**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**

# Clearing Trapped Air in Large Irregular Multi-Opening Ionoplast Laminated Glass: Process Tuning for Structural SGP-Type Builds

By Peter Lin

## CNCGLASS · Why this geometry fights the line

Architectural laminators meet a familiar headache when a panel stops being a simple rectangle. Five-sided irregular outlines, large spans, and several cut openings turn a routine ionoplast (SGP-type) laminate into a geometry problem first and a materials problem second. Air that should leave during pre-press can stall in dead ends, linger around openings, and reappear after autoclave as stubborn bubbles.

CNCGLASS wrote this note for workshop supervisors and process engineers who already run ionoplast interlayer for structural safety glazing. The goal is practical: explain why trapped air concentrates on this panel class, which machine levers matter, and how operator habits close the loop. Facts come from a production reset on oversized irregular multi-opening laminates; the wording and section order are original CNCGLASS prose for buyer and plant use.

## CNCGLASS · What failed on the first attempt

On a large irregular five-sided build with multiple openings, the first rolling / nip pass left widespread bubbles across the pack. The crew bagged again, pulled vacuum again, and sent the panels through autoclave. The bubbles remained. Repeating the same bag-and-pull sequence without changing heat, speed, and pressure staging did not rescue the lot.

That pattern is a signal. When re-bagging alone fails, the plant is usually looking at mismatched evacuation paths, not a single leaky nozzle. CNCGLASS treats the symptom as a system check: equipment health, temperature profile, degassing speed, and the timing of edge seal under pressure.

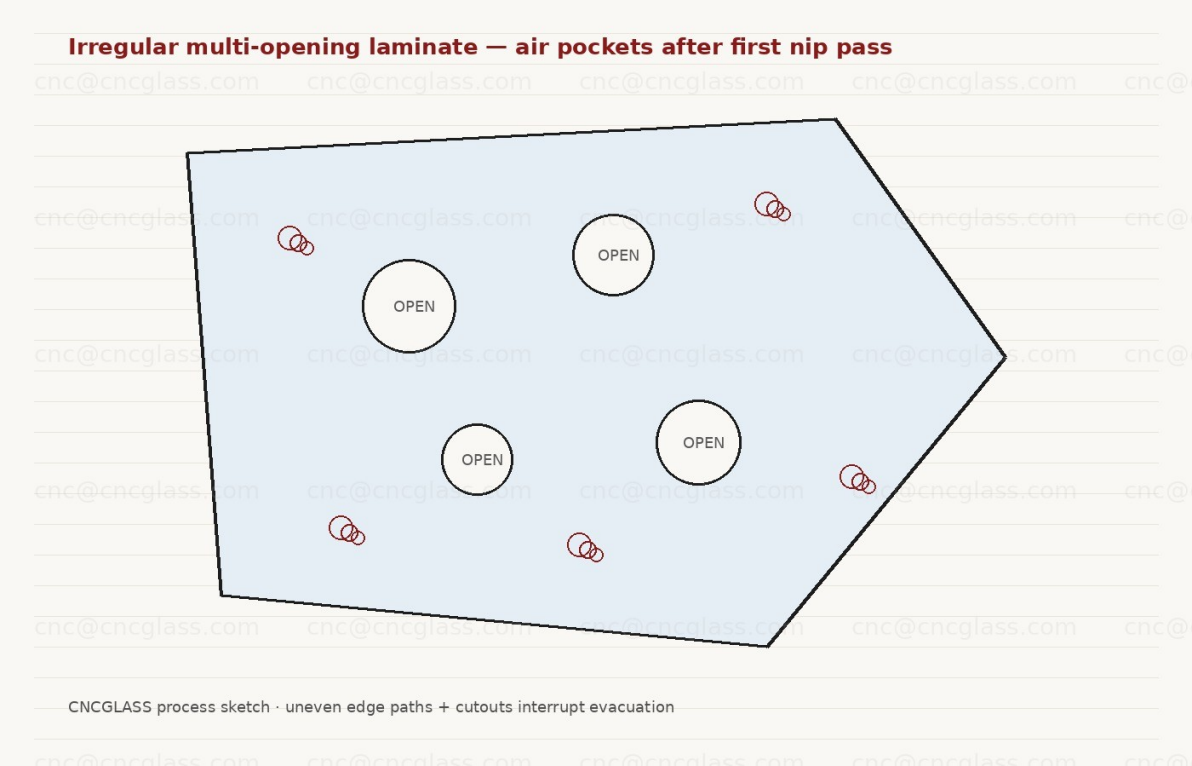



*Fig. 1 — Hand sketch: irregular multi-opening laminate with air pockets after the first nip pass.*

## CNCGLASS · Why irregular multi-opening ionoplast panels trap air

### Uneven escape routes along a pentagon edge

A rectangular edge gives air a fairly even corridor. An irregular five-sided outline shortens some sides, lengthens others, and creates corners that close early. Once a short edge seals, remaining gas has farther to travel and fewer exits.

### Openings break continuous vacuum channels

Cut openings interrupt the continuous film plane. Around each hole, air can circle, pool, or hide in thin residual pockets that a flat-panel recipe never sees. If breather paths are not planned into bagging and pre-press, those pockets survive into autoclave.

### Large area means uneven heat, uneven softening

On a large panel the center and the perimeter rarely track the same temperature curve. Ionoplast interlayer softens and grips when heat arrives; if the rim softens and seals while the mid-span is still cool, gas is locked inside. Structural SGP-type builds reward staged heat more than a single aggressive ramp.

Tech note (public method context): Ionoplast interlayers used for structural laminated glass typically show higher modulus and stronger glass adhesion than conventional PVB at service temperature. That structural grip is valuable on façades and canopies, but it also means early edge seal can trap air if degassing is incomplete.

## CNCGLASS · Three levers that moved the result

After confirming pumps, seals, and bag integrity, the reset focused on three linked settings rather than on more vacuum time alone.

### 1. Temperature profile for edge versus center

Rebuild the heat curve so the rim and the field reach workable interlayer softness on a staggered schedule. The intent is simple: keep edges from closing while the center is still stiff, then bring the whole pack into a consistent bonding window before main pressure.

### 2. Slower rolling speed in the degassing section

Reduce nip / roll speed through the degassing zone. Extra seconds on an irregular corridor give air time to migrate toward breathers and openings instead of being pinched into islands. Throughput drops slightly; scrap from trapped air drops more.

### 3. Stage-matched pre-press and main-press pressure

Hold pre-press low enough that edges stay permeable while gas leaves. Raise main-press only after the evacuation window. When pre-press mimics main-press too early, irregular sides seal first and the openings become bubble magnets.

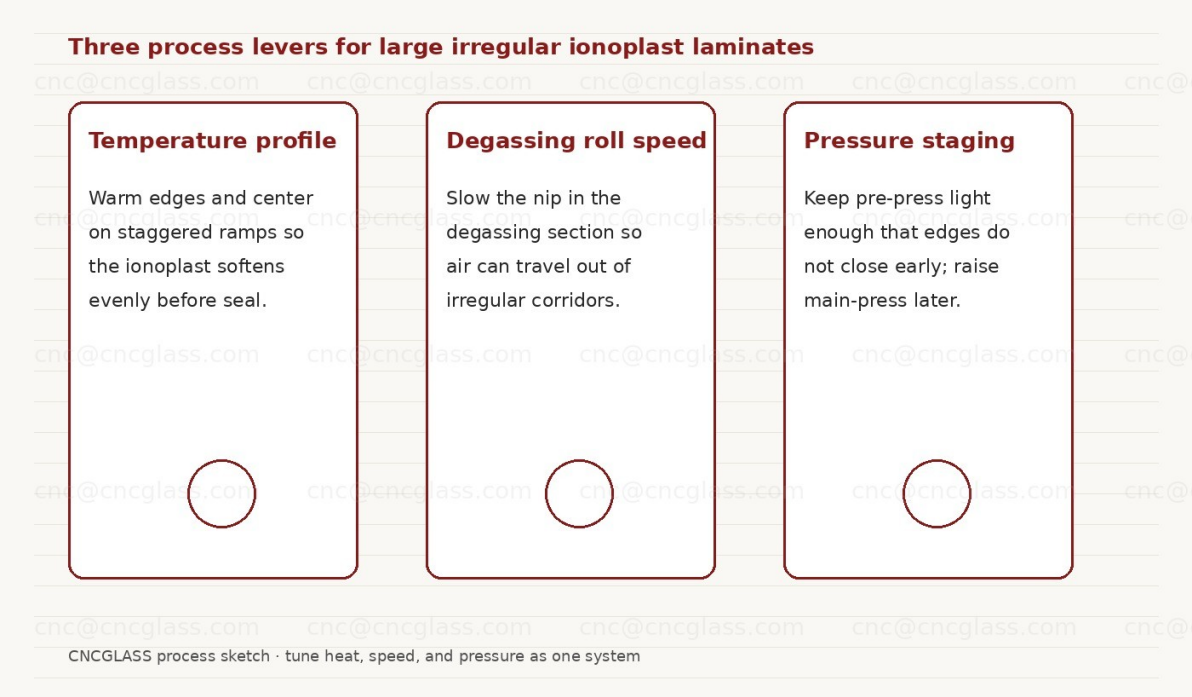



*Fig. 2 — Hand sketch: heat profile, degassing speed, and pressure staging as one system.*

## CNCGLASS · Train the crew for shaped and perforated glass

Machine numbers alone do not finish the job. Operators need habits that match the geometry:

- Anticipate dead ends from outline and opening layout before the first roll.
- Watch live bubble travel during degassing instead of waiting for autoclave unload.
- Bag shaped and perforated packs so breathers serve both perimeter and cutouts.
- Treat bubble prevention as a planned step, not a rework after failure.

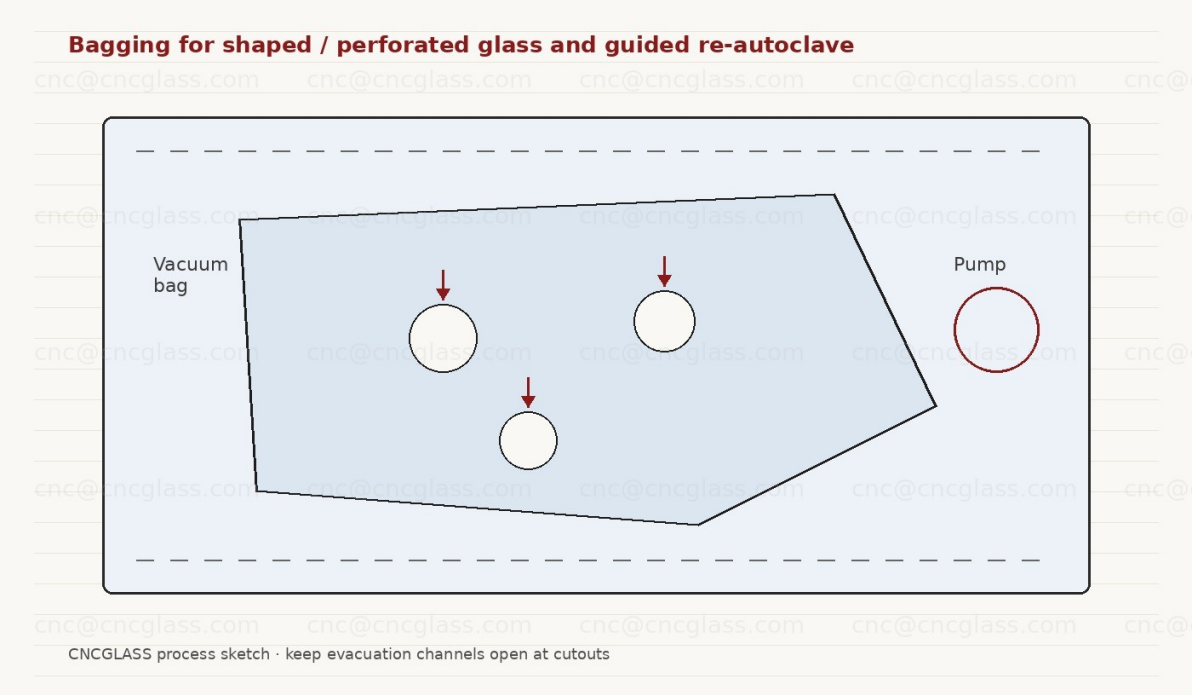



*Fig. 3 — Hand sketch: vacuum bagging that keeps evacuation paths open at openings, plus guided re-autoclave.*

## CNCGLASS · Outcome after the process reset

With equipment checked and the three levers aligned, autoclave success on the campaign rose to about 98 percent. Two panels still showed minor bubbles near openings; both were salvaged by a second autoclave cycle after secondary adjustments to local bagging and pressure timing. That salvage path matters: it shows residual defects were process-limited, not a blanket film failure.

CNCGLASS recommends logging panel outline class, opening count, heat curve ID, degassing speed, and pre-/main-press setpoints on every irregular lot. The log turns a one-time rescue into a repeatable recipe for the next canopy or façade package.

## CNCGLASS · Practical takeaways for fabricators

- Bubbles on large irregular multi-opening ionoplast laminates usually signal a structure–material–process mismatch, not a single missing vacuum minute.
- Tune temperature, degassing speed, and pressure staging together; changing only one lever rarely holds.
- Design bagging for openings as carefully as for the outer edge.
- Use operator observation during pre-press as quality data, not optional craft.
- Keep a short salvage protocol for minor opening bubbles after a controlled secondary autoclave.

When buyers specify structural SGP-type ionoplast interlayer from CNCGLASS, ask the plant to confirm irregular-panel recipes up front. A clear process map protects lead time, scrap rate, and the optical finish the project expects.

## CNCGLASS · Contact

Brand: CNCGLASS

Company: CNC Ucolin Interlayer Technology Co., Ltd.

Address: SHENZHEN, GD, CHINA

Contact: Peter Lin

Email: cnc@cncGlass.com

WhatsApp / Mobile: +86 15013829504

WeChat: wecan365

Website: www.cncglass.com

CNC Ucolin Interlayer Technology Co., Ltd. · SHENZHEN, GD, CHINA · Peter Lin

Ask CNCGLASS for ionoplast interlayer film, irregular-panel process support, and laminated-glass technical notes.