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TECHNICAL NOTE

Interlayer Films for Laminated Products: Chemistry Families, Field Benefits, and How Specifiers Choose

By Peter Lin

CNCGLASS · Why the thin film decides the laminate

Glass alone is brittle. Put a correctly chosen polymer sheet between two plies, bond it under controlled heat and pressure or vacuum, and the stack becomes something different: a laminated product that can hold fragments, damp sound, block ultraviolet light, and—when the chemistry is stiff enough—share load after a crack appears.

That polymer sheet is the interlayer film. Architects meet it in façades and balustrades. Automakers meet it in windshields. Module makers meet related encapsulant films in photovoltaic stacks. Display and specialty fabricators meet protective bonding layers in electronics. The industries look different; the selection logic is shared: match chemistry and thickness to exposure, process equipment, and the failure mode you refuse to accept.

This CNCGLASS technical note maps the main interlayer families used with glass—PVB, EVA, and ionoplast (SGP-type)—then walks through applications, performance payoffs, and a practical selection checklist. It is written for glaziers, façade engineers, and plant managers who need plant-level criteria rather than brochure slogans.

CNCGLASS · What an interlayer actually does

In a laminated glass build the interlayer is not decoration. It creates a continuous adhesive bond so that impact energy is spread across the plies and broken pieces stay attached instead of falling as sharp shards. Optical grades keep haze low and transmittance high. Weatherable grades resist UV-driven yellowing and moisture attack at exposed edges. Acoustic grades contribute damping that reduces airborne noise through the opening.

Flexibility during layup lets the film conform to glass flatness variation and to inserts such as mesh, fabric, or switchable PDLC film. After the process window is complete—nip plus autoclave for many PVB and ionoplast builds, or vacuum furnace / silicone-bag cure for many CNCGLASS EVA builds—the film must remain stable through years of sun, rain, freeze–thaw, and cleaning chemicals.

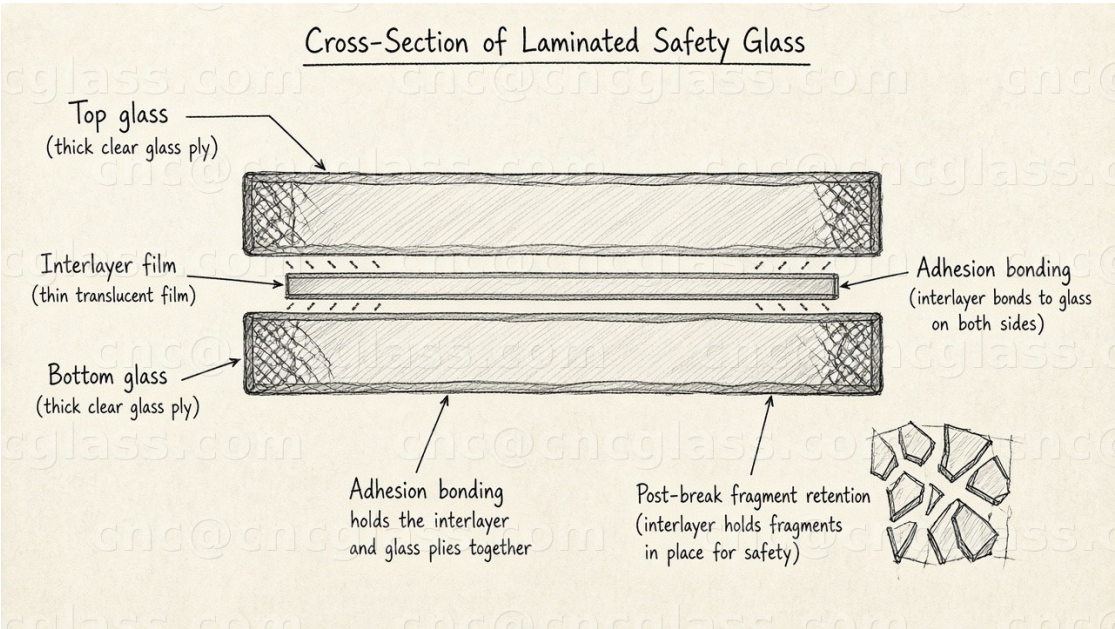


Figure 1 — Laminated safety glass cross-section: glass plies bonded by a clear interlayer that retains fragments after impact.

CNCGLASS · Three chemistry families used with glass

Most architectural and automotive laminated glass decisions start with one of three polymer families. Specialty films (TPU, cast resins, and others) exist, but PVB, EVA, and ionoplast cover the majority of commercial volume CNCGLASS customers ask about.

PVB — polyvinyl butyral

PVB remains the volume workhorse for automotive windshields and for many indoor or well-sealed architectural laminates. It offers strong adhesion, proven impact retention, acoustic contribution, and high optical clarity when plasticizer and moisture are controlled. Typical processing is nip de-airing followed by autoclave. PVB is more hygroscopic than EVA; unprotected edges in wet climates can show whitening if sealing and storage are weak. Specifiers still choose PVB when autoclave capacity is available and the opening is detailed for edge protection.

EVA — ethylene-vinyl acetate

Crosslinkable EVA for glass lamination is formulated as a thermoset system: during the heat hold, chains form a network that does not remelt like a simple thermoplastic glue. CNCGLASS EVA is widely used on vacuum furnaces and silicone-bag lines without autoclave capital. Strengths include moisture resistance at exposed edges, compatibility with decorative inserts and PDLC smart film, outdoor weathering when gel and UV packages are correct, and strong cost efficiency for many architectural and specialty builds. Related EVA chemistry also dominates solar module encapsulants, where the film protects cells against moisture and UV while maintaining optical coupling.

Ionoplast (SGP-type) — high-stiffness structural films

Ionoplast interlayers (often called SGP-type in the trade) deliver much higher post-break stiffness and shear coupling than standard PVB. They are preferred when the glass must act as a structural plate: glass floors, stairs, point-supported façades, long-span canopies, and hurricane or blast-oriented laminates where residual capacity after fracture is specified. Optical clarity is excellent. Processing is typically autoclave-based with tight flatness and cycle control. Material cost is higher; the premium is justified when engineering calculations need composite action that softer films cannot provide.

Decision factor	PVB	CNCGLASS EVA	Ionoplast (SGP-type)
Typical equipment	Nip + autoclave	Vacuum furnace / silicone bag	Autoclave; high flatness demand
Moisture at exposed edges	More sensitive; needs sealing discipline	Generally strong hydrophobicity when grade is correct	Good moisture behavior in many structural builds
Post-break stiffness	Lower than ionoplast	Medium — many safety & decorative builds	Very high — structural glass choice
Decorative / PDLC inserts	Possible; less natural for deep fabrics	High compatibility with planned flow & soft vacuum	Limited decorative freedom vs EVA for many inserts
Cost profile	Autoclave capital raises total cost	Strong cost efficiency on vacuum lines	Highest film cost; paid by structural need

CNCGLASS · Where interlayer films earn their keep

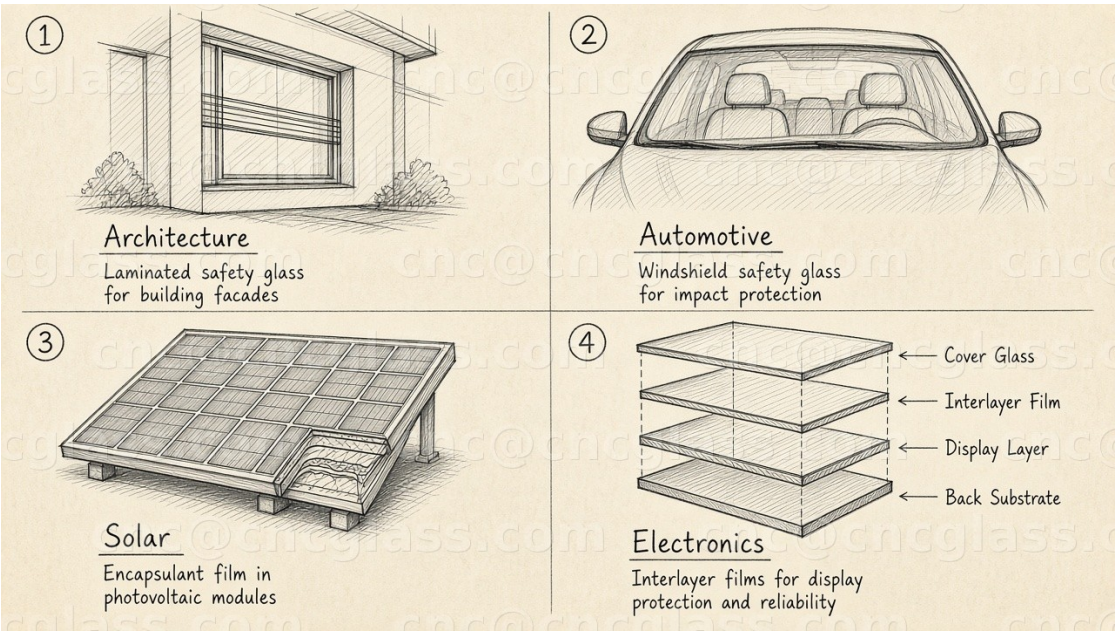


Figure 2 — Where interlayer films work hardest: architecture, automotive glazing, solar encapsulants, and protected electronics displays.

Architecture and interior glazing

Curtain walls, skylights, partitions, shower doors, balustrades, and canopies all use laminated glass for safety retention and, increasingly, for acoustic and solar-control targets. Colored, frosted, and insert-based EVA laminates expand design freedom without abandoning impact retention. Where engineers call for residual capacity after glass fracture—glass bridges, floors, oversized point-fixed panels—ionoplast enters the specification. Outdoor edges favor weatherable CNCGLASS EVA or carefully sealed PVB / ionoplast details.

Automotive and transport

Windshields are the classic PVB application: the film keeps the glass together in a crash, supports head-impact criteria, and contributes to acoustic comfort and UV protection of the cabin. Side and roof laminates follow similar logic with different thickness and acoustic packages. Specialty transport glass (rail, marine, specialty vehicles) often mixes PVB and EVA depending on process line and moisture exposure.

Solar energy encapsulants

Photovoltaic modules rely on encapsulant films—commonly EVA-family chemistries—to couple cells optically, isolate them from moisture, and absorb differential expansion between glass and backsheet. Module makers care about gel content, yellowing under UV, adhesion to glass and backsheet, and bubble-free lamination. Lessons from solar encapsulant QC (crosslink level, peel, damp-heat) overlap with outdoor architectural EVA screening even though the stacks differ.

Electronics and specialty displays

Touch panels, cover-glass assemblies, and protected displays use thin bonding or protective films to improve scratch resistance, optical stacking, and environmental durability. Requirements lean toward optical clarity, controlled thickness, and compatibility with coatings and adhesives already in the stack. Volume is smaller than architectural glass, but the same selection habits apply: prove adhesion and optics on coupons that match production cleaning and heat history.

CNCGLASS · Benefits that show up on site and in the cabin

Safety retention and impact behavior

The first job of any glass interlayer is to keep fragments attached after breakage. That reduces injury risk and, in façades, reduces the chance of glass falling into occupied space. Ionoplast extends the idea into residual structural

capacity; PVB and EVA deliver proven retention for the majority of safety laminates when thickness and adhesion are correct.

Durability against UV, moisture, and temperature

Interlayers that yellow, fog, or delaminate erase project value. Outdoor grades need UV packages and—especially for EVA—adequate crosslinking. Moisture resistance at open edges is a frequent reason plants choose CNCGLASS EVA for showers, coastal railings, and humid climates. Temperature cycling and boil or humidity screens remain practical factory QC tools before volume production.

Acoustic damping and UV protection

Laminated openings reduce sound transmission compared with monolithic glass of similar thickness; acoustic-oriented interlayers amplify that effect for hotels, offices, and vehicles. Many clear architectural films also block a high share of UV in the 280–380 nm band, protecting interiors and slowing fading of finishes behind the glass.

Design and process flexibility

Colored films, printed inserts, textiles, and switchable PDLC cores turn laminated glass into a design medium. EVA vacuum lines make many of those builds accessible without autoclave. Structural ionoplast builds keep engineering options open when spans and point supports demand stiffness.

CNCGLASS · Selection checklist used by CNCGLASS customers

Start from the opening or product, not from the film brand pitch. Work through these questions before locking a purchase order:

- Exposure: Indoor sealed opening, outdoor façade, coastal humidity, or shower/wet-room edge? Moisture and UV severity drive EVA outdoor grades versus sealed PVB versus ionoplast structural details.
- Structural demand: Is the glass only a safety laminate, or must it carry load after fracture? If calculations need high shear coupling, evaluate ionoplast early.
- Equipment: Autoclave available and preferred, or vacuum furnace / bag line? Chemistry must fit the capital you actually run.
- Inserts and smart glass: Fabric, mesh, wire, or PDLC needs flow, soft-stage vacuum, and compatible peak temperature—typically an EVA conversation.
- Optics: Target visible transmittance, haze, and color (clear, tint, frosted). Day-one clarity must survive your furnace cycle and aging screens.
- Compatibility: Confirm adhesion to your glass (annealed, tempered, coated) and to any insert or coating in the stack. Run peel and boil coupons from your wash line.
- Standards and market: Match thickness and build to the safety, hurricane, ballistic, or acoustic codes that govern the project—do not assume one film family covers every label.

CNCGLASS (CNC Ucolin Interlayer Technology Co., Ltd.) supplies EVA interlayer film and supports customers comparing PVB and ionoplast options so process, exposure, and structural demand stay aligned.

CNCGLASS · Industry habits that separate clean laminates from claims

- Store film cool, dry, and sealed; respect shelf life and moisture control especially for PVB.
- Clean and dry glass before layup; contamination is a leading cause of bubbles and poor peel.
- De-air while the film is soft; gel or autoclave hold only after air paths are cleared.
- Cool under control before opening chambers or breaking vacuum—shock cool pulls edge defects.
- Qualify with peel, boil/humidity, UV aging, and haze/transmittance after your real cycle—not only on virgin film.

CNCGLASS · Closing view

Interlayer films turn brittle glass into safety, acoustic, weatherable, and—when required—structural laminates. PVB, CNCGLASS EVA, and ionoplast each win in different combinations of moisture, equipment, decoration, and

post-break stiffness. Specifiers who decide from exposure, process, and failure mode—and who prove the stack with factory coupons—avoid the expensive pattern of clean day-one optics followed by edge claims months later.

For grade recommendations, vacuum-laminator process windows, and sample support across architectural and specialty builds, contact CNCGLASS.

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