NGA
NATIONAL GLASS ASSOCIATION with GANA

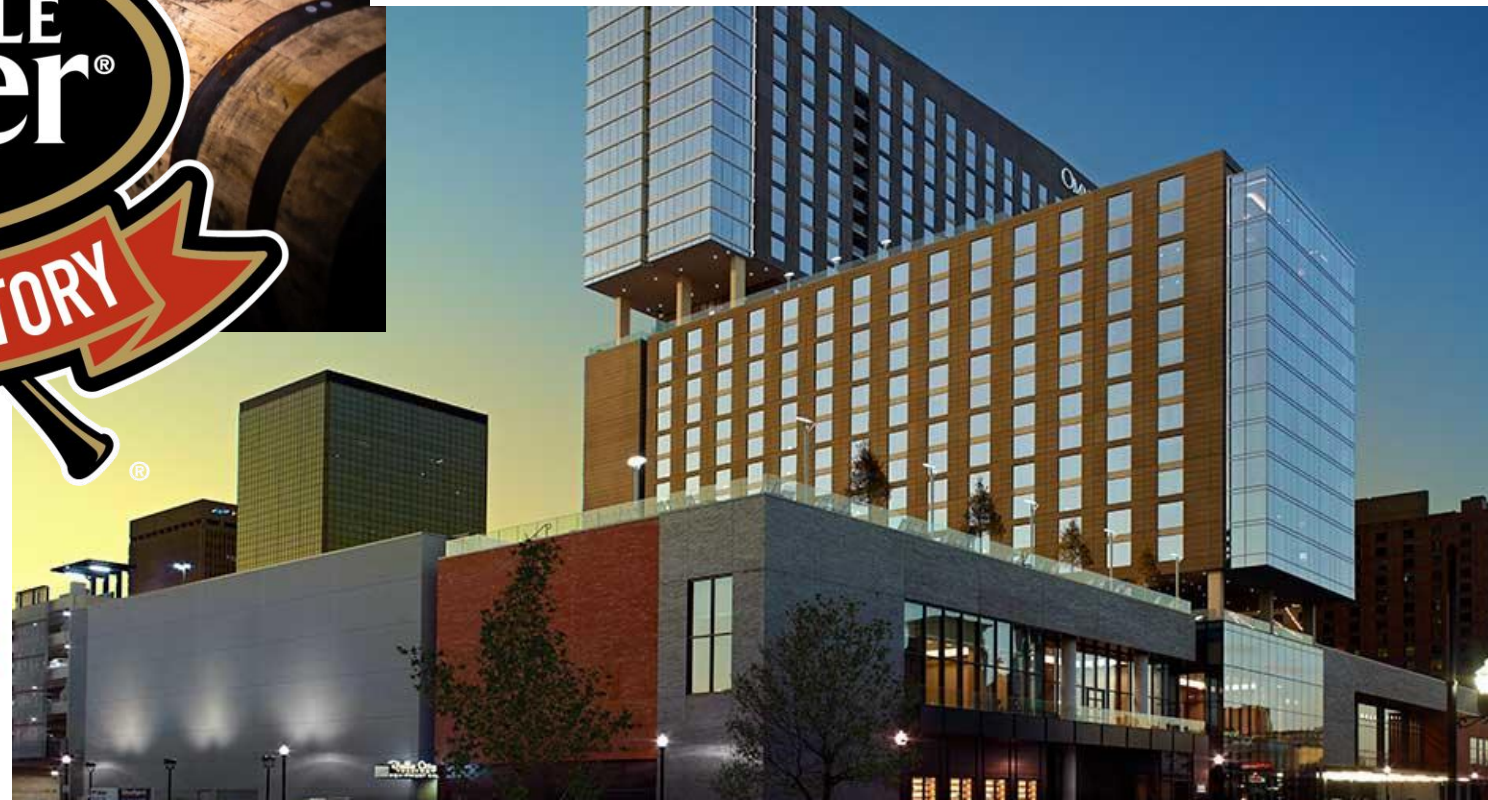
Thirsty THURSDAY

QUENCH YOUR THIRST FOR TECHNICAL KNOW-HOW

March 1-3, 2026

BEC CONFERENCE

Louisville®



THE CODE CHANGES SHAPING THE BUILT ENVIRONMENT

URMILLA SOWELL

NGA VP Advocacy
&Technical Services

TOM CULP

NGA Code Consultant

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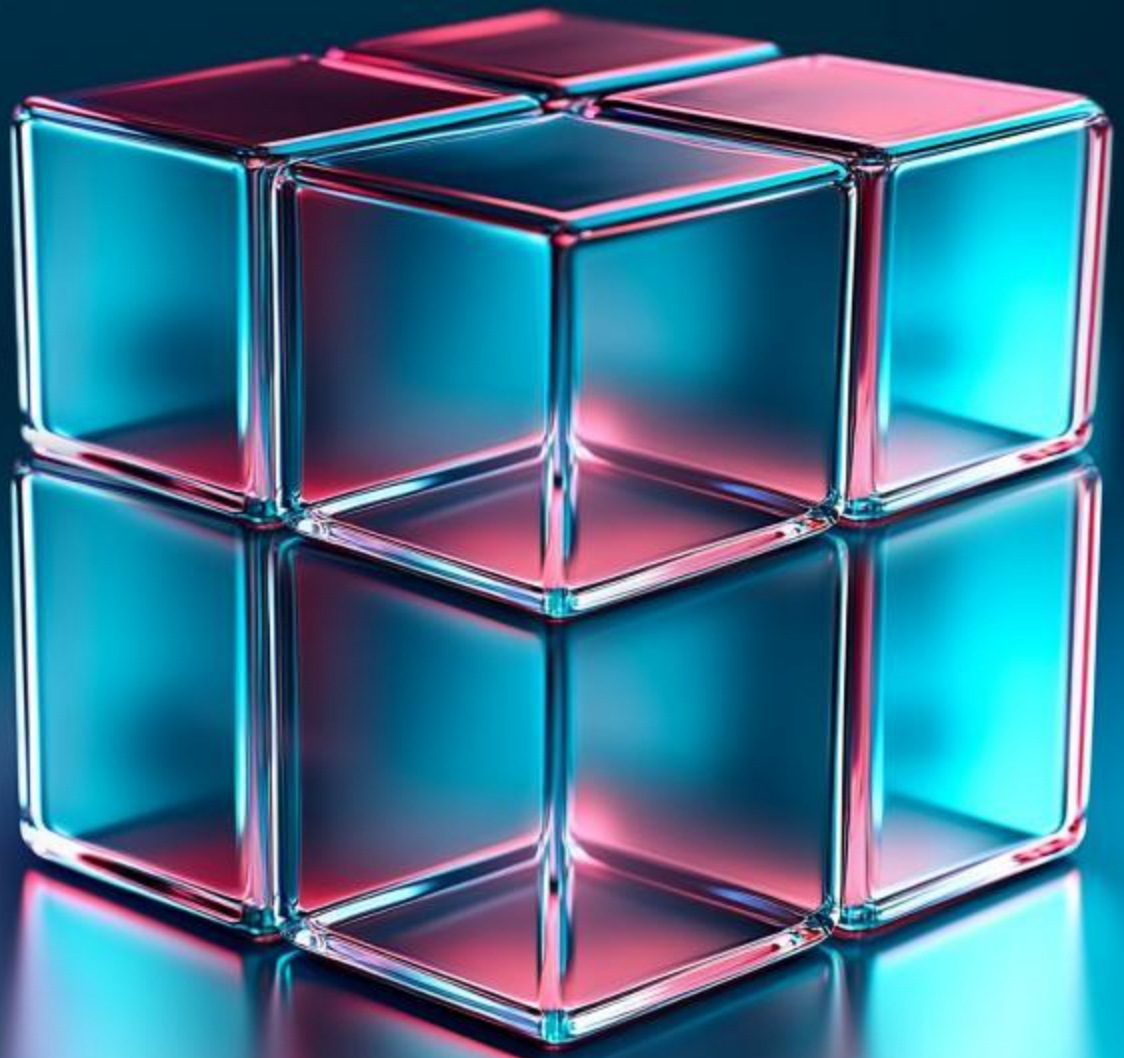

LEARNING OBJECTIVES

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- Paraphrase recent updates to commercial and residential energy and green building codes, and the impact they will have on building occupants.
- Illustrate how the codes affect fenestration and glazing products, and their impact on comfort or safety.
- List recent updates to the glass and glazing standards that affect the industry.
- Understand the role of fenestration and glazing products in sustainability legislation initiatives for low embodied carbon building materials, and it’s long-term intended impact on the climate.

TOPICS

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1) What NGA Advocacy does for the Industry
2) Natural Light in Classrooms, Dorms, and Apartments ← *BIG WIN TO REPORT!*
3) Energy Efficiency – IECC, ASHRAE 90.1, Energy Star, LEED, NFRC, …
4) Buy Clean Programs, Embodied Carbon, and EPDs
5) Glass Recycling and End-of-Life Study
6) Protective Glazing - School security, Bird Friendly Glazing

Another Win to Report!

1. WHAT NGA ADVOCACY DOES FOR THE GLAZING INDUSTRY

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National Glass Association

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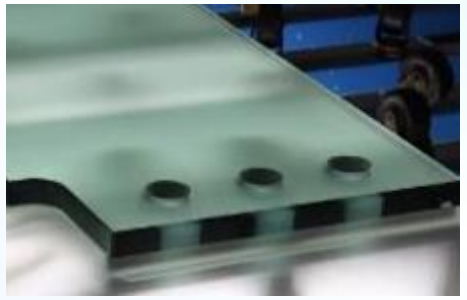
NGA is a not-for-profit trade association, and the only national trade association serving the entire glass and glazing industry.

PRIMARY GLASS MANUFACTURERS



FABRICATORS

GLAZING CONTRACTORS & FULL-SERVICE GLASS COMPANIES

SUPPLIERS

NGA's Vision

We envision a future in which glass is the material of choice to enhance spaces where people live, play, learn, work and heal.


GLASS
25 YEARS OF BEC
NGA


GLASS
WINDOW TO THE FUTURE
PLUS
10
NGA


WINDOW+ DOOR
PROFILE IN
WINDOWS
GlassBuild


WINDOW+ DOOR
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Education
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CURRENT ISSUE


WINDOW+ DOOR
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GLASS
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FIFTY

BALANCING THE MANY FUNCTIONS OF GLAZING

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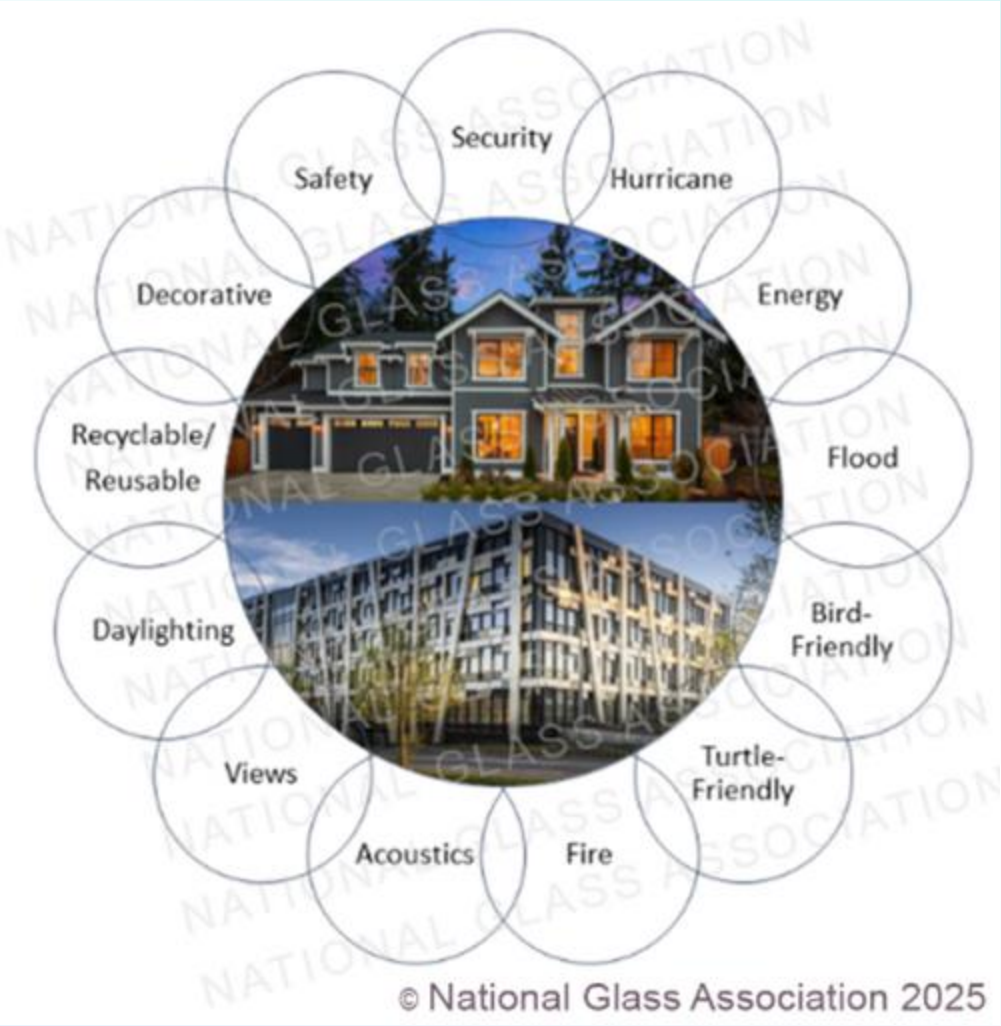
Controlled Environment

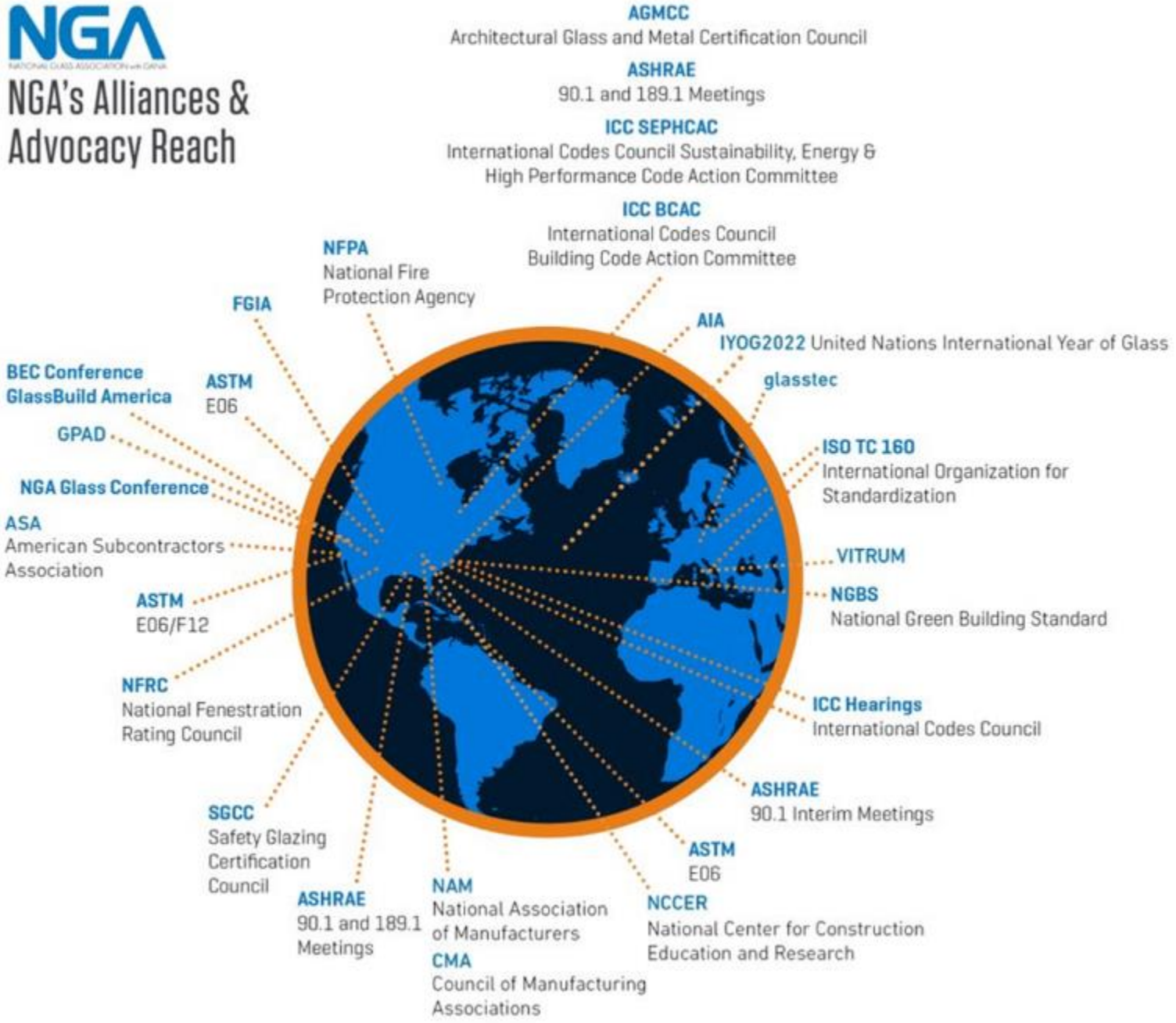
- Weather protection
- Ventilation
- View
- Daylighting
- Fade resistance
- Energy efficiency
- Thermal comfort
- Solar gain
- Acoustics
- Privacy
- Human health
- Safety
- Structural protection
- Security
- Fire
- Egress



Many Types

- Clear, low-iron, tint
- Low-e
- Heat treated
- Laminated
- Insulating
- Vacuum Insulated Glazing
- Thin glass
- Electrochromic, thermochromic
- Photovoltaic
- Decorative
- Patterned, fritted, etched
- Applied films

NGA's Alliances & Advocacy Reach



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NGA'S ADVOCACY & TECHNICAL SERVICES TEAM

- Urmilla Sowell – MSCE, PE – 24 years
- Karen Wegert – MS ChE – 23 years
- Georgia Scalfano – BSCE, EIT – 7 years
- Amber Johnson – B.A.Comm – 10 years
- Tom Culp – PhD ChE – 27 years
- Thom Zaremba – JD/Litigation Attorney – 47 years glass/glazing codes
- Nick Resetar – JD/Litigation Attorney – 15 years
- Lakisha Woods - CAE – 24 years

*William Koffel – P.E., FSFPE – 44 years

Top row: Urmilla Sowell, Karen Wegert, Georgia Scalfano, Amber Johnson
Bottom row: Tom Culp, Thom Zaremba, Nick Resetar, Lakisha Woods

DEFEND/PROTECT

- Stopped multiple attempts to reduce window area (Not just WWR and the "Battle for the Wall", much more)
- Stopped proposals with misapplication of products (conflicts with other building requirements, cost prohibitive or impractical, favor one technology over another, etc.)
- Stopped proposals that restrict compliance flexibility (performance path limits, etc.)

PROMOTE

- Expanded daylighting requirements in more spaces
- Advanced requirements to promote energy efficient products where cost effective and practical.
- Increased compliance flexibility for existing building retrofits
- Improved credits for shading, dynamic glazing, BIPV

DOWNLOADABLE MANUALS – NOW FREE FOR NGA MEMBERS

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Order now at glass.org/store or scan the QR code to get started.

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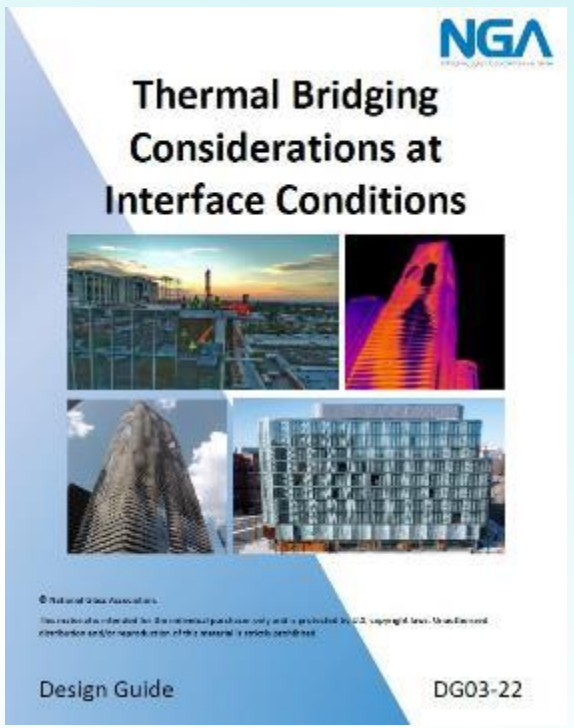

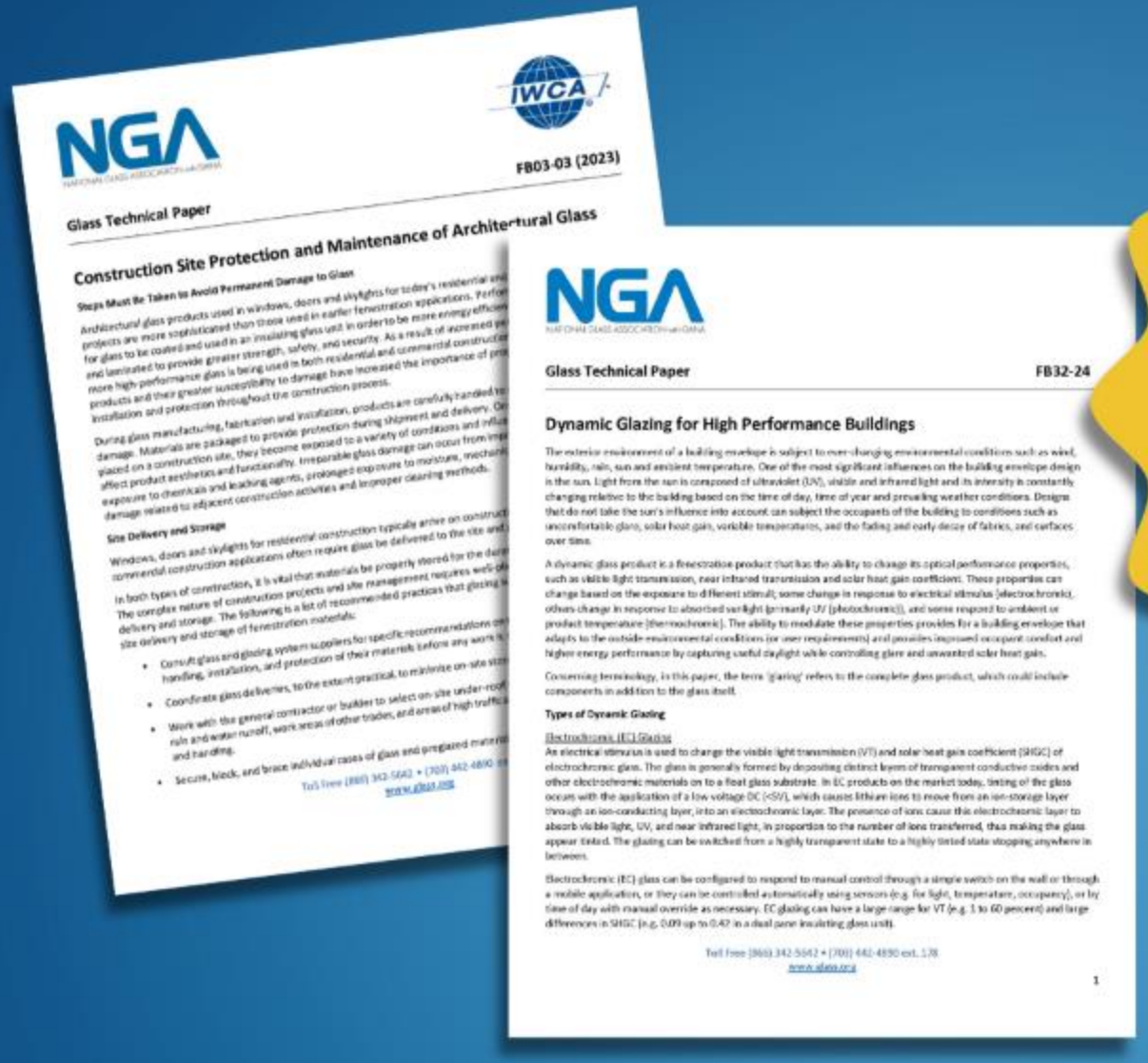

90+ Glass Technical Papers FREE to the Industry!

Download your copies on **glass.org/store** or scan the QR code to get started.

AIA Continuing Education Provider

AIA PRESENTATIONS

https://www.glass.org/architect

AIA CONTINUING EDUCATION & RESOURCES FOR ARCHITECTS

NGA's resources for architects include on-demand AIA-accredited courses, the Glass & Glazing Design Academy, NGA's Glass Technical Papers, and All about Glass and Metal: A Guide for Architects & Specifiers. NGA is an AIA-approved provider of CES credits for architects.

AIA Continuing Education Provider

GLASS & GLAZING DESIGN ACADEMY

NGA's accredited AIA presentations are now available in an on-demand, multimedia format through the Glass & Glazing Design Academy. Available to architects and industry professionals through a new partnership with Architectural Record, the online academy helps architects understand the performance, design considerations and benefits of the many glazing and glass building products available today.

Read our article on Occupant Comfort, featured in Architectural Record.

Earn 1.0 LU/HSW when you read the full article and take the accompanying quiz in our academy.

EXPLORE THE FULL ACADEMY

https://continuingeducation.bnpmedia.com/architect/academies/nga

ON-DEMAND EDUCATION FOR ARCHITECTS

MULTIMEDIA VIDEOS & QUIZZES FOR CREDIT




NGA Glass and Glazing Advocacy Days



https://www.glass.org/advocacy/initiatives/priority-issues

THE LATEST THIRSTY THURSDAY WEBINARS

Topic Business Insights Technical Residential Trends Training Resources Other

The New MyGlassClass: Build Your Company Training Program

Jenni Chase

NGA Member Benefits & Association Initiatives

Alicia Michaud & Sara Neiswanger

Window and Door Manufacturing Report: December 2024

Chris Beard

NGA Compensation & Benefits Report for Fabricators and Glaziers (Login Required)

Laura Clark & Ian Santo Domingo

The Glazier Approach to Division 10 Interior Projects

Jeff Phillips

How NGA Member Companies will Benefit from the EPA Grant

Tom Culp & Urmilla Sowell

Reflections of Hope: Suicide Prevention in the Construction Industry

Kevin Hines & Cal Beyer

Window and Door Manufacturing Report: July 2024

Chris Beard

Your Fire-rated Building Code Questions

Thom Zaremba

AI & Automation Unleashed

Stephanie Couch

Recruitment Resources for Installers

Jodi Martinez & Jenni Chase

7 Need-to-Know Code and Regulatory Updates

Tom Culp & Urmilla Sowell

HOW TO STAY INFORMED

Follow NGA on LinkedIn

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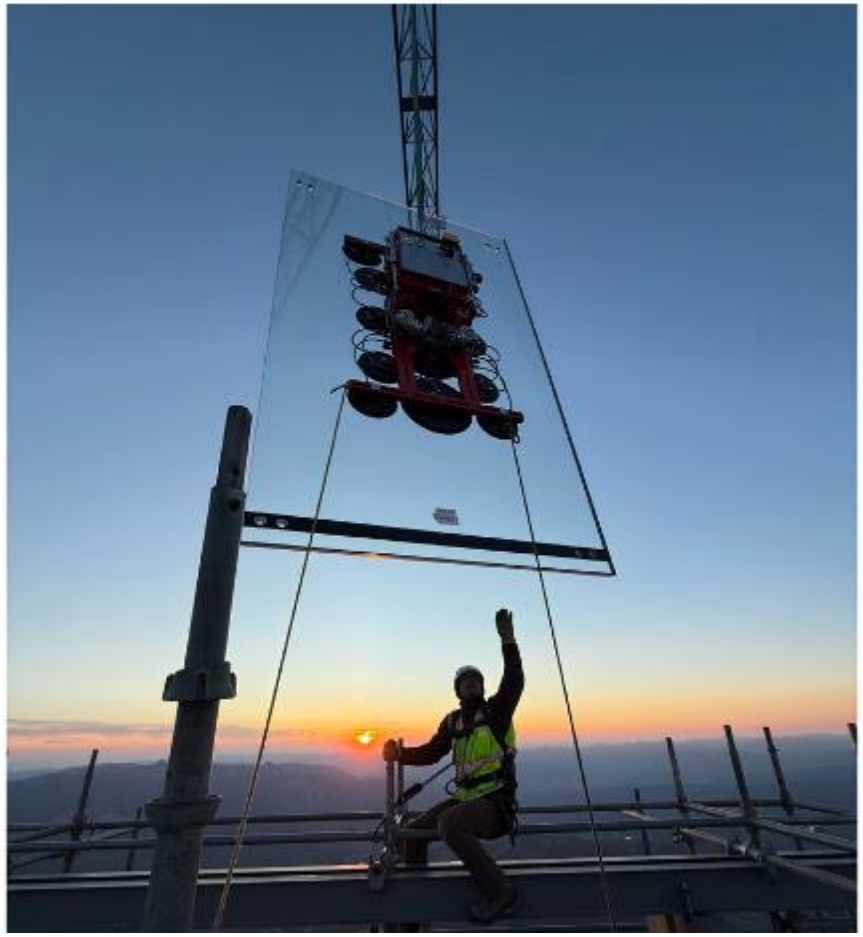
MEMBER SPOTLIGHT!!!!
MT Contracting, Inc.
MT Contracting, Inc. is a glass and glazing subcontractor specializing in ...more



Opt-in for the monthly AT Eblast

October 2025

Current Activities

Update to NGA's U.S. and Canadian Bird-Friendly Building Policies Database

NGA has updated information on bird-friendly glazing ordinances in York County, SC, Middleton, WI, Boise, ID, and Berkeley, CA. Specific requirements of bird-friendly building ordinances can vary widely between jurisdictions. NGA maintains a database tracking mandatory and voluntary bird-friendly policies, including what portion of the building must be bird-friendly, and how bird-friendly glazing is defined within each policy. NGA advocates that jurisdictions reference the NGA Best Practices for Bird-Friendly Glazing Design Guide (DG01-21) for consistent implementation of bird-friendly requirements.

The database is available for NGA Members on glass.org. Login to download NGA Member-Only Legislation Tracking Resources.

Not an NGA member? Learn about member benefits and join.

Interior Glass Survey and the Installing Committee

Should demountable glass walls be classified under Masterspec Division 8 or Division 10? What challenges do demountable walls and similar installations pose? NGA Installing Committee Task Group *Interior Demountable Wal Systems – Division 10* requests your input. Please respond to our survey to participate.

The NGA Installing Committee serves as the hub for all discussion and activities related to installing companies—

Reach Out Here

2. NATURAL LIGHT IN CLASSROOMS, DORMS, AND APARTMENTS

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CODE REQUIREMENTS FOR NATURAL LIGHT

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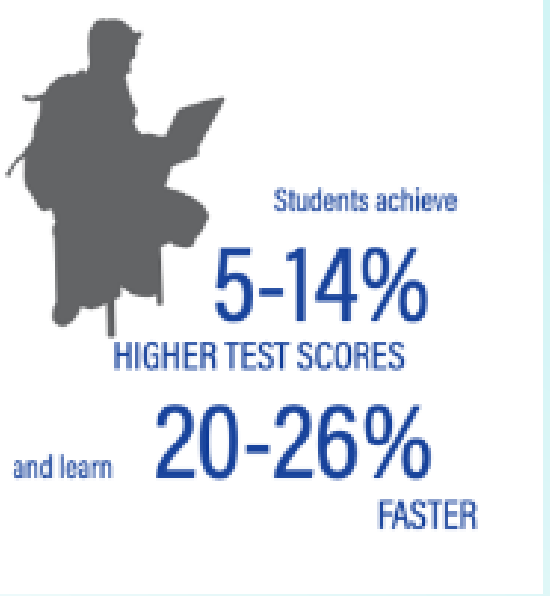
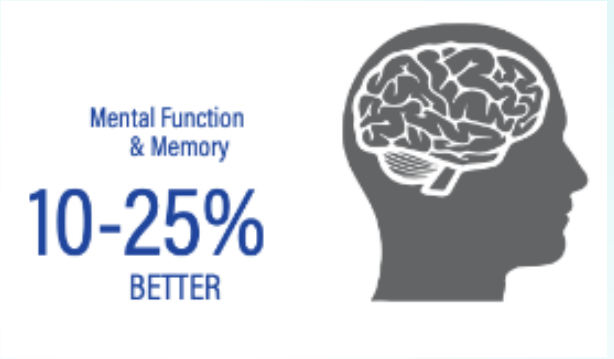
- The International Building Code (IBC) requires habitable spaces to provide ***<u>either</u>*** natural lighting (i.e. windows) ***<u>or</u>*** artificial lighting.

  Not necessarily both. 😬 🤯
- Some were using this as a loophole to try to build windowless dorms in MI, TX, and CA – despite the clear research from Lisa Heschong and others showing the significant benefits to occupant health and well-being from access to daylight and views.





CODE REQUIREMENTS FOR NATURAL LIGHT

- Through GICC and together with AEC, we submitted an IBC proposal to require *both* minimum natural light and artificial light in classrooms to provide the basic “right to light.”
- AIA and Prof. Miro from UT Austin also put in similar proposals requiring minimum natural light in living and sleeping spaces in Group R occupancies (dorms, apartments, hotels).

This is real.
“The loneliness and claustrophobia caused by the four solid walls is unbearable.”
– Karim, UT Austin student

CODE REQUIREMENTS FOR NATURAL LIGHT

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Big Win for Healthy Buildings and Students!

- Working together, NGA, AEC, AIA, and Miro successfully passed two proposals at the ICC committee action hearings on Oct 24 to require natural light in schools, dormitories, and apartments.
  - Group R proposal passed 6-5.
  - Classrooms proposal passed 8-2.
- We still have to defend these proposals in the final hearing next spring in front of the code officials before it is in the 2027 IBC, but a great step forward!

3. ENERGY EFFICIENCY

IECC, ASHRAE 90.1, ENERGY STAR, NFRC, ...

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MY PREDICTION FOR THE COMING YEARS ...

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Local vs. National Action:

- At the national level, slower but continued small incremental changes will continue in the national model energy codes

+

- Increase in regional activity, with political split
  - Less in red states
  - More in blue states and cities (including blue cities in red states)

- Creates both threats and opportunities at the regional level
  - Have to watch for attacks on window area like before, but we are ready.
  - Creates opportunity for high performance products (VIG, triple glazing, 4th surface low-e, advanced spacers, advanced frames).
  - Creates opportunities for retrofit and replacement products in existing buildings.

ENERGY CODE PROGRESSION - ASHRAE 90.1

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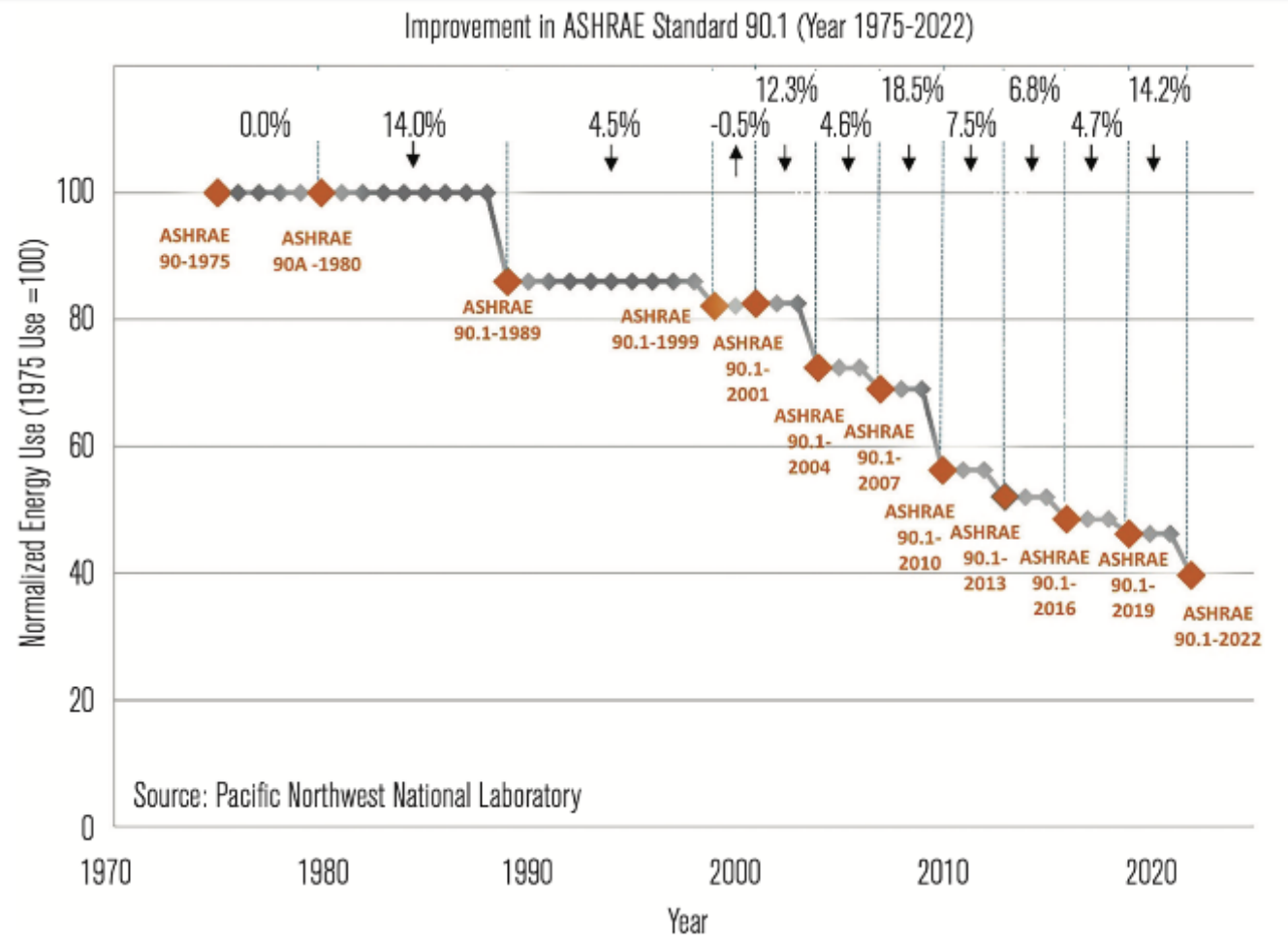

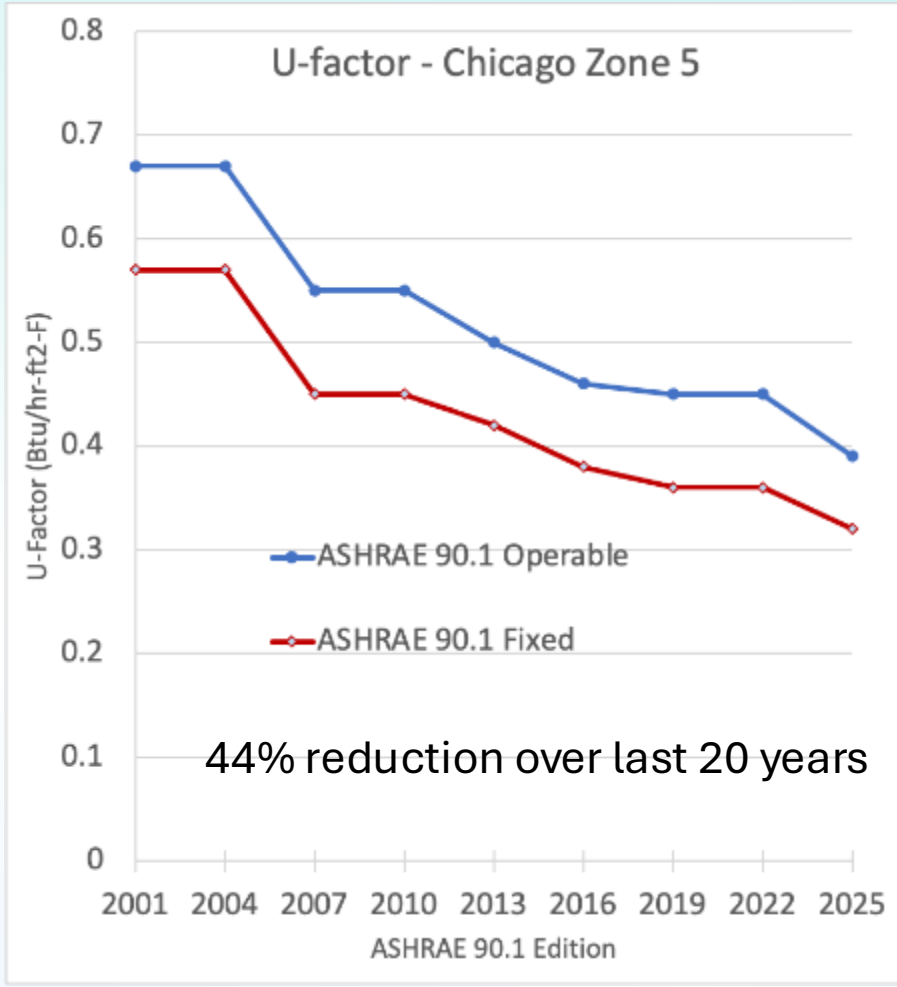

Steady progression over last 20 years, regardless of politics

THIS STEADY PROGRESSION IS CONTINUING:

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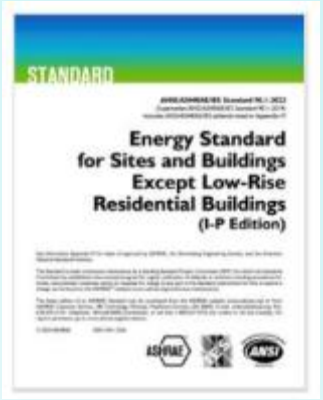
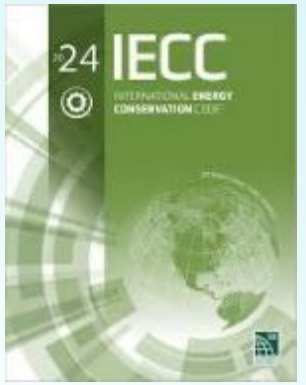
ASHRAE 90.1-2025 and 2027 IECC Fenestration Criteria are essentially complete.

- Comprehensive changes in fixed windows, operable windows, skylights/sloped glazing. No changes to glazed entrance doors.
- We worked with the committees over the last 3 years to ensure it is cost effective, practical.





- **No reduction in window area**
- ~ 3-13% changes in U-factor
- SHGC already mostly optimized, so main change is extending 0.23 SHGC up to Zone 2 in non-residential spaces.
- Increased use of thermally broken frames, warm edge spacers, gas-fill *in all zones*
- 4th surface low-e and higher performance thermal breaks *in northern zones*
- Triple glazing in far north zones (Zones 7-8)

STEADY PROGRESSION CONTINUED …

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- Also, despite some of the rhetoric about **renewable energy** (including glass in PV, BIPV), the national model codes have maintained or increased their requirements related to renewable energy serving buildings.
  - The 2027 IECC committee rejected proposals to reduce or eliminate the renewable energy requirements.
  - ASHRAE 90.1-2025 will increase the amount of renewable energy used on new building projects by 50% to align with what the 2024 IECC requires.

Also includes options for more proactive designers:

- Credits for higher performance envelopes (triple glazing, VIG), extra renewable energy, tighter air leakage.
- Expanded ability to take credit for automated shading and dynamic glazing in ASHRAE 90.1 (although less so in IECC).

RESIDENTIAL IECC SLIDE

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- Incremental progress in residential window requirements too.

	2021 IECC		2024 IECC		Likely 2027 IECC	
Zone	U-factor	SHGC	U-factor	SHGC	U-factor	SHGC
0,1	0.50	0.25	0.50	0.25	0.45	0.23
2	0.40	0.25	0.40	0.25	0.35	0.23
3	0.30	0.25	0.30	0.25	0.30	0.23
4	0.30*	0.40	0.30	0.40	0.30	0.40
5	0.30*	NR	0.28*	NR	0.27*	NR
6	0.30*	NR	0.28*	NR	0.27*	NR
7,8	0.30*	NR	0.27*	NR	0.27*	NR
	*0.32 for hurricane, altitude > 4000 ft		*0.30 for hurricane, altitude > 4000 ft		*0.30 for hurricane, altitude > 4000 ft	

Nothing earth-shattering, but more warm edge spacers, inert gas-fill, improved frames, 4th surface low-e. Triple silver low-e in the south.

WHAT ABOUT ENERGY STAR?

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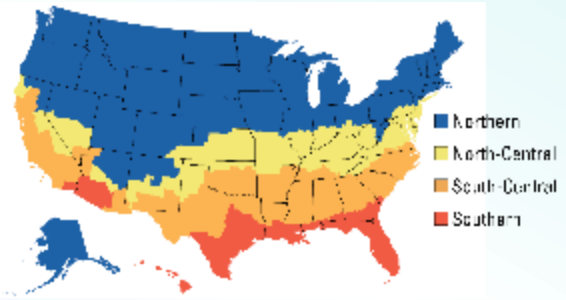
- **Energy Star program version 7 for residential windows, doors, and skylights** has been in effect since Oct 2023.
- Current administration has proposed ending or privatizing the Energy Star program – not just windows, everything.
- However, big pushback from building owners, builders, manufacturers to keep it.
  - Energy Star has helped with marketing of many consumer products.
  - Homebuilders market Energy Star homes.
  - Energy Star buildings program used for tax credits and local benchmarking ordinances.
  - Logistics for privatizing more difficult than first expected.

Climate Zone	U-Factor[1]	SHGC[2]	
Northern	≤ 0.22	≥0.17	Prescriptive
	= 0.23	≥ 0.35	Equivalent Energy Performance
	= 0.24	≥ 0.35	
	= 0.25	≥ 0.40	
	= 0.26	≥ 0.40	
North-Central	≤ 0.25	≤ 0.40	
South-Central	≤ 0.28	≤ 0.23	
Southern	≤ 0.32	≤ 0.23	



WHAT ABOUT ENERGY STAR?

- Because of pushback, both the House and Senate appropriations committees have included a specific line item to fully fund Energy Star for FY25 (bipartisan, unanimous).
- However, if no budget is approved or only do a continuing resolution, the program is still at risk of impoundment.
- Impact of shutdown? 🤷‍♂️
- As for now, mostly continuing like normal.
  Utility programs still looking to Energy Star as basis for incentives.

PARTNERSHIP FOR ADVANCED WINDOW SOLUTIONS

PAWS
PARTNERSHIP FOR ADVANCED WINDOW SOLUTIONS

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- Public / private partnership with DOE, national labs, utilities, industry, energy efficiency groups.
- https://paws.energy – good info on utility incentives and more.
- Hosted workshop with energy efficient homebuilders at EEBA summit this month to promote triple glazing and other high performance options.

- Reviewing minimum housing ordinances in Ann Arbor MI, Austin TX, Boulder CO, Berkeley CA, Burlington VT that potentially impact window replacement in existing residential and multifamily buildings.
  May serve as model for other cities, like building performance standards do for existing commercial buildings.

EXAMPLES OF REGIONAL ACTIONS - COLORADO

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- Colorado passed a law requiring all **residential** windows, doors, and skylights sold in the state to meet Energy Star v7 criteria starting Jan 2026.
- However, following review of market availability and cost, uncertainty about Energy Star, and some background negotiating, CO revised the requirement at the end of June to match the **2024 IECC** instead of Energy Star.
  - U-0.30 for windows and glazed doors, U-0.50 for skylights, no SHGC requirement, opaque doors exempted.
  - Compromise that gets more parties on board and still advances the market for the entire state (regardless of local code adoption).
  - Intent is to update it every 3 years to follow the model code.
- They did not include proposals to limit the argon exemption (from U-0.28 to U-0.30) to only above 6500-7000 ft, but more manufacturers starting to do high altitude argon via pre-equalization.

COLORADO ROCKIES

EXAMPLES OF REGIONAL ACTIONS - COLORADO

- Also, new "Colorado Model Low Energy and Carbon Code"
  - Starts July 1, 2026
  - Based on 2024 IECC but with extra solar, EV, electrification.
  - Local jurisdictions updating their code required to use this.

EXAMPLES OF REGIONAL ACTIONS - ILLINOIS

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- Updated **Illinois Stretch Energy Code**
  - Used for state-funded buildings, and can be adopted by local cities wanting to go beyond base code.
  - Based upon 2024 IECC plus some.
  - Final approval expected Sep 30.

- For **commercial** windows,
  - U-0.28 fixed, U-0.32 operable in IL stretch code
  - U-0.32 fixed, U-0.39 operable in ASHRAE 90.1-2025

  So more advanced, but still achievable and practical.

- For **residential** windows, accepted PAWS proposal to align with expected 2027 IECC values.
  - U-0.27 zone 5, U-0.30 zone 4

EXAMPLES OF REGIONAL ACTIONS

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- **Boston** has new "Net Zero Carbon Zoning policy"
  - Started this last July 1, 2025, new building projects must demonstrate net zero carbon emissions during permitting.
  - Aggressive MA stretch energy code + renewable energy
  - Report embodied carbon (EPDs). Large projects must do whole building life cycle assessment.
  - New buildings > 20,000 ft^2, multifamily with 15 units or more.
  - Additions, renovations > 50,000 ft^2

- Enabling other regional action, ASHRAE 90.1-2025 has new *voluntary* addenda for net-zero energy buildings (performance and prescriptive) that can be adopted by local jurisdictions.
  - Notch above main energy code + increased on-site renewable energy.
  - High performance target, but no direct limit or attack on window area.

EXAMPLES OF REGIONAL ACTIONS - CA, MO

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Local action can also work the other way …

- California only considering small changes this cycle to the nonresidential window requirements in two zones to align with 2027 IECC.
- California AB130 puts a pause on local communities adopting residential reach codes more stringent than state code for next 6 years, with some exceptions.
  Residential only.

- Missouri introduced bill to roll state energy code *backwards* from 2018 IECC to 2009 IECC. Bill died, but shows some of the sentiment out there.

NFRC RATINGS

- IECC, ASHRAE 90.1, and state energy codes require U, SHGC, VT ratings determined in accordance with NFRC technical procedures by an independent lab.
- NFRC is the gold standard for calculating U, SHGC numbers, but not everyone uses the full certification program.
- For residential products, labeling is standard.
- For commercial products, NFRC technical numbers (U, SHGC, VT) are widely used for product info, specs, and code compliance

… but …

- Full use of NFRC certification program is much less due to concerns about speed, cost, ease-of-use, and flexibility.

NFRC RATINGS

- On residential side, NFRC is implementing new “LEAFF” process to provide increased flexibility for determining ratings with different components.
- On commercial side, staff and members have been working for 6+ years to revamp their rating and certification program for commercial systems.
- Two paths:
  - CUSTOM PRODUCT PATH: simulation of all products on a specific project, including custom sizes and configurations.
  - PRODUCT DIRECTORY PATH (Commercial Trendline Approach – CTA): individual certified product lines with ability to quickly incorporate different glazing products.
    Ratings at standard size, but can also optionally report alternative custom sizes.
- 2018-2022: developed technical and certification documents
- 2022-now: staff working on program implementation and software tool

NFRC RATINGS

They are done! Just announced last month full implementation of the new commercial program.

- All new product certifications must use new program starting now.
- 6 month period (3/30/26) to transfer existing CMA product lines to new program with no retesting.
  - For framing mfrs.
    Spacer and glass mfrs don't have to do anything.
- For more info,
  - https://nfrc.org/commercial/
  - https://nfrccommunity.org/page/CPathFAQ
  - Email commercialCP@nfrc.org
    or contact Kevin Louder and Steve Urich.

BULLETIN

Commercial Program Bulletin 2025-01
Updated Commercial Program and Tool
Now Ready for Use

The National Fenestration Rating Council will launch the new NFRC 715: Commercial Energy Performance Certification Program (Commercial Certification Program), on Sept. 29, 2025. This program standardizes certification for fenestration products in commercial buildings, supporting compliance with energy codes and building performance standards, and will replace the existing CMA and PCP site-built programs.

Overview of the Commercial Certification Program

The program provides two certification paths to meet varying project needs:

- Product Directory Path (Commercial Trendline Approach – CTA)
- Custom Project Path

For full program details, visit our website and the program standard, NFRC 715. For additional information, contact commercialCP@nfrc.org.

4. BUY CLEAN PROGRAMS, EMBODIED CARBON, PCRS AND EPDS

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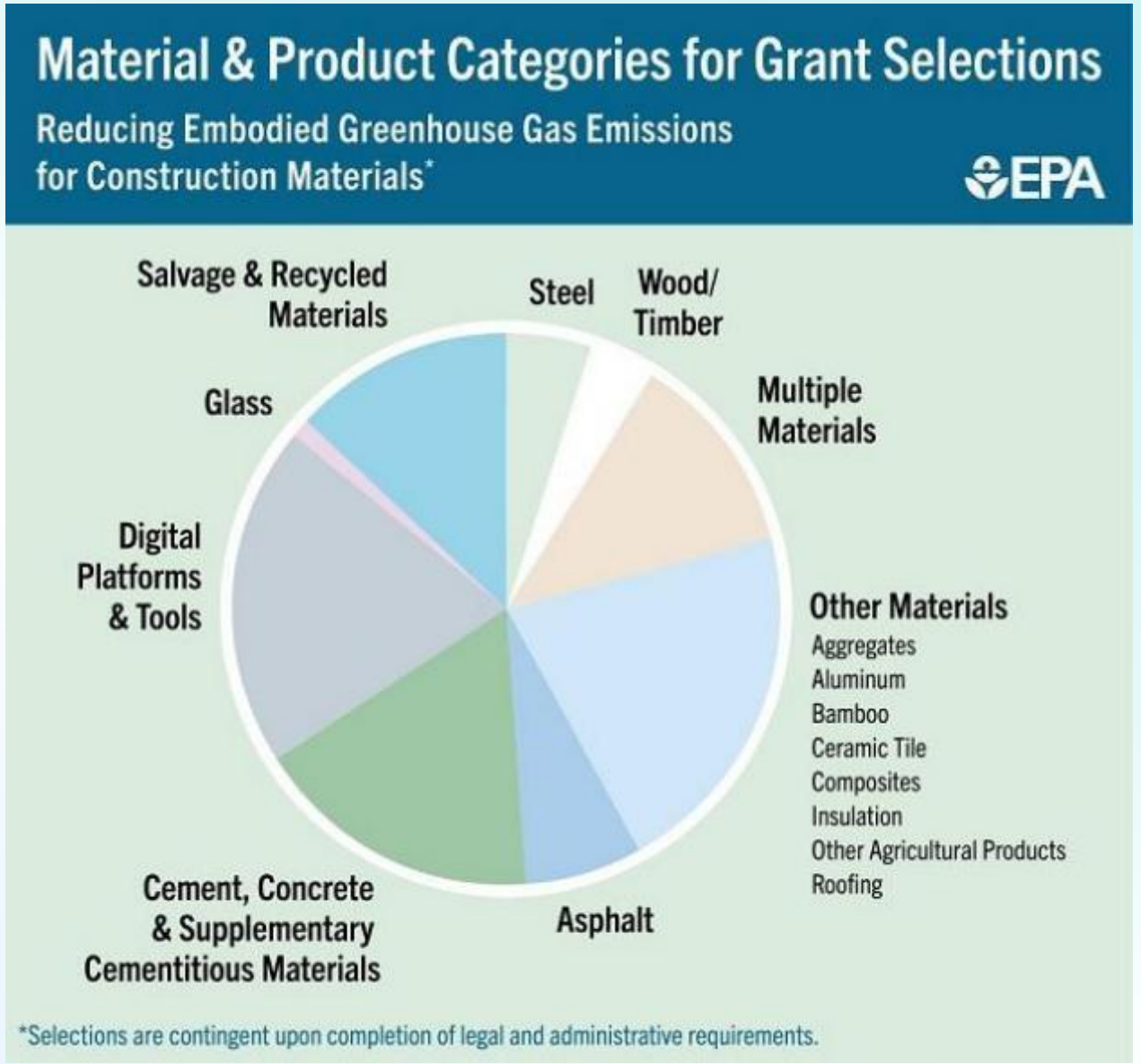
EPA GRANTS =160M

NGA - $2.1 million over 5 years

38 grantees selected
14 material types

NGA is the ONLY glass representative



ARCHITECTURAL GLASS EPD DEVELOPMENT GRANT

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Four subprojects:

1. Primary Flat Glass LCI Data Aggregation

- Provide support to improve granularity of primary flat glass LCI data, as well as PCR update.

2. EPD Generator Tool for Processed Glass

- Develop robust generator tool capable of producing both LCA data reports and full 3rd-party reviewed EPDs for processed glass products in conformance with ISO standards.

3. EPD Development Assistance for Glass Fabricators

- Provide technical, educational, and financial assistance to glass fabricator members for EPD development.

4. End-of-life LCA data collection on architectural glass recycling

- To improve the understanding about glass end-of-life and quality of LCA part D data, quantify glass recovery rates and track end-use outcomes for recycled glass on 1-3 deconstruction projects.

EPA GRANT STATUS - SEPT 2025

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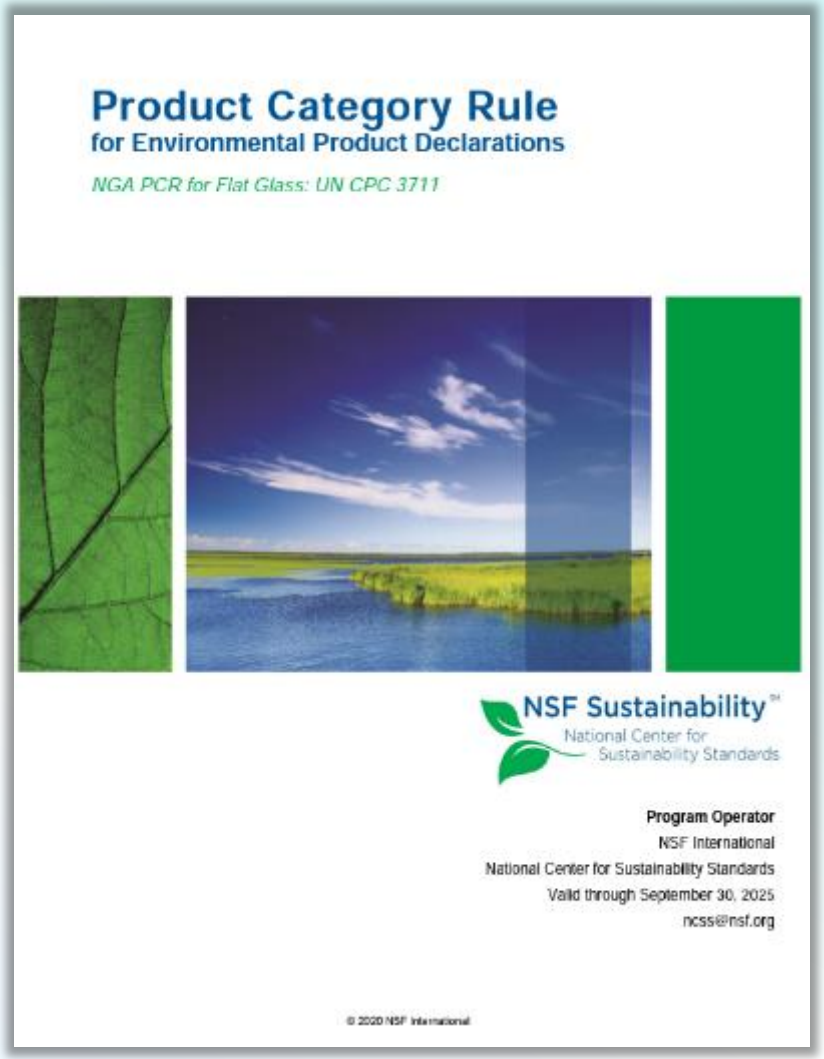
- Jan 20th – Pres. Trump issued an executive order to “pause the disbursement of funds appropriated through the Inflation Reduction Act of 2022 or the Infrastructure Investment and Jobs Act” and orders a review of programs and policies for issuing grants against newly stated Trump administration policies.
- Spring 2025 – NGA 2.1M was on a DOGE list but didn’t officially hear anything
- July 2025 - The One Big Beautiful Bill Act officially canceled any unobligated funds for the low embodied carbon construction materials programs in EPA and GSA – including our $2.1M EPA EPD assistance grant.

FLAT GLASS PCR

- NGA PCR for Flat Glass was published by NSF describing requirements for LCAs and EPD of flat glass
- Valid through Sept. 30, 2025
- Current status - EXPIRED



https://www.glass.org/sites/default/files/2021-10/pcr_flat_glass_2020.pdf

FLAT GLASS EPD: INDUSTRY AVERAGE

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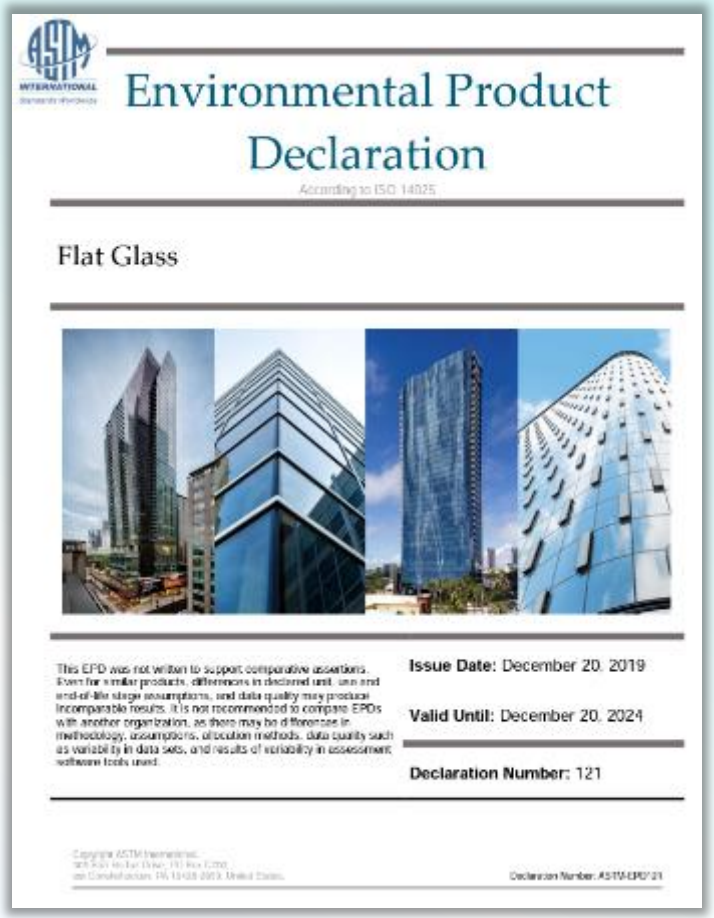
- NGA flat glass member companies (members of Forming Committee) published an industry average EPD for flat glass produced in the US in December 2019.
  - Average GWP is 1,430 kg CO2 eq
- Valid through Dec. 20, 2024
- Current status - EXPIRED


Environmental Product Declaration

According to ISO 14025

Flat Glass

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.

Issue Date: December 20, 2019

Valid Until: December 20, 2024

Declaration Number: 121

https://www.glass.org/sites/default/files/2019-12/NGA_EPD_2019_12_16_signed.pdf

PROCESSED GLASS PCR

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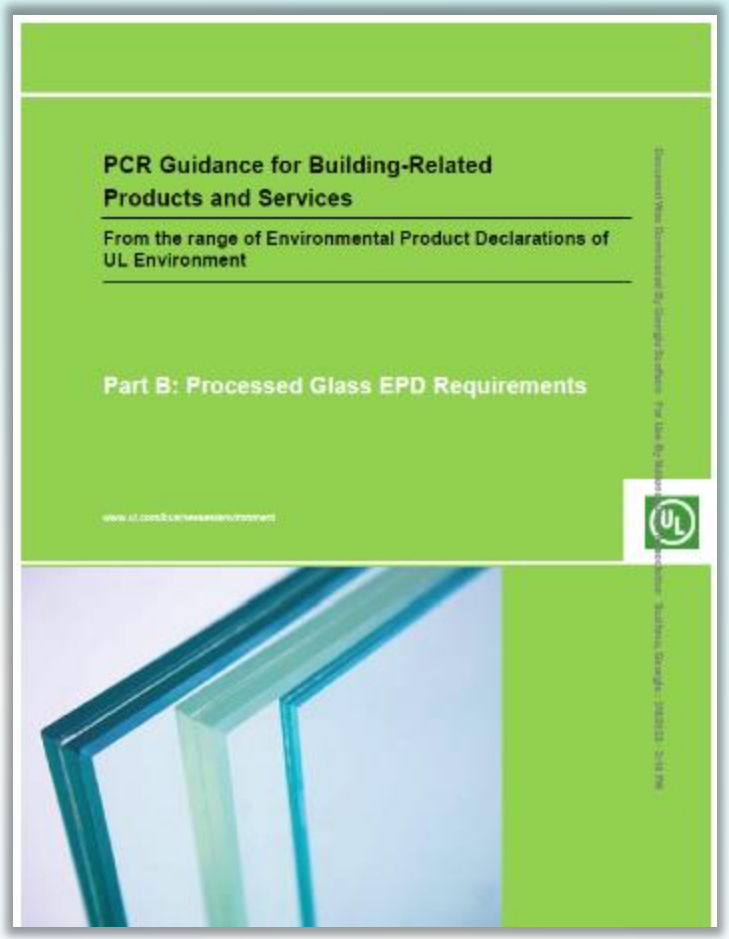
- PCR Guidance for Building-Related Products and Services Part B: Processed Glass EPD Requirements (Established Aug. 2016)
  - Original expiration date Dec. 6, 2023 extended to June 2024
  - Current status - EXPIRED



https://www.shopulstandards.com/ProductDetail.aspx?UniqueKey=35842

FENESTRATION ASSEMBLIES PCR

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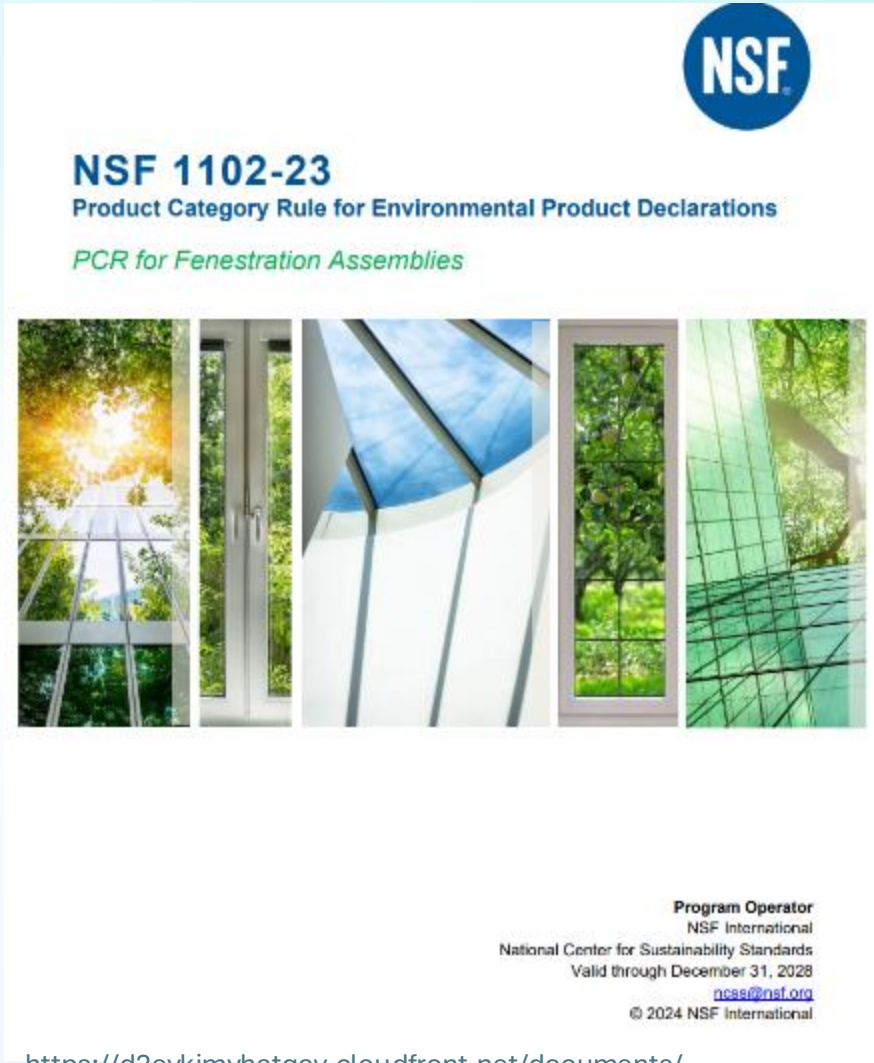
- PCR for Fenestration Assemblies (previously Windows PCR 2015)
  - Published December 2023
  - Expires December 2028



https://d2evkimvhatqav.cloudfront.net/documents/PCR-Product-Category-Rules/fenestration-assemblies-nsf-1102-23.pdf?v=1707165191

CONTINUED DEMAND FOR EPDS

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- Architects / GCs continuing to add to specifications or make a last-minute request.
- "Buy Clean" policies remain at state and local level. Mostly concrete, steel, flat glass, and asphalt for now. Whole building life cycle assessment will require product carbon footprint info on all materials, including glass and aluminum.
  - **Buy Clean California and CALGreen** for state-funded projects, large offices, schools – will need PCF data.
  - **IgCC / ASHRAE 189.1** – will need product-specific EPDs
  - **Boston new "Net Zero Carbon Zoning policy"** for new buildings > 20,000 ft^2 and additions, renovations > 50,000 ft^2. Will need product specific EPDs.
  - **Buy Clean Colorado** for state-funded projects, tax credits for private projects. Will need PCF data.
  - **New York State** looking at new requirements
  - **LEED v5** now finalized …

LEED V5

- LEED v5 has now been finalized.
  - LEED v4.1 sunsets Mar 31, 2026 although projects registered prior to then have 6 years to complete certification.
- Two main items related to embodied carbon:
  - “Quantify and Assess Embodied Carbon” reporting prerequisite requires EPDs.
  - “Reduce Embodied Carbon” credit awards different point levels.
    - Level 1 points are for providing company and product-specific EPDs.
    - Higher Level 2 points are awarded for products showing a 20% reduction in embodied carbon compared to a baseline.
    - Baseline can be prior industry-wide EPD, Carbon Leadership Forum published number (which matches industry-wide EPD), or a previous EPD for the same product.

CONTINUED DEMAND FOR EPDS

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NGA – TrueNorth Collective

5. GLASS RECYCLING AND END-OF-LIFE STUDY

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GLASS RECYCLING

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Recycling

- Recycling rates are trending positive
- Majority of recycled glass is post-industrial
- Highest recycling rates occur with clean glass cullet
- Demand for recycled cullet is increasing

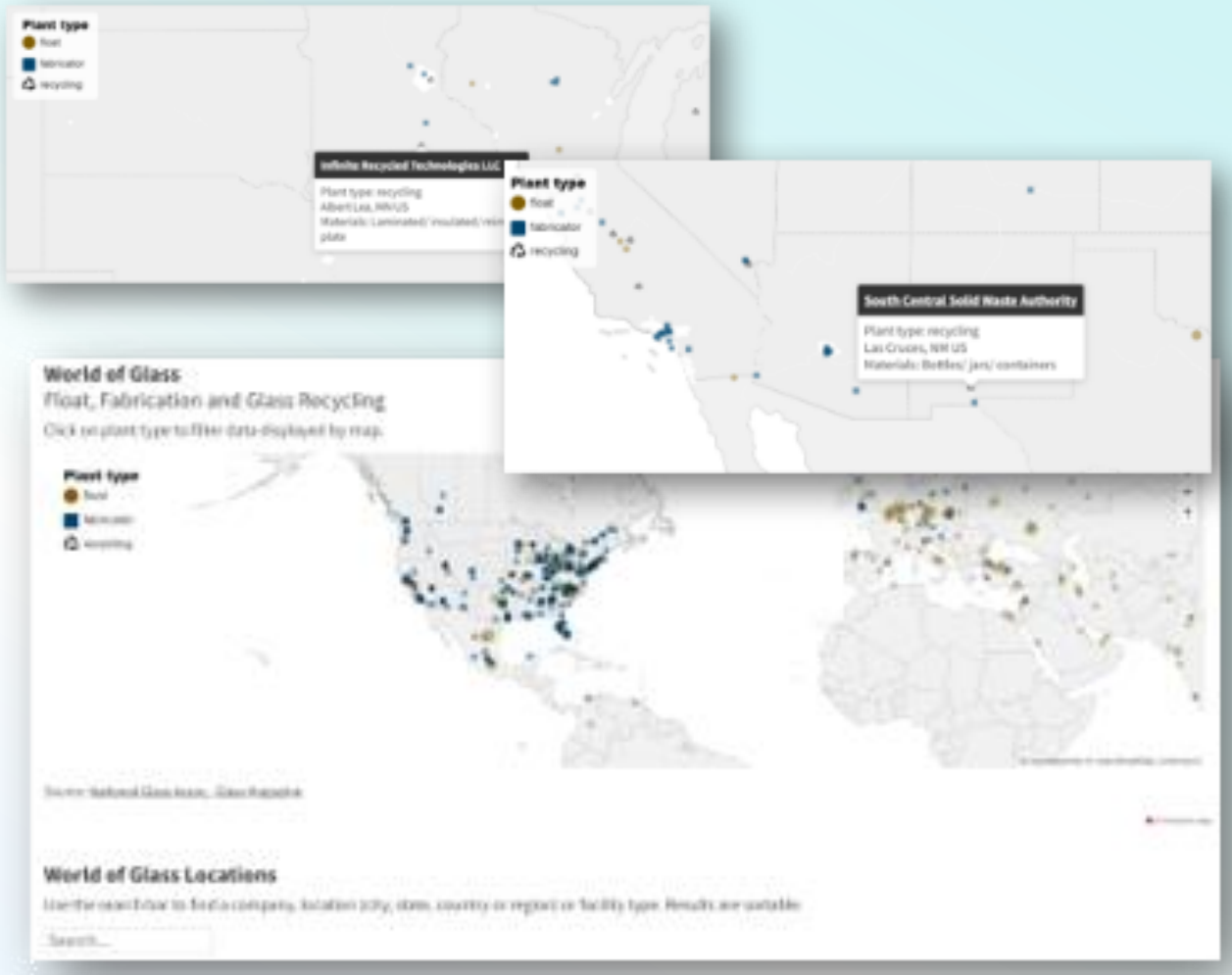
Why Recycle?

- Recycling back into architectural glass production must be done carefully with high quality standards, but offers benefits:
- Manufacturing new glass requires 15-16% more raw material, whereas manufacturing using cullet is 1:1
- Cullet melts at lower temperature --Every 10% of cullet used in place of raw material saves 3% energy and 5% CO2 emissions
- Melting cullet results in longer furnace life – cullet is less corrosive and higher temps are unnecessary

GLASS RECYCLING

- World of Glass Map
  - Updated data for North American glass fabrication & float plants
  - New category: Recycling Plants
    - North American recyclers
    - Info on types of materials to be accepted
    - Proximity to float/fabrication plants

→ Worldofglassmap.com



END OF LIFE / CIRCULARITY STUDY

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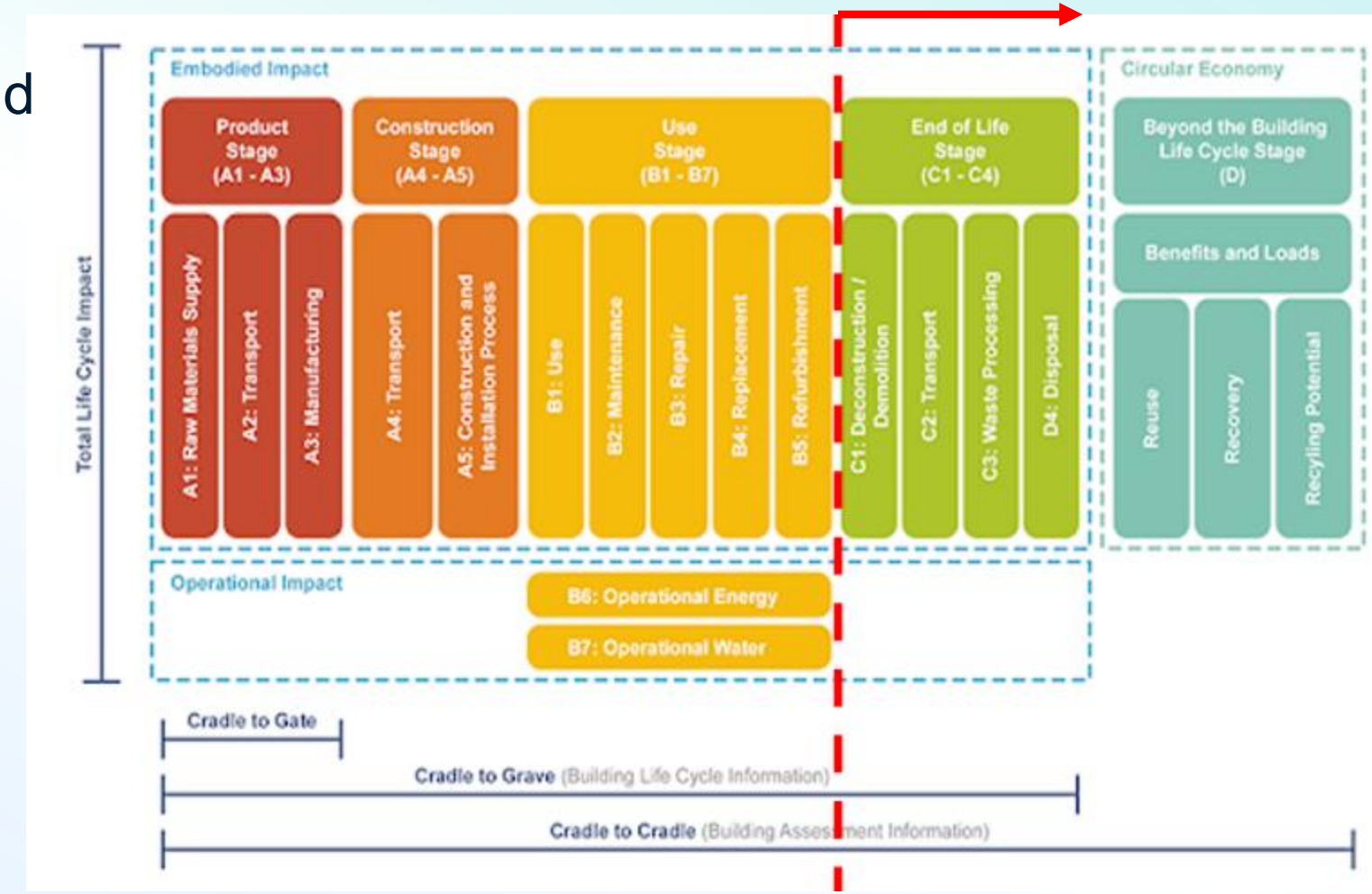
- Together with Aluminum Extruders Council, track both aluminum and glass and recovery in real façade or building deconstruction project(s).
- Quantify recovery percentage, LCA part D data, end uses, and improve the understanding about material circularity.
- Similar to prior studies done in Europe for aluminum, but for the U.S. for both aluminum and glass.



END OF LIFE / CIRCULARITY STUDY

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- Starting with 1 deconstruction project at a premier Midwest institution starting this month.
- Recovery and recycling by Infinite Recycled Technologies (thank you!)
- Contracted with Digne (Sophie Pennetier) as third-party LCA expert

END OF LIFE / CIRCULARITY STUDY

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- It's underway!
- Sophie will provide report in the spring.

- Thank you:

INFINITE™
RECYCLED TECHNOLOGIES

Digne

6. PROTECTIVE GLAZING

SCHOOL SECURITY, BIRD FRIENDLY GLAZING

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SCHOOL SECURITY

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NGA NATIONAL GLASS ASSOCIATION with GANA | ADVOCACY

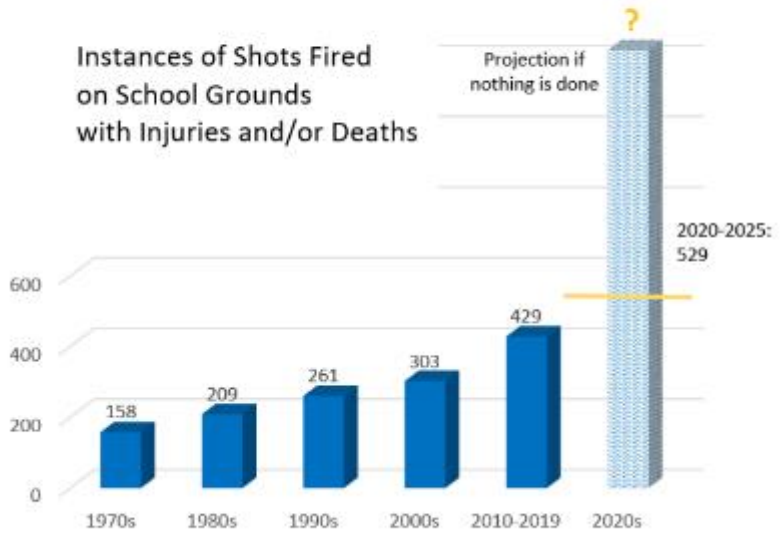
School Security: Windows and Doors Respond First

The request:

Support **Federal legislation** and funding appropriation for school safety and security. The glass industry is prepared to make schools safer with security windows and doors.

The issue:

Active shooter events are becoming more frequent.



The strategy:

Make schools safer with security, ballistic, and attack resistant windows and doors.
In active shooter events, windows and doors can be the first line of defense. Security glazing resistant to forced entry can be used to slow down an attacker, allowing more time for schools to enact emergency plans and for first responders to arrive.

High risk areas of school buildings include entrance areas, exterior window and door access points, and classroom window and door access points.

Third-party tested glazing systems are available.
ASTM F3561 *Standard Test Method for Forced-Entry-Resistance of Systems after Simulated Active Shooter Attack* serves as the industry-accepted standard for minimum criteria for security windows and doors for schools.

TIME IS CRITICAL

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- The average length of active shooter events is 8 minutes
- The shortest is 90 seconds.
- Response times for first responders average 3 minutes. Some active shooter events are over even before first responders arrive.

No building codes for school security

THIRD-PARTY TESTED GLAZING SYSTEMS ARE AVAILABLE

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ASTM F3561 *Standard Test Method for Forced-Entry-Resistance of Systems after Simulated Active Shooter Attack* serves as the industry-accepted standard for minimum criteria for security windows and doors for schools.

Glass can be part of the school's security plan as the "first element of surprise."

SAFLEX VANCEVA | from Eastman

ASTM F3561 TESTING

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NGA will continue with both legislation and building code regulations

WINDOW AND DOOR SOLUTIONS

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- Security glazing resistant to forced entry can be used to **slow down an attacker**, allowing more time for schools to enact emergency plans and for first responders to arrive.
- Allow school personnel and first responders to **see impending danger**.
- Provide privacy and allow diffuse light in
- Selectively **block attacker's line-of-sight** when translucent or reflective glass is utilized
- Can be designed for forced entry resistance and/or bullet-resistance.
- Are available at various protection levels as **retrofit options**.
- Create a secure environment for teachers and students without imposing visible barriers.
- Provide passive protection, even during power outages.

BIRD-FRIENDLY REQUIREMENTS

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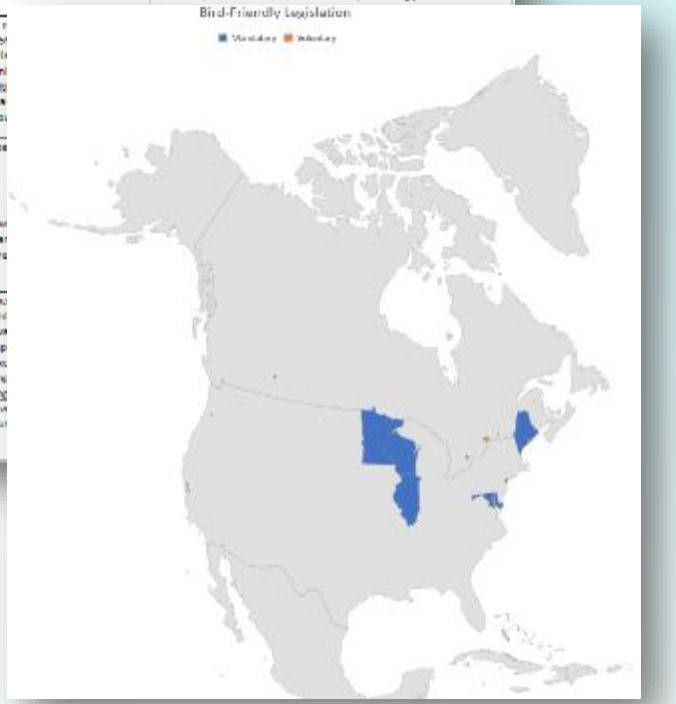
- Bird-Friendly Glazing requirements continue to expand in local city ordinances, for state-owned buildings, etc.
- NGA maintains a member resource for bird-friendly policy tracking.
- State, date, voluntary/mandatory status, summary of policy, etc.
- Well intentioned, but a little chaotic with lots of variations.

US & CAN Bird-Friendly Building Policies

Jurisdiction	City	Year	Name	Mandatory or Voluntary	What structures does the policy apply to	What portion of each structure must be "bird-friendly"?
California, USA	Emeryville, CA	2020	Emeryville Municipal Code, Ch 8.28 Bird-Safe Buildings	Mandatory	Projects that require a building permit and that are new construction involving new glass or other rigid transparent materials; replacements of any window, glass door or other rigid transparent materials; or glass structures (e.g., greenhouses, wind barriers	>90% of glazing must be bird friendly on any window or contiguous glazed segment (area within mullions and/or frames) with an area of >12 sq. ft
California, USA	Cupertino, CA	2021	Chapter 10.208 Glass and Lighting Standards	Mandatory	New construction and renovations involving glass or transparent features. Exempts certain properties in residential zones, first-floor storefronts, and historic buildings	Must use 100% "treated glass" on surface areas on first 60 ft. above grade and 20% on surface areas above 60 ft. Skyways, balconies, freestanding walls, and building corners must use bird-safe treatments
District of Columbia, USA	Washington DC	2017	2017 District of Columbia Green Construction Code	Voluntary	Projects ≥ 10,000 sq. ft. that are either new construction or classified as specific levels of alteration by the city's building code.	Projects that fall under the DC Green Construction Code must achieve a specified number of "site project electives." To receive an elective credit for bird collision deterrence, buildings must be built to LEED Credit SSpc55 Bird Collision Deterrence, including post-construction
District of Columbia, USA	Washington DC	2023	D.C. Law 24-297, Mandatory Local Wildlife Protection Act of 2022	Mandatory	New construction, [illegible] replacement of [illegible] bird-hazard [illegible] buildings, multi-[illegible] institutional facili[illegible]	New construction [illegible] projects; existing [illegible]
Illinois, USA	Forest Preserve District of Cook County, IL	2008	Forest Preserve District Code § 32.5, "Bird Safe Building Materials"	Mandatory	New construction [illegible] projects; existing [illegible]	
Illinois, USA	Highland Park, IL	2020	Highland Park Code of Ordinances, Sec. 150.326 Bird-Friendly Construction Requirements	Mandatory	New buildings to be [illegible]	
Illinois, USA	State of Illinois	2021	Public Act 102-0119 (HB0247)	Mandatory	State buildings new[illegible] for which more than [illegible] substantially alter[illegible]	
Illinois, USA	Evanston, IL	2022	Bird-Friendly Building Design Guide	Mandatory	Planned disclosure[illegible] multifamily and [illegible] projects and renova[illegible] that include the rep[illegible] color for glazing. Ex[illegible] two-family dwelling[illegible] residential building[illegible]	
Illinois, USA	Lake County, IL	2024	Bird-Friendly Building Design Policy for Lake County Facilities	Mandatory	All Lake County gov[illegible] which the Lake Cou[illegible]	



BIRD FRIENDLY GLAZING IN THE GREEN BUILDING CODE

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- To help promote more uniformity, we have been working to introduce bird-friendly glazing requirements in ASHRAE 189.1 and the International Green Construction Code.
- Based on NGA Design Guide.
- Specify where required
  - 90% of vertical fenestration, glass spandrel, skylights below 100 ft
  - Glazed corners, skywalks, glass railings, vegetated roofs, etc.
- Prescriptive criteria for glazing
  - Includes opaque, translucent (e.g. etched), and ultraviolet reflective markers.
  - Essentially 2x2 rule but written to provide flexibility for dots, lines, random patterns, new products.
- Testing threat factors *not* included, but can be approved by AHJ

BIRD FRIENDLY GLAZING IN THE GREEN BUILDING CODE

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SUCCESS !

- We received unanimous support from the committee and after two public reviews, it is now being processed for publication.
- Will be published shortly as a separate addendum, and then incorporated into ASHRAE 189.1-2026 and the 2027 International Green Construction Code.

BIRD FRIENDLY GLAZING AT ASTM

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NGA's design guide to become an ASTM standard practice

ASTM E06.51 task group

Complete this quiz to:

- Earn 1.0 AIA LU|HSW
- Receive a certificate of attendance

glass.org/webinars

NGA Upcoming Webinars

Apprenticeship

How to Pursue Your Own Program

December 11 at 1:00 pm ET