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TECHNICAL NOTE

How Structural Interlayers Work in 2026: Ionoplast (SGP-type), Clear EVA, and PDLC Smart Laminates

By Peter Lin

CNCGLASS · Glass as a load-sharing skin

Architectural glazing in 2026 is asked to do more than fill an opening. Curtain walls, cantilevered canopies, glass floors, and frameless railings must carry wind, live load, and residual capacity after fracture. In those builds the decisive layer is often only a millimetre-scale film between glass plies: the structural interlayer.

A binder that merely catches fragments after impact is not the same product as an interlayer that locks two plies into composite action. Structural performance starts with high shear coupling. When the film is stiff enough in shear, the laminate behaves closer to a single thick plate; when it is soft, the plies slip relative to each other and deflection grows.



Figure 1 — Cleanroom layup of structural interlayer film on architectural glass before vacuum lamination.

CNCGLASS · What makes an interlayer structural

In everyday safety laminates the interlayer's first job is adhesion and fragment retention. In structural laminates the film must also develop a high shear modulus so that tensile and compressive stresses share efficiently between the glass plies. The practical test is simple: under service load, do the plies work as one member, or as two loosely glued sheets?

Material chemistry decides the answer under storm, blast, or crowd loading. Soft thermoplastic behaviour stretches and sags; stiff ionomer or well-crosslinked thermoset networks keep the stack upright and aligned.

CNCGLASS · Three working steps shared by high-performance films

1. Stress transfer

External pressure or point load arrives at one glass face. A stiff interlayer transfers shear so tension and compression distribute through the stack. That coupling raises effective section stiffness and reduces deflection for a given glass thickness.

2. Energy absorption

Under impact, molecular chains stretch and dissipate kinetic energy. The film slows crack travel and lowers the chance of full penetration, even when the glass itself cracks.

3. Post-break redundancy

After both plies fracture, a structural interlayer still carries residual membrane and bending stiffness. Fragments stay bonded, the panel stays in the frame, and—in the best ionoplast builds—the broken laminate can continue to support significant load until replacement.

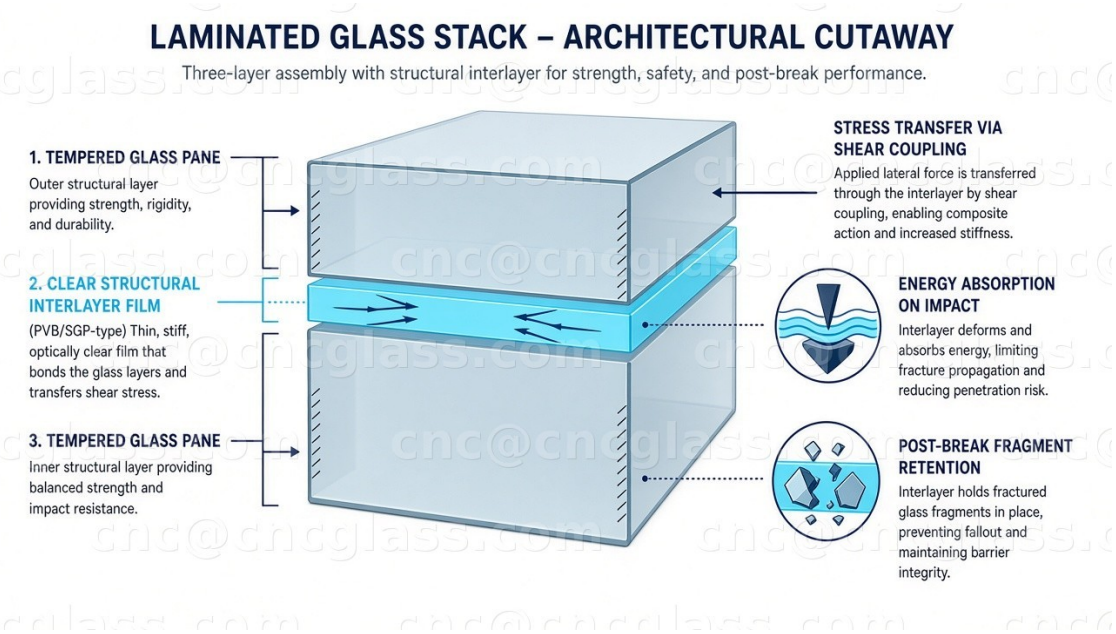


Figure 2 — Laminated glass stack cutaway: tempered glass, clear structural interlayer, tempered glass — stress transfer, energy absorption, and post-break retention.

CNCGLASS · Clear EVA: thermoset bonding for interiors and smart stacks

CNCGLASS clear EVA interlayer is a thermosetting ethylene–vinyl acetate film for vacuum laminators. Unlike thermoplastic PVB, which softens reversibly with heat, crosslinkable EVA forms a three-dimensional network during the cure hold. Before gel, the melt flows into micro-roughness on the glass; after gel, the network resists creep and edge moisture far better than a plasticized thermoplastic sheet.

- Stable bonding: excellent wet-out before cure creates physical keying plus polar contact at glass silanols.
- Hydrophobic cured film: edge exposure in showers, canopies, and open partitions is more forgiving than moisture-hungry PVB.
- Process fit: vacuum furnaces in roughly the 80–130 °C class (grade-dependent) protect decorative inserts and electronic layers that dislike autoclave pressure and high shrinkage.
- Typical uses: interior partitions, frameless shower enclosures, decorative inserts, and EVA encapsulation of PDLC smart film.

CNCGLASS · Ionoplast (SGP-type): rigid coupling for façades, railings, and floors

When codes and engineers demand true structural laminated glass, SGP-type ionoplast interlayers are the usual reference class. Relative to ordinary PVB, published ionoplast shear modulus is on the order of one hundred times higher, with tear strength roughly five times greater. Mechanically the film acts as a rigid coupler: relative slip between plies is minimal, so two glass sheets behave like one thickened member.

Post-break behaviour is the signature advantage. Even with both panes shattered, a high-modulus ionoplast can keep the panel standing as a stiff membrane in the frame—often still able to carry an adult's weight for egress and fall protection. That residual panel stiffness is why façades in high wind zones, frameless balustrades, glass floors, and cantilevered canopies specify ionoplast rather than thickened soft interlayers.

CNCGLASS · PDLC film: privacy on demand, protected by EVA

Polymer-dispersed liquid crystal (PDLC) film adds switchable privacy to laminated glass. With power off, liquid-crystal droplets scatter light and the panel looks frosted. With power on, the field aligns the droplets and the panel clears.

PDLC itself is electrically delicate and contributes almost no structural bond. It must be encapsulated between glass with clear EVA—not forced through a harsh autoclave PVB cycle. Autoclave heat, pressure, and PVB shrinkage risk damaging bus bars and conductive layers. EVA's gentler vacuum process (commonly discussed in the 80–110 °C encapsulation band for many smart builds) flows around the film without crushing the electronics.

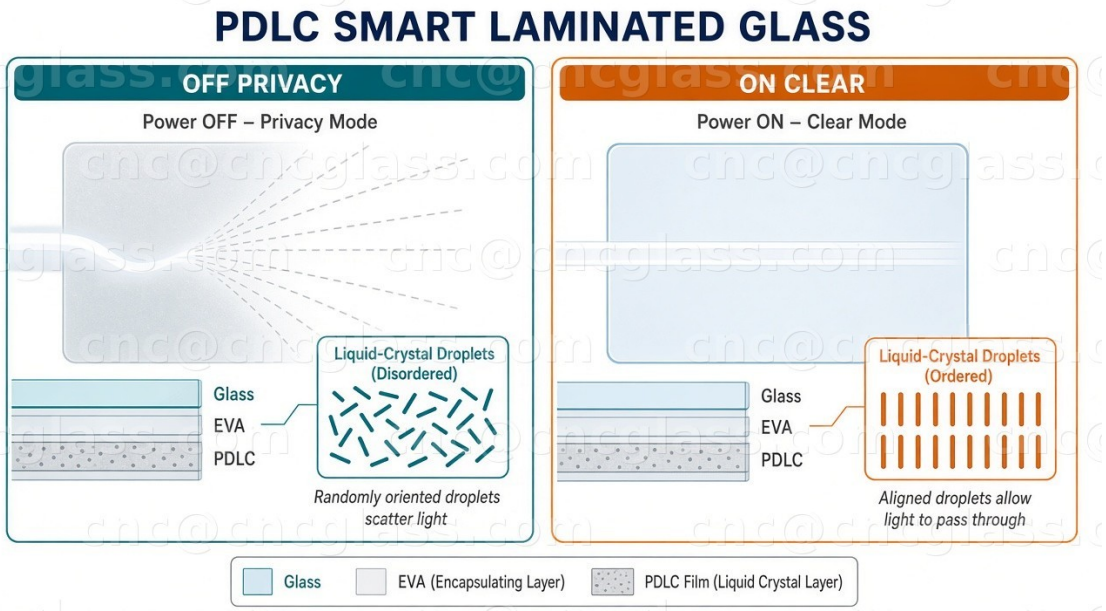


Figure 3 — PDLC smart laminate concept: privacy (power off) versus clear (power on), encapsulated with EVA between glass panes.

CNCGLASS · PVB: toughness and acoustics, with heat and humidity limits

Standard PVB remains valuable where toughness, impact absorption, and sound damping dominate and edges are well sealed. Hydrogen bonding to glass hydroxyls gives reliable adhesion in controlled autoclave lines. As temperature climbs above roughly 30 °C, however, PVB shear stiffness falls sharply. In humid climates, moisture uptake drives edge haze and delamination—especially on frameless railings or large exposed façades. Soft PVB is therefore a poor substitute for ionoplast when structural coupling is required.

CNCGLASS · Working-mechanism comparison

Feature	Ionoplast (SGP-type)	Clear EVA (thermoset)	PVB (thermoplastic)
Primary mechanism	High stiffness & structural coupling	Crosslinking & chemical bonding	Flexibility & impact / sound absorption
Shear modulus class	Very high (~100× typical PVB)	Medium	Low; heat-sensitive
Tear strength class	~5× typical PVB	Moderate; grade-dependent	Baseline reference
Post-break behaviour	Stands as a residual structural panel	Holds fragments; semi-rigid	Slumps / folds; non-structural
Moisture at exposed edges	Excellent for many open-edge designs	Excellent (hydrophobic cured film)	Poor without careful edge sealing
PDLC compatibility	Usually too harsh / wrong process path	Preferred encapsulant (vacuum)	Shrinkage & autoclave risk to circuits

CNCGLASS · Application picks driven by mechanism

- Structural façades and curtain walls under sustained wind and self-weight → ionoplast (SGP-type) for high-modulus coupling and low deflection.
- Frameless railings, glass floors, and canopies needing post-break walk-on or fall-protection capacity → ionoplast.
- Interior partitions, showers, and decorative laminates needing clarity plus moisture tolerance → clear EVA.
- Smart privacy bathrooms, meeting rooms, and façades with switchable glass → clear EVA + PDLC encapsulation.

CNCGLASS · Engineering selection: load, environment, process

1. Start with the load

Continuous live load, extreme wind, or code-required residual capacity after breakage points to ionoplast. Do not expect thicker soft PVB to replace high shear modulus.

2. Read the environment

Humid bathrooms, outdoor open edges, or hot façades without sealed edges favour EVA or ionoplast over standard PVB to limit moisture-driven edge failure.

3. Match the process

Meshes, fabrics, metals, and PDLC layers prefer vacuum EVA cycles with controlled temperature and low mechanical abuse. Structural ionoplast builds follow their own autoclave or hybrid process windows—confirm with CNCGLASS application engineering before freezing glass thickness.

Scenario	Recommended interlayer	Engineering reason
Hurricane-zone façade	Ionoplast (SGP-type)	High stiffness limits pull-out and keeps residual panel capacity
Smart privacy bathroom	Clear EVA + PDLC	EVA protects PDLC from moisture and harsh pressure cycles
Cantilevered glass canopy	Ionoplast (SGP-type)	Maintains shape and load path after glass fracture
Interior decorative wall	Clear EVA	High clarity and insert-friendly vacuum processing

CNCGLASS · Closing note

There is no universal interlayer—only the film whose working principle matches the job. Ionoplast (SGP-type) exists for rigidity and post-break redundancy. Clear EVA exists for stable thermoset bonding, moisture tolerance, and gentle encapsulation. PDLC exists for dynamic privacy and must ride inside EVA. Choosing by mechanism—not by price alone—protects façades, interiors, and smart glass for the full service life the architect promised.

CNCGLASS supplies clear EVA interlayer film, supports ionoplast process discussions for structural builds, and helps plants tune vacuum cycles for EVA+PDLC stacks. Share your load case, edge condition, and laminator type for a matched recommendation.

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Ask CNCGLASS for ionoplast, clear EVA, and EVA+PDLC process windows matched to your façade, railing, floor, or smart-glass stack.