

CNCGLASS

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CASE STUDY / TECHNICAL NOTE

EVASAFE Film Lamination Bubbles Case Study

By Peter Lin

A fabric and film laminator reported random bubbles on a thick glass-to-glass stack using Bridgestone EVASAFE® EVA interlayer. Their multi-stage cycles worked for fabric inserts, but plain glass-to-glass still trapped air. This case study records the enquiry, two practical remedies (a low-temperature vacuum hold before melt, and optional wooden edge bars), and the customer's confirmation after adding a 65 °C / 30 min start stage.

CNCGLASS · Problem

Random bubbles appeared in a multi-layer glass-to-glass laminate. Cleaning with isopropanol (IPA), degreaser, and de-ionised water did not remove the defect. The bubbles were not lined up with toughening roller wave — they appeared in random locations.

Lay-up (customer): 10 mm glass + 2 × 0.76 mm interlayer + 10 mm glass + 2 × 0.76 mm interlayer + 10 mm glass, using Bridgestone EVASAFE® EVA film (not CNCGLASS EVAFORCE).

CNCGLASS · Customer Enquiry

A well-known glass company (name and company details anonymised) specialises in glass laminates with fabrics and films. They wrote to Peter Lin for advice on a simple glass-to-glass project with EVASAFE from Bridgestone.

They had built substantial in-house knowledge and produced impressive fabric/film work, but were struggling with very random bubbles on the glass-to-glass stack described above. They offered oven calibration graphs and pictures if needed.

After reading a published two-stage oven sketch online, they cited:

- **Low-temperature stage:** 60 °C for 15 minutes
- **High-temperature stage:** 130 °C for 40 minutes (vacuum on)

Their own settings were longer, with more stages and ramps. Those cycles worked well for fabrics and films (typically two pieces of glass). Problems appeared mainly when laminating glass to glass at the thicker multi-layer lay-up. They later shared oven times and settings for 10–20 mm, 20–30 mm, and 30–40 mm total thickness bands.

CNCGLASS · Solution Option 1 — Low-Temperature De-Air Hold

Peter noted that their programme did not include a dedicated stage near 65 °C for about 30 minutes. That hold helps vacuum air out while the EVA interlayer has not yet melted. Above room temperature the air becomes more active and is easier to evacuate.

If the temperature jumps directly to 90 °C or higher, the EVA layers can melt and seal the edges of the laminated glass too early. Early edge seal makes vacuuming more difficult — and sometimes impossible — so trapped air remains as bubbles.

Recommended start stage (this case): 65 °C for 30 minutes with vacuum on, before climbing into the melt / cure high stage.

CNCGLASS · Solution Option 2 — Wooden Bar Around the Edges

A second practical approach targets the same root cause: edges sealing too early so air cannot be fully evacuated.

Edges of a laminated stack usually feel more mechanical stress than the centre. Placing a wooden bar around the edges of the laminate (inside the vacuum bag) can loosen edge stress so the perimeter does not seal prematurely. The bar thickness can be the same as, or slightly higher than, the laminated glass pack — consistent with common CNC vacuum-bag practice of supporting bars around the silicone bag at approximately laminate height.

CNCGLASS · Result

The customer added a beginning stage of 30 minutes at 65 °C, ran glass in the oven to test, and later confirmed:

“With you suggesting the vacuum cycle at the beginning 65 °C for 30 mins we seem to be getting good results, we are still testing at the moment but it is definitely working.”

CNCGLASS · Technical Takeaway

Early edge seal versus vacuum: if EVA melts and closes the perimeter before air is fully evacuated, residual gas becomes random body or edge bubbles. A low-temperature vacuum hold (around 65 °C for ~30 min in this case) keeps the film below melt while air is still mobile. Optional edge bars reduce premature perimeter seal under bag pressure. Fabric/insert cycles that already work may still need this de-air stage for plain multi-layer glass-to-glass stacks.

Trademark note: EVASAFE® is a Bridgestone product. CNCGLASS EVAFORCE is a separate interlayer brand. This case is about helping a laminator even when they are not using EVAFORCE.

CNCGLASS · Share Knowledge — Contact Invitation

If you have questions about EVA interlayer lamination, please feel free to contact us. Even if you do not use our EVAFORCE interlayer film (details on www.cncglass.com), we are still glad to help.

Knowledge of EVA glass lamination grows as we solve problems together. Sharing that experience can help glaziers worldwide — a meaningful practice. We can all benefit from the discussion.

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