

CNCGLASS

Brand: **CNCGLASS**

Company: **CNC Ucolin Interlayer Technology Co., Ltd.**

Address: SHENZHEN, GD, CHINA

Peter Lin | cnc@cncGlass.com | WhatsApp/Mobile +86 15013829504 | WeChat wecan365 | www.cncglass.com

TECHNICAL NOTE

Why Failed EVA Film Laminated Glass

《EVA 夹层玻璃失败原因》

By Peter Lin

CNCGLASS · 1. Context — Do Not Blame the Film Alone

As an experienced glass-lamination EVA film manufacturer in China, CNCGLASS is often asked why a laminate fails when processing with EVA film. Laminators sometimes assume the film grade is the sole cause. In workshop practice, many process and environmental parameters can produce bubbles, haze, delamination, incomplete bonding, or scrap — even with sound film. This note lists the main failure-factor families to check systematically, softens absolute blame language, and points briefly to outdoor safety and decorative process discipline covered in related CNC technical notes. It is a diagnostic checklist — not a claim that film quality never matters.

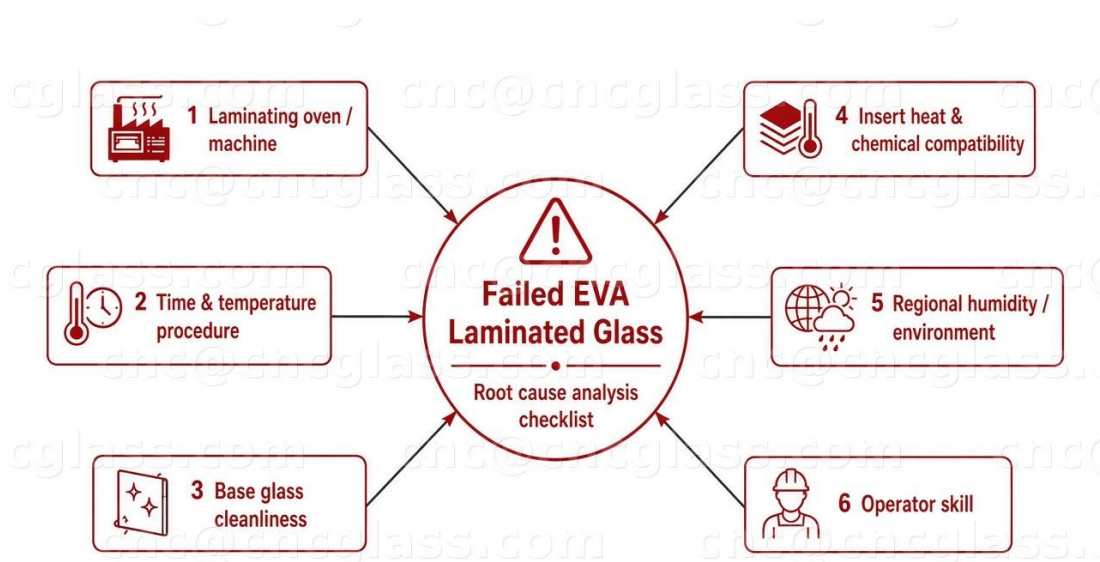


Figure 1 — Failure-cause checklist: laminating oven/machine, time-temperature procedure, base-glass cleanliness, insert heat & chemical compatibility, regional humidity/environment, and operator skill — check all possibilities.

CNCGLASS · 2. Failure-Factor Checklist (Six Families)

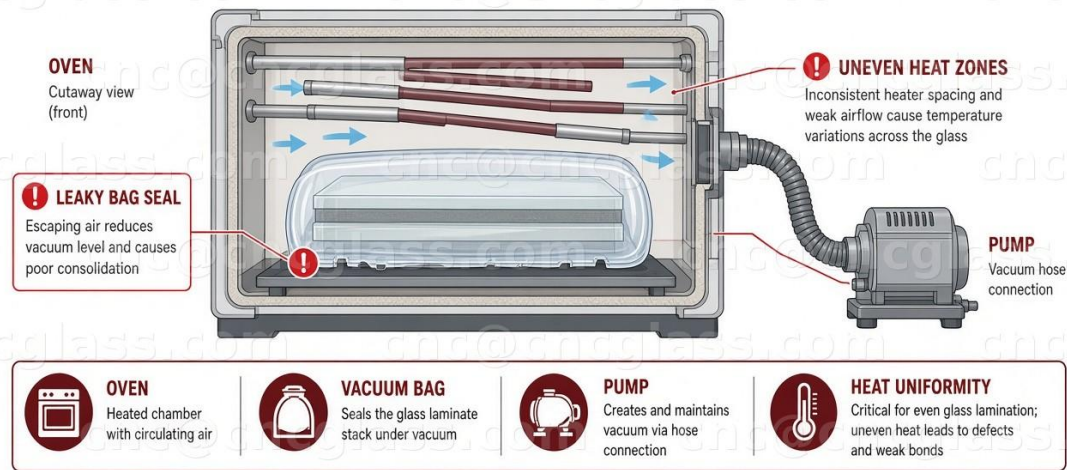
2.1 Laminating oven / machine

The laminating oven (or vacuum-bag machine) may contribute to failure. Check heating-pipe layout and power, circulating-fan uniformity across beds, silicone-bag seal and vacuum ports, pump capacity and stability, and whether temperature probes sit where they represent glass-surface conditions rather than chamber air alone.

Practical cue: uneven heat or a leaky bag often shows as localized bubbles, soft edges, or incomplete melt on one bed while another looks acceptable — validate with a known outdoor-clear recipe before blaming the roll.

VACUUM OVEN – GLASS LAMINATING PROBLEM AREAS

Poor heat uniformity and vacuum bag leaks cause inconsistent laminating results



⚠ Common results: bubbles, delamination, residual stress, breakage

Figure 2 — Oven / vacuum-bag cue: heat uniformity, bag seal integrity, circulating airflow, and vacuum-pump stability all affect EVA laminate success.

2.2 Inappropriate time / temperature procedure

An inappropriate time–temperature procedure can cause failure with EVA film: under-heating leaves incomplete melt and cure; over-heating or a sudden high spike can drive bubbles, edge outflow, or stress. Match staged heat + soak to glass thickness, clear vs colored film, and insert builds — do not mix unrelated recipes on the same shelf.

Practical cue (cross-check outdoor / process-practice notes): keep vacuum through cool-down; avoid a large ΔT when unloading — summer fan cool and winter extended vacuum cool are common workshop patterns. Confirm glass-surface hold on your probes, not chamber set-point alone.

2.3 Base-glass cleanliness

Have the bonding faces of the base glass been cleaned? Dirt, water marks, fingerprints, cutting oil, and adhesive chips can seed bubbles, haze, or weak adhesion. Outdoor clear safety laminates show these defects especially clearly in daylight.

Practical cue: clean with pure / deionized water or suitable solvent (e.g. acetone or ethanol where allowed), dry thoroughly, and inspect under a daylight lamp before layup. Treat cleaning as a quality gate.

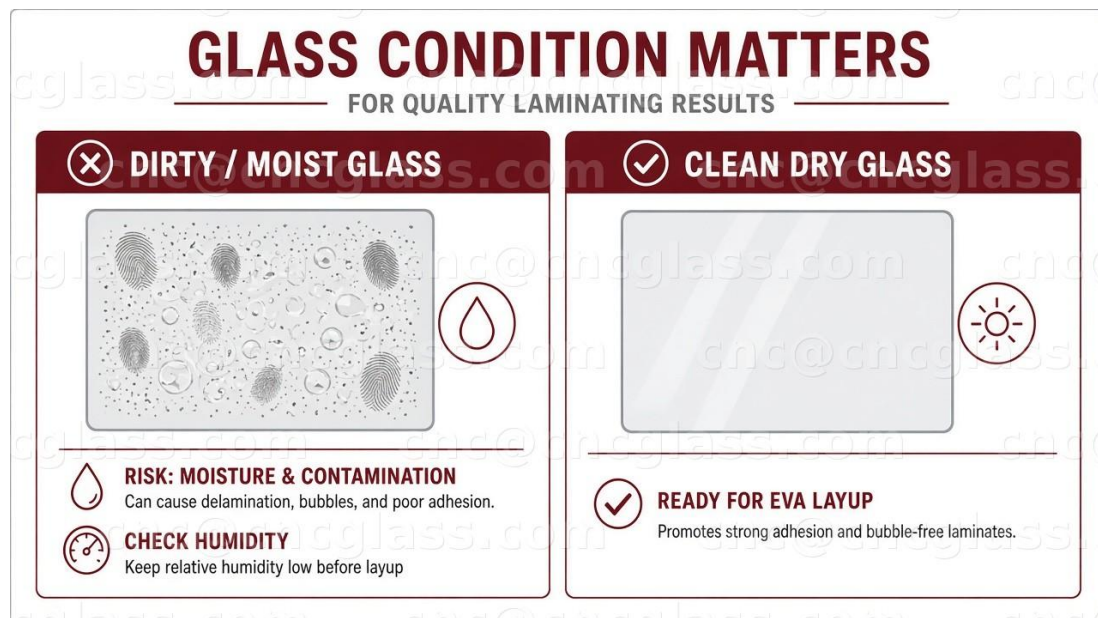


Figure 3 — Glass condition cue: dirty or moist bonding faces vs clean dry glass ready for EVA layup; humidity and contamination raise bubble / adhesion risk.

2.4 Inserts — heat resistance & chemical compatibility

When an interlayer insert is placed inside the laminate (fabric, PET graphic, paper, silk, mesh, and similar), ask: does it withstand the process temperature window, and does it harm or react with the EVA film? Coatings, inks, plasticizers, and moisture in the insert can locally degrade adhesion or generate gas.

Practical cue: dry inserts before use; flag coated or printed faces; run a coupon larger than a small sample before mass production. Not every decorative material is suitable for EVA vacuum lamination.

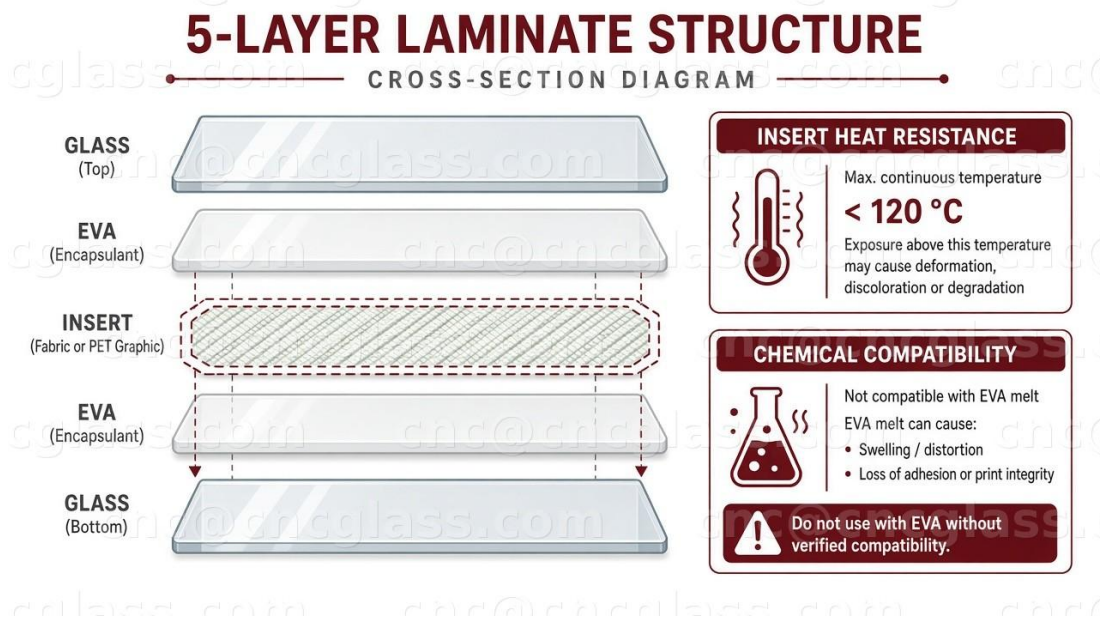


Figure 4 — Insert cue: Glass + EVA + insert + EVA + Glass; confirm heat resistance and chemical compatibility with molten EVA before mass production (schematic — validate each insert type).

Insert figure is schematic; any temperature-limit numbers shown on the graphic are not source data or a plant standard — validate heat and chemical compatibility per supplier and coupon tests.

2.5 Regional humidity / environment

Is humidity high in your region or workshop? Elevated moisture on glass, opened EVA film, or absorbent inserts can contribute to bubbles and adhesion problems during vacuum forming.

Practical cue from related CNC process-practice guidance: on rainy days, or when workshop relative humidity is over 65%, dry glass, film, and inserts carefully; keep opened film sealed between jobs. “Less moisture-sensitive than PVB” does not mean “ignore humidity.”

2.6 Operator skill

Operator skill affects layup flatness, edge trim (without hard pulling that seals vacuum paths), bag loading and spacing, leak checks, probe placement awareness, and cool-down discipline. The same film and oven can yield different scrap rates with different habits.

Practical cue: train against a written recipe card for outdoor clear and for decorative insert jobs; keep a sample-first rule before mass production — especially for colored film and new inserts.

CNCGLASS · 3. Suggested Diagnostic Order

When a laminate fails, consider all of the possibilities above and check situations in a practical order rather than jumping first to film quality:

- Reproduce on a clean coupon with known good outdoor-clear (or matched decorative) recipe — same oven bed, same glass cleaning.
- Confirm vacuum leak-check, bag seal, pump stability, and heat uniformity on that bed.
- Verify time–temperature against glass thickness / color / insert; confirm glass-surface hold and cool-down under vacuum.
- Re-inspect glass cleanliness and workshop RH / rain risk; dry materials if RH is elevated.
- Qualify inserts (heat + chemistry + dryness) on a separate coupon before blaming film.
- Review operator steps against the recipe card; only then investigate film storage, batch, or grade with the supplier.

CNCGLASS · 4. Link to Outdoor Safety & Decorative Practice

Good outdoor clear safety practice and decorative-insert practice reduce many of the failure modes above: edge polish and bag protection, clean dry bonding faces, disciplined layup and bag spacing, staged vacuum heat with glass-surface confirmation, vacuum held through cool-down with season-aware ΔT control, insert drying and compatibility tests, and sample confirmation before mass production. Detail cycles and equipment checks live in the related CNC notes on outdoor safety process, process-practice guide, and laminating-machine properties — this note stays on diagnosis.



Figure 5 — Why process discipline matters: outdoor clear safety railing / canopy and indoor decorative insert scenes depend on systematic checks, not film blame alone.

CNCGLASS · 5. Practical Takeaway

Failed EVA laminated glass is rarely explained by a single slogan. Check the oven and vacuum system, the time–temperature procedure, glass cleanliness, insert heat and chemical compatibility, regional humidity, and operator skill — then work with the film supplier on storage, batch, or grade if process factors are ruled out. Systematic diagnosis protects both production yield and a fair reading of film performance.

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