

CNCGLASS

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TECHNICAL NOTE

Delamination and Spontaneous Breakage Solutions for EVA Film Laminated Glass

By Peter Lin

This technical note covers two common failure modes when processing EVA-film laminated glass: delamination (loss of glass–interlayer adhesion) and spontaneous breakage (also called self-explosion in the industry). Part A lists seven practical causes of delamination and the corrective actions. Part B lists six practical causes of spontaneous breakage during or after cooling and the corrective actions. Heating and cooling settings follow the EVA grade manufacturer's guidance. The only numeric figures retained from the source guidance are a typical shelf life of about one year or longer (depending on the manufacturer) and the 75 °C oven-door cooling rule.

CNCGLASS · Part A — Delamination of EVA Film Laminated Glass (7 Causes)

Delamination is usually a loss of glass–interlayer adhesion. In production, the most common drivers are incomplete melt and cross-linking, film past its usable life, film quality issues, excess moisture, surface contamination (oils, organics, or sweat), and wet or heavily inked decorative papers.

1. Heating temperature too low or heating time too short

If the heating temperature is not high enough, or the heating time is not long enough, the EVA film may not melt and cross-link completely. An incomplete cross-link reaction leaves weak glass–film adhesion and can lead to delamination.

Solution: Increase the heating temperature or prolong the heating time of lamination, following the EVA film manufacturer's recommended temperature–time window for the specific grade, until melt and cure are complete.

2. EVA film past its shelf life

The EVA film may be past its shelf life. For most EVA films, shelf life is about one year or longer. Different manufacturers may specify different shelf-life periods for their grades.

Solution: Use EVA film within the shelf life stated by the film manufacturer. Do not process film that has expired or that shows clear storage damage.

3. EVA film quality

Delamination may also result from a quality problem in the EVA film itself.

Solution: Do a small sample test before mass production, so that any film or process issue is found on a limited trial lot rather than on full production volume.

4. Excess moisture on glass or EVA film

Moisture on the glass or in the EVA film before lamination may be too high. EVA film is generally less moisture-sensitive than PVB film, but if moisture is too high it still harms adhesion and can promote later delamination.

Solution: Dry the glass thoroughly before lay-up, and store EVA film properly—keep unused rolls sealed, cool, and dry, and re-seal opened packaging promptly.

5. Organic or oily residue on the glass surface

Organic substances on the glass surface—especially oily residues—interfere with EVA adhesion and can cause local or edge delamination.

Solution: Clean the glass before lamination when necessary. Suitable cleaning media include clean water, industrial alcohol, or acetone, selected as appropriate for the residue and shop safety rules.

6. Painted papers (PP / PVC) with wet or excess ink

When laminating with painted papers (such as PP or PVC), excess printing ink that has not dried can weaken interlayer bonding and lead to delamination around the decorative insert.

Solution: Dry the printing papers fully before laminating them between glass and EVA film.

7. Edge delamination from oily or sweaty hands

If delamination appears mainly at the edges of the laminated glass, workers' bare hands may have touched the glass edges. Natural oils on the skin reduce EVA adhesion. In summer, heavy sweating can leave moisture and salts at the edge that also harm bonding.

Solution: Require operators to wear clean gloves during lay-up and edge handling. In hot weather, manage sweat carefully so that moisture and skin oils do not contact the glass–film interface at the edges.

CNCGLASS · Part B — Spontaneous Breakage (Self-Explosion) of EVA Film Laminated Glass (6 Causes)

Spontaneous breakage of EVA-film laminated glass can occur during cooling after the oven cycle, or shortly after processing. Typical drivers are cooling that is too fast or uneven, contact between hot glass and cold water, glass quality defects, residual internal stress in the EVA interlayer that tries to contract after lamination, and a hard raised point inside a dirty silicone vacuum bag that concentrates vacuum pressure on the glass.

1. Cooling too fast after the oven cycle

If the laminated glass cools too quickly, thermal stress can initiate breakage. Do not open the oven door to force cooling after the temperature of the laminated glass is lower than 75 °C. Allow a controlled cool-down with the door closed once the laminate is below 75 °C.

2. Hot laminated glass contacting cold water

Avoid letting hot laminated glass touch cold water. Sudden hot-to-cold contact creates thermal shock (surface contraction while the core remains hot) and can crack or shatter the laminate.

3. Uneven cooling between stacked laminates

Place wood blocks between laminated glass sheets so that cooling is evenly distributed across the stack. Gaps for air circulation reduce local hot spots and uneven contraction that can lead to breakage.

4. Poor glass quality

Glass of poor quality is more prone to spontaneous breakage. Use better glass with sound edges and fewer defects. Edge chips, inclusions, and residual tempering or handling damage raise the risk of delayed or process-related failure.

5. EVA film internal stress not relieved

Good-quality EVA film has its internal stress eliminated (relieved) so that the film contracts less after processing. If residual internal stress remains in the film, that stress tends to contract toward its original state during or after lamination and can break the laminated glass.

Prefer EVA film whose manufacturer has properly relieved internal stress, and follow the grade's recommended lamination process.

6. Dirty silicone vacuum bag or hard debris inside the bag

If the silicone vacuum bag is not clean—for example if a hard block or debris remains inside—the pre-laminated glass may sit on that raised point. When vacuuming starts, concentrated pressure at that point can break the laminated glass. Clean the silicone vacuum bag before every lay-up cycle and keep it free of foreign objects.

CNCGLASS · Further Assistance

For any other situation related to delamination or spontaneous breakage of EVA-film laminated glass—or if you need process guidance on heating and cure, film storage and shelf life, moisture control, glass cleaning, decorative-paper drying, handling discipline, cooling practice, or vacuum-bag care—please feel free to contact us.

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