Bernard Savaète, head of BJS.Différences, 2019



WORLDWIDE GLASS INDUSTRY EMBRACES HIGH-PERFORMANCE GLASS DURING PANDEMIC

Float line closures in Europe

Three

2023 production growth for Asia/Pacific

5.2%

Active float lines in China

230

The industry outside the Americas also struggled with the realities of growing and expanding during the pandemic. The Glasstec Virtual conference, held in October 2020, hosted “Glass Associations Summit,” a panel presentation and discussion with the heads of international glass associations that included a status update of the glass industry during COVID-19. Panelists for India, the European Union and Germany all pointed to the automotive industry as the hardest-hit sector for flat glass production, and EU and Germany representatives said that some float lines had been on hot hold during the pandemic.

China still leads growth, but many lines sit idle

Gaorong Han of Zhejiang University, representing the Chinese Ceramic Society during the panel discussion, provided some insight into China’s expanding place in the world of glass. According to Han’s presentation, the country has over 370 float lines, with about 230 currently in production, as of 2019.

Data from “Global Flat Glass -

Demand and Sales Forecasts, Market Share, Market Size, Market Leaders,” a comprehensive report from market research firm Freedonia Group, mirrors Han’s predictions in terms of Asia’s share of the float glass market. The report projects that the Asia/Pacific market demand for float glass will grow by 5.1 percent (Fig. 1) from 2018-2023. The Asia/Pacific market similarly leads in production (Fig. 2) and is projected to grow 5.2 percent from 2018 to 2023.

Pandemic compounds market overcapacity in Europe

The sudden onset of COVID-19 created logistical manufacturing barriers, but also appeared to exacerbate and compound other economic and market strains. AGC Glass Europe cited the pandemic, but also ongoing market overcapacity, when it announced it would be closing one of its two float lines at its Boussois, France, location.

Saint-Gobain and Guardian Glass faced similar situations. Saint-Gobain leadership proposed the closure of its L’Arboç, Spain, plant—which has one line—due to market realities pre-dating the pandemic,

including market overcapacity. In June, Guardian Glass informed Luxembourg’s economy minister that the company would close its Dudelange float facility, which has one float line, according to Delano, a Luxembourg-based publication. According to the reporting, company officials cited the uncertainty of demand for flat glass, which officials did not feel would return until 2023, as a major reason, as well as the financial investment the older plant requires.

THE SUDDEN ONSET OF COVID-19 CREATED LOGISTICAL MANUFACTURING BARRIERS, BUT ALSO APPEARED TO EXACERBATE AND COMPOUND OTHER ECONOMIC AND MARKET STRAINS.

Global Flat Glass

Source: Freedonia Group

FIG. 1 Demand by Region

(million square meters)

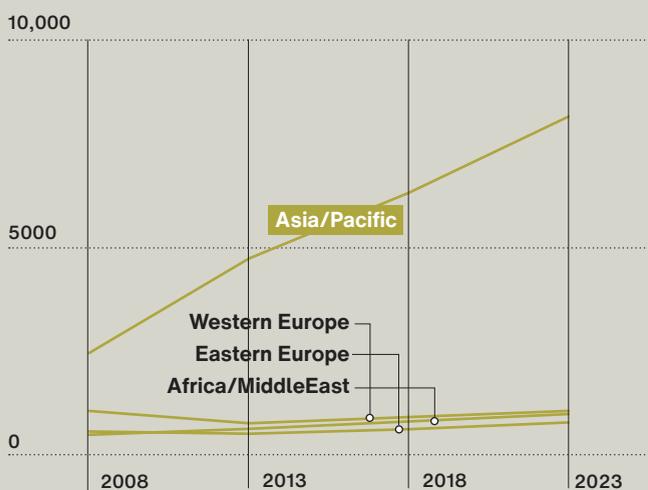


FIG. 2 Production by Region

(million square meters)



Major float glass players make strategic expansions

While logistical and market realities were strained at the onset of COVID-19, major float companies continued to open new locations and make capital investments toward manufacturing high-performance float glass.

Europe

Poland's glass industry continued to see investments from Guardian and Saint-Gobain. Guardian Glass opened a new float line at its facility in Czeszochowa, which is one of two facilities it owns in the city. The new float line is Guardian's largest, according to Guus Boekhoudt, Guardian Glass executive vice president. Guardian also launched a new coater at the facility in July 2020, which is the second coating line at the facility. Saint-Gobain also added a new jumbo coater to its plant in Dąbrowa Górnicza, Poland in July.

Asia

In Turkey, Şişecam continued its expansion by adding a new float furnace to its facility in Ankara's Polatlı district. The furnace, which represents a \$130-million investment, offers a capacity of 240,000 tons, increasing the plant's total capacity to 540,000 tons.

Azerbaijan and Vietnam also saw float openings this past year. Azerbaijan Float Glass Co. kicked off the year with the announcement of its new float line, which has a production capacity of 330 tons per day.

NSG Group also opened a new float furnace dedicated to manufacturing glass for solar panels at its Ho Chi Minh City, Vietnam, facility. The company upgraded a dormant line to produce transparent conductive oxide coated glass to supply First Solar, a company that manufactures photovoltaic solar panel systems. This opening, along with its new North American plant, also built to supply solar glass, represents a larger investment strategy in solar technology, according to the company.

Research Partnerships Push Innovation During Crisis

Gaorong Han of Zhejiang University, representing the Chinese Ceramic Society during the panel discussion "Glass Association Summit," part of glasstec Virtual, named industry partnerships as an important way to innovate, especially to mitigate the worst effects of crises like the pandemic. 2020 certainly saw this trend continue, and possibly grow, as major float manufacturers made strategic partnerships with academic and private research firms to develop new technologies.

Carbon capture

In November, NSG/Pilkington announced a partnership with C-Capture, a private company originating from the University of Leeds, that researches carbon-capture, or the prevention of carbon dioxide emissions from reaching the atmosphere. Emissions from float glass manufacturing cannot be contained by existing carbon-capture technologies because they contain high levels of impurities. NSG has also tested the use of hydrogen as an alternative fuel at its Greengate Works location in St. Helens, in the U.K.

Smart technology

Guardian, NSG/Pilkington and AGC Glass Europe formed partnerships toward further deploying sophisticated technologies in architectural façade manufacturing.

Smart façades

Guardian Glass formed new distribution partnerships with technology companies. The company signed a distribution agreement with Merck, a science and technology company, adding Merck's dynamic liquid crystal windows to Guardian's other structural façade solutions. The dynamic windows allow users to cut solar glare and can change transparency to offer privacy. Guardian formed a similar distribution partnership with M System S.A., a manufacturer of building-integrated photovoltaics.



MAJOR FLOAT MANUFACTURERS MADE STRATEGIC PARTNERSHIPS WITH ACADEMIC AND PRIVATE RESEARCH FIRMS TO DEVELOP NEW TECHNOLOGIES.

NSG Group also formed a partnership toward supplying high-tech glass. The company is collaborating with the Fluids in Advanced Manufacturing team at the University of Cambridge to develop methods of printing conductive materials onto

Photo courtesy of NSG Group.



curved surfaces; currently this is only possible with flat glass surfaces. The innovation would allow for new applications in architectural sectors by making glazing more multi-functional, according to the company; glazing could help detect pollution, incorporate heating elements and act as digital signage.

Artificial intelligence

AGC Glass Europe developed a partnership with Citrine Informatics to use artificial intelligence in the manufacture of high-performance glass. AGC Glass will provide data to Citrine, which will be used in the creation of AI models. Citrine can use these models to help discover the best process conditions that produce high-performance glass materials. ■

Float Glass Resources from the National Glass Association

Float plant map and database

Visit NGA's worldofglassmap.com for a searchable map of global float glass locations. Get details about each plant and download a database of locations, with additional address and contact information. The database is updated throughout the year and is free for NGA members.

Float glass EPD

The NGA published an Environmental Product Declaration for flat glass products sold in the U.S. The declaration is valid for five years for clear, low-iron and tinted glass products that have been manufactured in an unprocessed annealed state. Glass that has been coated, heat-treated, or undergone any secondary processing is not within the scope of this declaration.

The content of the declaration includes:

- Product definition and physical building-related data
- Description of how the product is manufactured
- Details of raw materials and material origin
- Life Cycle Assessment results.

California AB262 FAQs

The NGA developed a resource that addresses frequently asked questions regarding compliance of glass in buildings in accordance with the California AB262

legislation, also known as the Buy Clean California Act.

"The Buy Clean California (AB262) legislation has generated a lot of questions about its impact on the use of glass in construction in the state," says Chris Dolan, Guardian Glass and member of the NGA Forming Committee. "We think stakeholders and other interested parties will find the NGA Frequently Asked Questions a helpful document. It summarizes key elements of the legislation, defines flat glass and processed glass to their respective Product Category Rules (PCRs) and offers guidance on what is required when bidding on California state-funded projects."

The FAQs go into detail on additional topics, including:

- The definition of a public works project and how it fits into CA AB262
- Key legislation dates that affect eligible materials accepted
- Definitions of flat glass and processed glass according to the legislation verbiage
- Requirements to bid on a California state-funded project
- Methods to locate data and address questions surrounding data for Global Warming Potential and compliance with AB262.



Online

Access these resources and more at glass.org.

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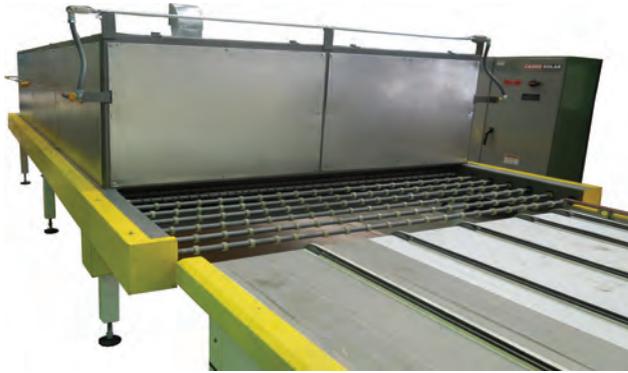


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PRODUCTS

02



01

01. Coated glass

Guardian Glass North America introduced Guardian SunGuard SNE 50/25 HT, a high-performance, low-emissivity coated glass. The new product has a visible light transmission of 48 percent and low solar heat gain coefficient of 0.25 with a crisp, neutral, subtle blue reflected color in the mid-exterior reflective range. Designed to be used on the No. 2 and No. 3 surface of a standard insulating glass unit, SunGuard SNE 50/25 HT coating is available on multiple Guardian Glass substrates.

855/584-5277 | GUARDIANGGLASS.COM



03



02. Frameless glazing

Slimpact IG by Faour Glass Technologies passed the Florida protocol for HVHZ large-missile requirements. The newest Slimpact frameless glazing solution will soon be available in an insulating glass makeup. The 12-by-8-foot IG window wall will provide architects and owners with an oversized, frameless impact window that offers thermal performance to meet the more stringent energy codes in Florida and along the Gulf and Atlantic coastlines, say officials.

813/884-3297 | FAOURGLASS.COM

03. Sample kit

Vitro Architectural Glass introduced a new Solarban solar control, low-emissivity glass kit featuring a more compact and environmentally friendly design, say company officials. The streamlined, foam-free package contains 4-by-6-inch samples of Solarban 60, Solarban 70, Solarban 90, Solarban 67 and Solarban R100 glasses on clear and Acuity low-iron glass substrates. Solarban 60 glass also is shown on tinted Optiblue and Optigray substrates, and Solarban 72 glass is coated on Starphire Ultra-Clear and Acuity low-iron glasses.

855/887-6457 | VITROGLAZINGS.COM



Roto



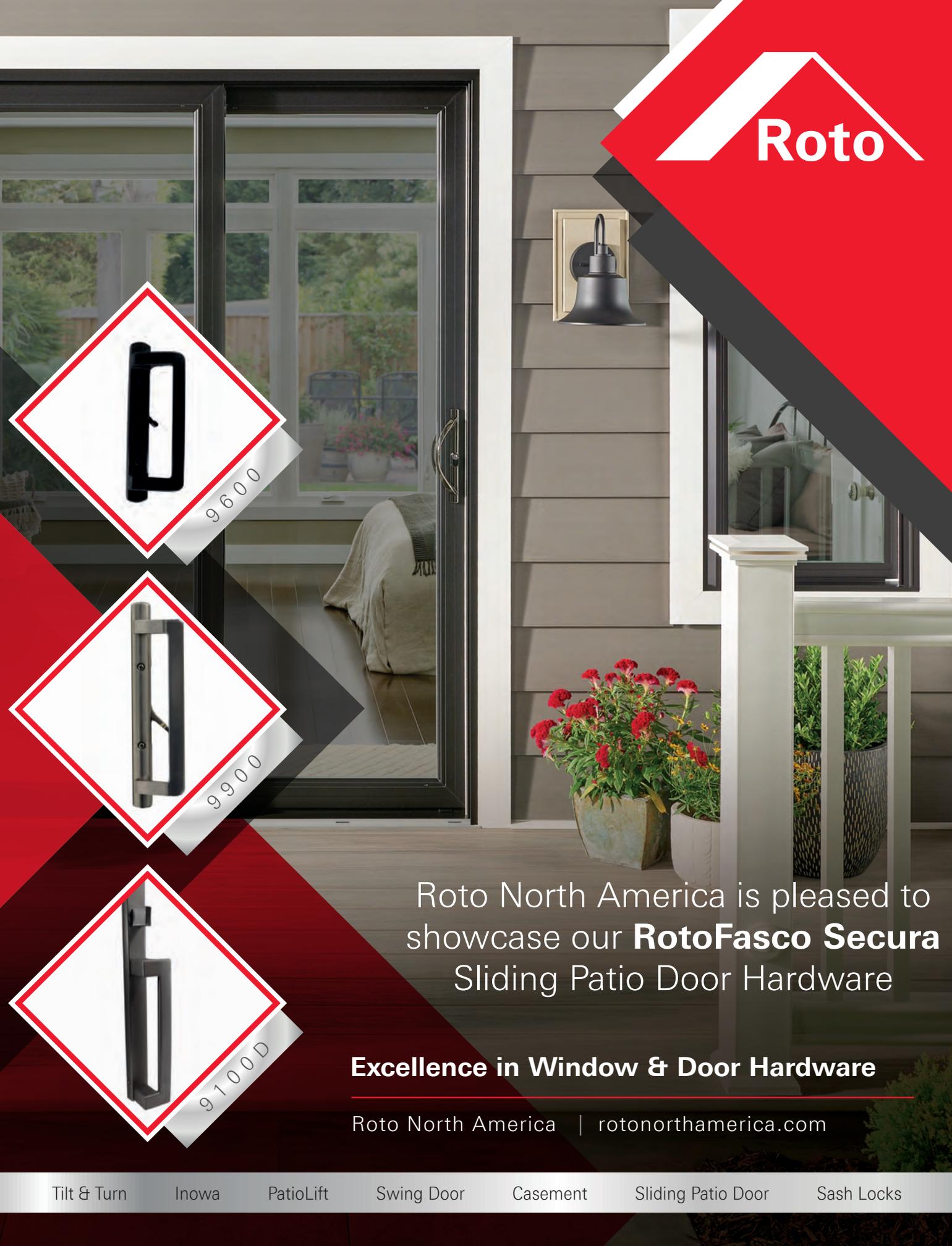
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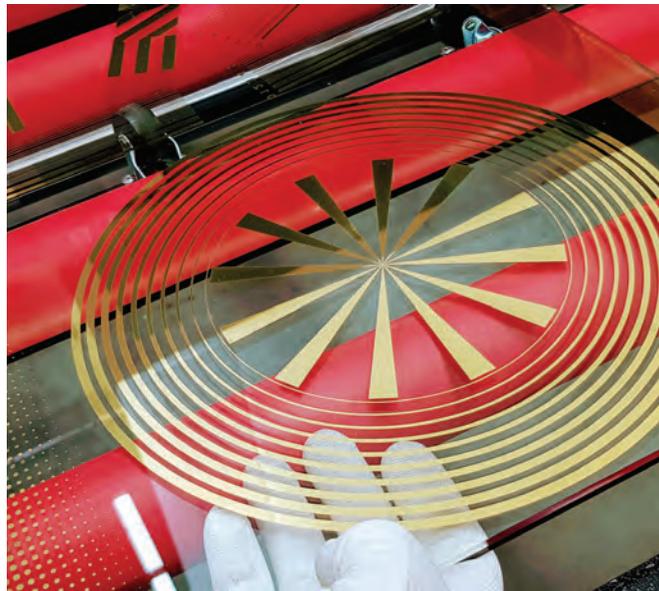
Casement

Sliding Patio Door

Sash Locks



01



02



01. Glass barrier

C.R. Laurence expanded its protective barrier solutions with more than 20 new hardware and material options. The comprehensive line of new protective barrier systems provides optimum function and flexibility. Designed to shield from contamination, the systems feature frameless profiles for maximum visibility and minimal hardware; are easy to clean and disinfect; and are available in floor and countertop configurations for added versatility. Applications include schools, restaurants, retail, workplaces, health care and more.

800/421-6144 | CRLAURENCE.COM

02. Engraved glass

Tvitec is offering Tvitec Gold, a new line of glass engraved with precious metals. The line crystalizes gold, platinum and other precious metals onto hardened and laminated glass. The selection is available in a variety of designs, and can be fabricated for flat glass as well as curved glass in a range of radiuses, all with high definition, says the company. Fabrication uses the Jetver Luxury paint line and Tecglass digital printing technology.

+{34} 9156-7089-6 | TVITEC.COM

03. Textured glass

Nathan Allan Glass Studios introduced its Fluted Champagne Glass. Champagne is bold and bright, say officials, and the transparent feature allows for excellent light transmission, while the fluted texture maintains a level of privacy. Champagne is ideal on all Nathan Allan FreeForm Series glass options, say officials, including Cathedral and Channel designs. It can be produced in whatever thickness of glass is required, and in panel sizes up to a maximum of 5 by 10 feet.

+{1} 6045-3588-49 | NATHANALLAN.COM

04. Security glass

Glass fabricator sedak offers bullet-resistant insulating glass, sedak isosecure, to meet the demands of high-security spaces, such as seats of government, airports and event venues. The bullet-resistant insulating glass is available up to a maximum format of 11.8 by 65.5 feet and is also certified for thermally toughened glass. sedak isosecure achieves its high splinter-free resistance without use of the conventional polycarbonate system, reducing fire risk significantly, say officials.

+{49} 8212-4942-22 | SEDAK.COM



04

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01



01. Media glass

ANC and Glaam have introduced Glaam Media Glass, ICT LED glass, for U.S. clients. This media façade technology is a fully transparent, LED-embedded, construction-grade material that allows designers and building users to transmit digital media on the glass. Applications include retail developments, sports venues, transportation and directional signage, say officials. The glass features embedded micro-LED technology that provides 100,000 hours of full brightness over its lifetime.

213/263-0066 | GLAAMAMERICA.COM

02



02. Fenestration product

Deceuninck North America launched a line of architectural products, Innergy AP. Made from a fiber-reinforced polymer, Innergy AP parts are custom-designed to fit existing commercial fenestration products and include pressure plates, structural thermal struts, reinforcements, and curtain wall components. The product line builds from Deceuninck's Innergy Rigid Thermal Reinforcements already used in window and door frame chambers for enhanced energy efficiency.

513/539-5505 | DECEUNINCKNA.COM

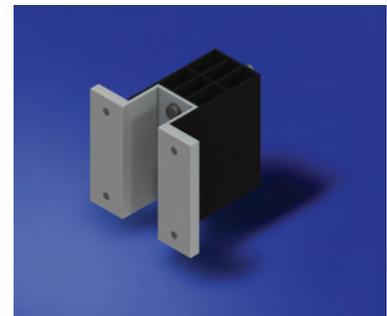
03



03. Safety windows

Alumicor added SecurSash 2800 to its specialty window product line. Designed to withstand aggressive human impact up to 2,000 foot-pound-second, the SecurSash 2800 is tested to AAMA 501.8-14 in multiple glazing options and also complies with the New York State Office of Mental Health's Patient Safety Standards. Applications include institutional and commercial projects, for use inboard in curtain wall or fixed window systems. It is especially well-suited for the health care sector due to the need for environmental safety and privacy.

416/745-4222 | ALUMICOR.COM



04

04. Thermal isolator clip

Technoform introduced its thermal isolator clip for buildings with continuous insulation systems. Engineered for use in exterior wall cladding and façade systems, the thermal isolator clip is suited for both renovation and new construction applications. Ensuring the dew point of the wall system stays outside of the air-water barrier, Technoform's thermal isolator clip provides a thermally efficient mounting support for cladding applications to maintain the continuous insulation requirements for the wall.

330/487-6600 | TECHNOFORM.COM

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Trex Co.

Trex Co. appointed *Laura Rygielski Preston* as president of Trex Commercial Products Inc. Rygielski Preston takes over management of the company’s commercially focused subsidiary, which includes Trex Commercial Products and Staging Concepts, a provider of portable staging solutions.

Rygielski Preston brings with her more than 25 years of experience as a sales and operations executive with large global companies. Most recently, she served as vice president and general manager of a \$200 million business with Trane Inc., a subsidiary of Ingersoll Rand, where she succeeded in driving record sales growth and implementing lean manufacturing processes.



Cannon

the Pacific Northwest, Colorado, Idaho, Montana and Wyoming. He will represent SAF for their sheet, extrusion, fabrication, painting, and anodizing and will serve primarily as an outside salesman. Cannon comes to SAF with extensive manufacturing and construction experience, including at SECO in Redding, California, where he sold surveying equipment to the construction industry.



Rodriguez

The Frameless Hardware Co.

The Frameless Hardware Co. appointed *Armando Rodriguez* to the position of vice president of manufacturing. Rodriguez brings over 30 years of glass industry manufacturing and fabrication experience to the newly

created role, most recently serving as senior vice president of manufacturing at C.R. Laurence.



Stanley

Giroux Glass Inc.

Giroux Glass Inc. appointed *Duane Stanley* as preconstruction manager to its new office location in Phoenix, Arizona. Stanley started with the company in July 2019, commuting from Phoenix to fill the need at that time for a seasoned project manager in Las Vegas, Nevada.



Johnson

Standard Bent Glass

Standard Bent Glass hired *Jon Johnson* as national sales manager. Johnson joins the team at SBG with a long and very successful track record in the glass and glazing industry. He now takes on the role of managing Standard

Bent’s portfolio of products and services and its nationwide network of sales representatives.



Henrickson

Soft Tech

Soft Tech welcomes *Kyle Hendrickson* as strategic account manager, North America. Hendrickson brings 16 years of fenestration CNC experience to his position. In his role, Hendrickson will work with existing customers to make sure they succeed. His primary area of expertise is in computer-aided manufacturing with a focus on the needs of the fenestration and extruded aluminum industries.



Campbell

Crawford-Tracey Corp.

Crawford-Tracey Corp. hired *Dennis Campbell* as the company’s new safety director. He replaces the recently retired Hank Coombs, who had previously been both a safety director and superintendent for the company.



Ore

Graboyes Commercial Window and Glass Solutions

Graboyes Commercial Window and Glass Solutions welcomed *Gregory Ore* to its team as a glazing and fenestration estimator. Ore brings a track record as an estimator in the Division 08 and 10 trades and offers more than 20 years of estimating experience. Ore most recently worked for LF Driscoll in estimating and purchasing. Previously he served as chief estimator for his family’s successful general contracting business, Artis T. Ore Inc.



Ngo

YKK AP America

YKK AP appointed *Will Ngo* as organizational development and engagement leader. Ngo will join the organizational excellence team, where he will provide simple, effective and scalable solutions that will drive employee engagement

through best-in-class talent practices. Ngo comes to YKK AP America with more than 13 years of experience in recruiting, training and development, and performance management, as well as market research and customer relations.

Kalwall Corp.

Kalwall Corp. named *Michael Keller* as sales manager for a swath of the U.S. Mid-Atlantic. Keller replaces Bob Beganie, who is retiring after more than 38 years with the company. Keller has been the Kalwall sales representative for southeastern Pennsylvania and Delaware for the past two years. He previously spent 10 years with the company in various roles, including drafting, engineering, programming and sales support. Keller is a grandson of Kalwall founder Robert R. Keller.

Southern Aluminum Finishing Co.

Southern Aluminum Finishing Co. hired *Cliff Cannon* as an account manager for SAF’s customers in Northern California,

Roto Frank

Roto Frank of America Inc. hired *Mayela Vela* as its new human resources manager. Vela joins the Roto team after previously

working in HR management and development roles for mid- and large-sized global manufacturing companies in the U.S. and Mexico.

She brings to the Roto team extensive HR experience in manufacturing and distribution companies, along with a strong background in IT and HRIS implementation, safety and training, and international exposure.

Faro Technologies

Faro Technologies Inc. hired two industry veterans to join its senior leadership team and manage the global hardware and software R&D teams. *Avi Ray-Chaudhuri*, who serves as vice president of hardware R&D, and *Wesley Tilley*, who serves as vice president of software R&D, joined the company.

Ray-Chaudhuri most recently served as vice president, engineering, commercial lasers for Lumentum, where he significantly reduced the product development cycle time and implemented best-in-class program management, engineering and operations practices. Tilley has more than 30 years of experience in the telecommunications industry, and most recently served as vice president, communications software as a service at Oracle, where he led a strategic shift in global business unit strategy to Cloud native, software as a service offerings in the telecommunications space.

Paradigm

Paradigm hired *Cory Kellum* as an account executive for the company. Kellum is a sales professional with hands-on experience in the construction trades and more than a dozen years in account management roles ranging from real estate sales to software as a service technology.

As an account executive, Kellum will focus on Paradigm's expanding homebuilding technology market, including Paradigm Omni, a virtual home design software that helps production homebuilders create a virtual design experience for homebuyers.

Linetec

Jason Morrey joined Linetec as a safety manager. He will collaborate across all departments to continue building on Linetec's award-winning safety culture, say officials.

Reporting to *Mike Schauls*, vice president of operations, Morrey will be responsible for developing and leading the company's safety programs, injury prevention and compliance initiatives. ■



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Custom Glass Products, a full-line glass fabricator located in Weston Wisconsin, is looking to fill the position of Plant Manager. We are seeking a Manager who can motivate and direct employees to generate quality products in a timely, efficient and safe manner. Qualified candidates will have a proven track record of operational and safety excellence with a deep understanding of production efficiency and 5+ years supervisory experience in the glass fabrication field. Send resumes to ajurek@cpgglass.com

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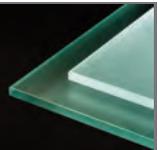
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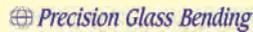
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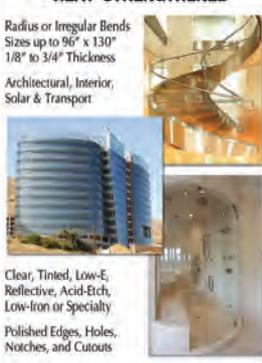
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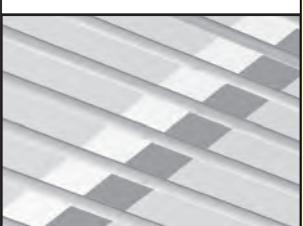
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Companies from all parts of the glass and glazing industry have implemented innovative, out-of-the-box ideas to improve business from the ground up. Here's an Idea showcases these sometimes small behind-the-scenes ideas that can make a big impact on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

TIPS FOR PREVENTING WINTER WEATHER INJURY AND ILLNESS

Winter is here in the United States, and that means freezing temperatures and inclement weather for many parts of the country. These conditions can of course impact outdoor workers, including glaziers and installers. To help prevent cold-related sickness and injury, the Occupational Safety and Health Administration created cold weather resources for employers. The following are some major takeaways; the full guidance and list of resources can be found at osha.gov.



Prevent cold stress

Employees who labor outside can be vulnerable to cold stress during winter. According to OSHA, “cold stress occurs by driving down the skin temperature, and eventually the internal body temperature. When the body is unable to warm itself, serious cold-related illnesses and injuries may occur, and permanent tissue damage and death may result.” Frostbite, hypothermia and trench foot are all examples of cold stress.

To prevent cold stress, OSHA recommends that companies train employees how to recognize the conditions and symptoms that lead to cold stress. Some other recommended prevention tactics include scheduling short breaks in warm or heated areas, using a buddy system and dressing for cold weather. The last measure can include wearing at least three layers of loose-fitting clothing, as tight clothing reduces blood circulation.

Identify environmental hazards

In addition to freezing temperatures, winter also brings other environmental hazards, such as snow and ice. These risks can be compounded for workers who labor at heights, such as glaziers and installers.

OSHA recommends caution and careful planning when workers are laboring at heights or on roofs during winter. OSHA guidance says that surfaces weighed down by snow should be inspected prior to work to determine structural safety. Guidance also directs employers to remove snow from roofs without workers on the roof, if possible.

To prevent slips on snow and ice, insulated and water-resistant boots with rubber treads are suggested, especially if employees are outside working after a winter storm. Workers should also take shorter steps, at a slower pace, so they can react quickly to icy conditions.

Drive safely

Installers and glaziers are not the only industry employees laboring outside in winter. Those working in transportation, driving trucks or cars, also are subject to winter weather conditions. To help promote employee safety during inclement weather and dangerous road conditions, employers can ensure that drivers are licensed for the vehicles they are operating, and that the vehicles are properly maintained, according to OSHA guidance.

In the case of crashes or other difficulties on the road during transit, employees should have an emergency kit that includes a cellphone or two-way radio, windshield ice scraper, snow brush, flashlight, shovel, tow chain, traction aids, emergency flares, jumper cables, snacks, water, road maps, blankets and a change of clothes. ■

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