

CNCGLASS

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TECHNICAL NOTE

What Is Laminated Glass?

《什么是夹层玻璃》

By Peter Lin

CNCGLASS · 1. Definition and Construction

Laminated glass is a composite glazing assembly in which two or more glass panes — and, where specified, plastic glazing sheet materials — are permanently joined by one or more adhesive interlayers. In architectural practice, the interlayer is most often ethylene-vinyl acetate copolymer (EVA) or polyvinyl butyral (PVB). The stack is bonded under controlled heat and pressure (and, depending on process route, vacuum), so the finished “sandwich” behaves optically and mechanically as a single unit that still looks like ordinary glass.

In standards language, ISO 12543-1 describes laminated glass as an assembly of glass (and/or plastic glazing sheet material) joined by interlayer(s). Laminated safety glass is further classified by soft-body impact performance: when breakage occurs, the interlayer is intended to retain fragments, limit opening size, offer residual resistance, and reduce cutting or piercing injury risk (see also ISO 12543-2 / -3 for safety and performance requirements).

EN: Definition aligned to ISO 12543-series wording; project acceptance still follows local codes and the purchase specification.

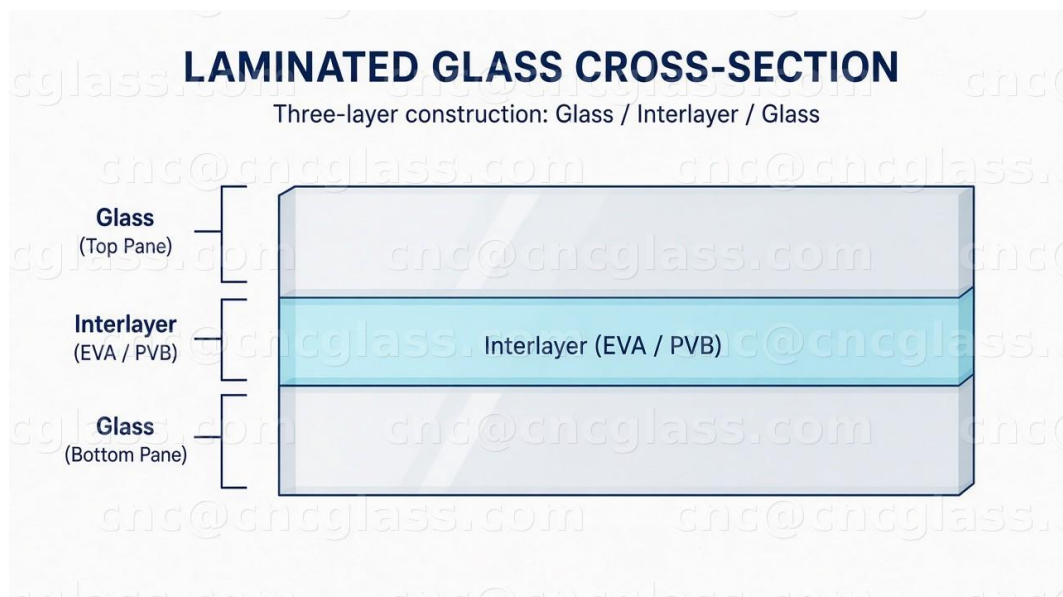


Figure 1 — Laminated glass construction (cross-section): Glass + interlayer (EVA / PVB) + Glass, bonded as a single unit under heat and pressure.

CNCGLASS · 2. Interlayer Options (EVA and PVB)

Both EVA and PVB can form the tough protective interlayer that bonds glass panes. Choice depends on process equipment, edge/durability environment, insert materials, optical targets, and the performance class required by the project.

- **PVB** — widely specified for architectural safety laminated glass produced on autoclave lines; familiar to many façade specifications.
- **EVA** — commonly laminated in vacuum-oven routes; often preferred when workshops need strong adhesion to mixed inserts (PET, fabric, metal mesh, papers, etc.) or when a lower-capital process line is used. Outdoor-grade clear EVA is selected for architectural safety clarity; indoor / decorative grades support graphic and privacy builds.

Interlayer selection is application-specific. Not every interlayer chemistry is suitable for every threat class (for example, blast-resistant design typically follows specialist interlayer and framing guidance). Match film grade, thickness, glass type, and edge detailing to the required standard test evidence.

EVA and PVB are common interlayers; blast and other special threats require dedicated specification — do not treat all interlayers as equivalent.

CNCGLASS · 3. Glass Substrate Types

Annealed, heat-strengthened, tempered (toughened), and bent (curved) glass can all be used to produce laminated glass, provided the lamination process and interlayer grade are compatible with the selected substrate.

Substrate choice affects breakage pattern, residual strength after break, thermal stress behavior, and how the laminate should be handled in fabrication and installation. Curved tempered laminates need process control against interlayer overflow and optical distortion; annealed stacks may be preferred where post-break opening behavior or later cutting/drilling constraints differ.

CNCGLASS · 4. Safety Behavior on Impact

Laminated glass may crack upon impact, but glass fragments are held by the protective interlayer rather than falling free and potentially causing injury.

That fragment-retention behavior is the core safety value of laminated safety glass when the product is correctly classified and installed. Performance still depends on interlayer type and thickness, glass build-up, framing/retention, and the impact or load scenario used for design. Residual integrity after breakage is a design property to be proven against the relevant soft-body / hard-body / wind / human-impact standards — not an automatic claim for every laminate.

LAMINATED GLASS AFTER IMPACT

Cracked but intact – fragments retained by the interlayer

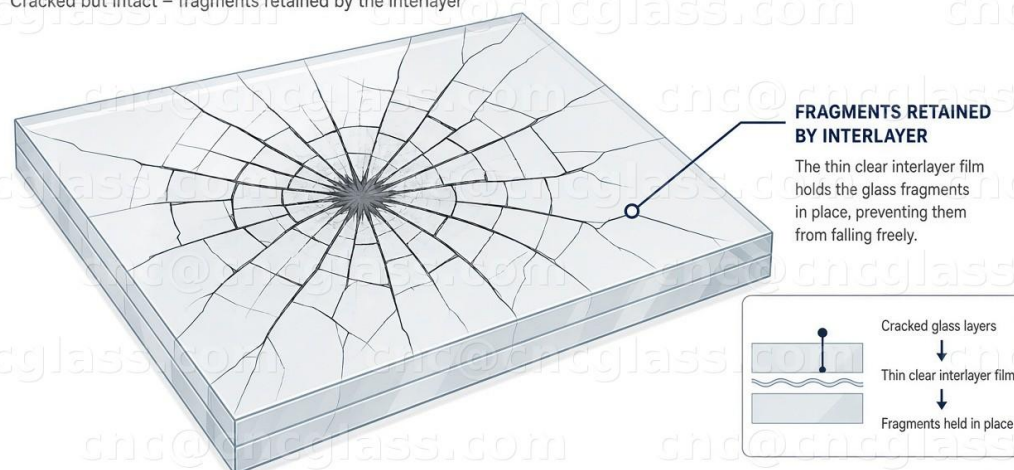


Figure 2 — Safety behavior: the laminate may crack on impact, but fragments remain retained by the interlayer rather than falling free.

CNCGLASS · 5. Architectural and Multi-Function Benefits

When correctly specified, laminated glass combines durability and multi-function performance with the visual appearance of glass. It is widely used to address architectural design needs such as overhead glazing safety, railing and balustrade residual retention, acoustic improvement via interlayer damping, UV filtering by selected interlayers, and decorative privacy or graphic effects.

Laminated constructions can also contribute to weather- and impact-related risk reduction in façades and openings — for example, keeping the opening more intact under wind-borne debris or seismic façade loads — but such benefits are not automatic. Hurricane, earthquake, and hail performance must be demonstrated through the applicable regional standards, tested glass types, interlayer builds, and framing systems. Do not treat laminated glass as the only glazing product that can deliver durability or multi-function benefits; compare options against the project performance matrix.

Both clear and tinted laminated glass are available, using clear or colored interlayers and/or tinted glass plies to meet daylight, privacy, and design intent.

CNCGLASS · 6. Multi-Purpose Inserts and Decorative Laminates

Multi-purpose laminated glass is a composite functional laminate made by encapsulating PET, polycarbonate (PC) sheet, paper, silk, cloth, wire mesh, and similar materials with EVA film between two or more glass sheets, then heating, pressing, and evacuating to combine the stack.

Decorative laminated glass similarly bonds two or more glass sheets with decorative interlayer builds. Additional materials — such as wood veneers, fabrics, and metals — can be added for a wide range of design possibilities. EVA's melt flow and adhesion profile is often chosen for these insert builds because it wets mixed surfaces well in vacuum-oven processing; insert temperature limits and graphic heat sensitivity must still be respected (low-temperature / staged cycles where required).

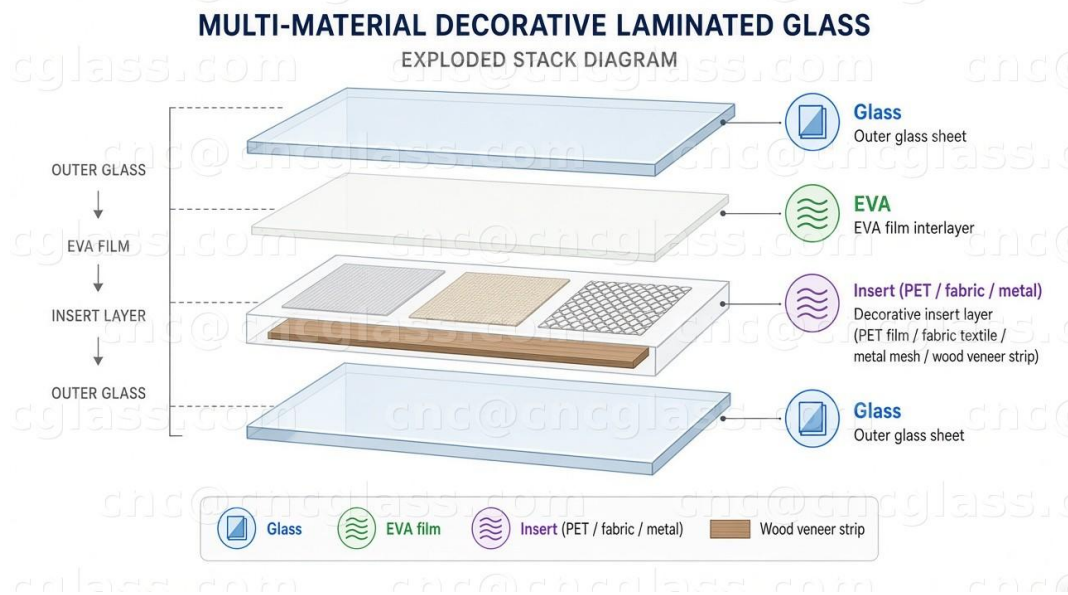


Figure 3 — Multi-material / decorative stack: Glass → EVA → insert (PET / fabric / metal / wood cue) → Glass.

CNCGLASS · 7. Typical Applications

- Building façades and curtain-wall units where laminated safety glass is specified.
- Overhead canopies, skylights, and glass floors requiring fragment retention.
- Railings, balustrades, and stairs where residual integrity after breakage matters.
- Indoor partitions, feature walls, and decorative inserts with fabric, PET, or metal mesh.
- Privacy glazing using opaque or translucent white EVA interlayers.



Figure 4 — Application scene: architectural facade / curtain-wall glazing where laminated glass is specified for safety and residual retention.



Figure 5 — Application scene: indoor decorative laminated-glass partition / feature wall with interlayer design options.

CNCGLASS · 8. Common EVA Interlayer Families (Overview)

For workshop planning, EVA interlayers used in laminated glass are often grouped by optical and process role rather than by marketing slogans:

- Clear outdoor / indoor safety grades — high clarity architectural safety laminates.
- Graphic-insert grades — process windows suited to PET, paper, fabric, and heat-sensitive inserts.
- White opaque grades — high privacy (example source Visible level 0%).
- White translucent / sandblast-look grades — medium privacy (example source Visible level 65%).
- Arctic Snow-type translucent white — source Visible level 69.8%
- Cool Jade / Cool White-type translucent white — source Visible level 82.2%.

If you have further questions about laminated glass construction, interlayer selection, or EVA process routes, please feel free to contact us.

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