

CNCGLASS

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TECHNICAL NOTE / CASE STUDY

Case Study: Cracked Annealed EVA Film Laminated Glass with Fabric Inserted

By Peter Lin

This case study answers an industry question about annealed EVA laminated glass with a fabric insert that showed edge bubbles after processing and, about three weeks later, edge-to-edge mid-pane cracking. Plain EVA laminates without fabric did not crack. It is written for laminated-glass fabricators and process engineers working with decorative fabric inserts in EVA laminates.

CNCGLASS · Industry Question

A glass friend asked about EVA film laminated glass in the LinkedIn group EVA GLASS LAMINATING:

<http://www.linkedin.com/groups/EVA-GLASS-LAMINATING-4147748>

Topic: Cracked annealed laminated glass with fabric.

I've got some samples from various EVA suppliers (**Note: this is not CNCGLASS EVA**). We tried it on the fabric and the only problem with them after they were processed was the bubbles around the edges. After about 3 weeks, we found that most of them have cracks, which did not happen to EVA laminated glass without fabric. The crack was edge to edge and in the middle of the pane.

The samples came from various EVA suppliers and were explicitly not CNCGLASS EVA. The contrast between fabric-inserted laminates (edge bubbles, then delayed cracking) and plain EVA laminates without fabric (no cracking) is the key diagnostic fact for the analysis below.

CNCGLASS · Situations Observed

Situation 1 — When you make EVA film laminated glass without fabric, you do not have the bubbles.

Situation 2 — When you make fabric EVA laminated glass (fabric inserted), you have bubbles around the edges.

After roughly three weeks in storage or service, most fabric-inserted annealed samples developed edge-to-edge cracks through the middle of the pane, while the same EVA process without fabric remained intact. That pattern points to insert-related voids at the edges plus residual stress that annealed glass is less able to tolerate than tempered or heat-strengthened glass.

CNCGLASS · Reasons and Solutions

Here are the reasons and solutions for the glass question, answered by Peter Lin.

1. Use thicker EVA film when laminating with fabric

You should use thicker EVA film (for example, change from **0.38 mm** to **0.76 mm**) when you are laminating with fabric. You need more EVA film to fill the surface gap between the glass and the fabric.

Industry practice for decorative media is that the EVA layer thickness should exceed the thickness of the insert being encapsulated. A common guideline is at least 0.38 mm EVA on each glass-to-media interface; if the fabric or media is thicker than about 0.38 mm (but still under about 0.76 mm), use 0.76 mm EVA so the melt can fill texture and surface irregularities and reduce edge voids that appear as bubbles.

2. Prefer EVA with suitable melt flow for gap filling

You should use EVA film that is better in melt flow index. That means the melting EVA film flows more readily to fill gaps and wet the surfaces of the glass and the fabric.

High melt flow helps EVA penetrate fabric texture and microscopic voids that would otherwise remain as bubbles—especially at edges where the interlayer may thin during processing. Some EVA grades used in architectural glass lamination show melt-flow values on the order of about 25 g/10 min (typical for certain VA content ranges); treat that as a general industry reference, not a brand specification. Always follow the supplier cure window and avoid over-squeeze at the edges, which can starve the edge of interlayer and recreate bubble paths.

3. Reduce residual stress from interlayer heat-cool expansion and contraction

If the glass cracks at the edges and through the middle, residual stress in the laminate is a likely driver. Select an EVA formulated for low residual stress and controlled shrinkage when used with decorative inserts, so the film expands less aggressively with heat and contracts less aggressively with cold during and after lamination. Verify the grade against the supplier process window (heat ramp, hold, cool-under-vacuum).

Optional example: some fabricators also trial CNCGLASS EVA film grades marketed for decorative inserts where residual stress control is a selection factor—compare process windows and run your own annealed + fabric trial panels before production.

4. Check fabric thermal expansion and moisture sensitivity

Check whether the fabric you use is sensitive to expanding with heat and contracting with cold. If so, try to find one that is more dimensionally stable under heat and cold.

Coefficient of thermal expansion (CTE) mismatch among fabric, glass, and EVA can leave post-lamination stress in the pane. Moisture-sensitive fabrics can also swell or shrink after lamination as humidity cycles, adding delayed stress. Prefer dimensionally stable, low-moisture decorative fabrics; dry the fabric before lay-up; and qualify the full stack (annealed glass + EVA + fabric) with a short aging or thermal-cycle check before releasing production.

CNCGLASS · Practical Process Notes

Adequate vacuum and edge seal matter when fabric is present: cold pre-vacuum before heat rise helps remove air from fabric texture; keep vacuum through cool-down until the interlayer is firm enough that air cannot rush back into the edges. Moisture-dry the fabric and store EVA and inserts in a dry environment so absorbed moisture does not flash to vapor during heat-up. Use controlled heating and cooling—over-hot edges can squeeze EVA out and thin the edge interlayer, recreating bubble paths around inserts.

Annealed glass has lower residual surface compressive strength than tempered or heat-strengthened glass, so it is more sensitive to insert-induced residual stress. That is why the title case focuses on annealed laminates: the same fabric/EVA stack that survives in tempered glass may crack later in annealed glass when stress and environmental cycling coincide.

CNCGLASS · Closing

We hope this answers the question. If you have further process questions on EVA laminated glass with decorative fabric inserts, please contact us.

CNCGLASS · Contact

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