



Qun-An Group

Troubleshooting Guide for Common Issues In Laminated Glass Produced with Qun-An SGP® Ionoplast Interlayer

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Issue 1: - Bubbles

Defect 1: Large-area bubbles across the entire glass panel

Cause: Insufficient roll pressing temperature, glass not edge-sealed, leading to trapped air.

Solution: Increase the roll pressing temperature in each section, increase roll pressing pressure. At the same time, slow down the roll pressing speed to fully exhaust air from the tail end of the laminated glass.

Defect 2. Numerous soybean-like round bubbles at the glass tail

Cause: Air trapping occurring about 20cm from the tail of the laminated glass during roll pressing

Solution: Decrease the roll pressing temperature in each section by about 5°C, and slow down the roll pressing speed to fully exhaust air from the tail end of the laminated glass.

Defect 3. Large-area bubbles forming around the hole positions in holed glass

Cause: No edge sealing around the hole positions

Solution: Slow down the roll pressing speed at the hole positions during roll pressing.

Defect 4. Bubbles at the edges

Cause: Poor tempering conformity, causing trapped air.

Solution: For tempering process matching into the furnace, one glass with knife edge facing up, one set with knife edge facing down. The tempering process must ensure glass conformity.

Defect 5. Full-panel bubbles in boiling test

Cause: Not using tin side to tin side for lamination

Solution: Use ATTA direction for lamination - glass air side / glass tin side / SGP / glass tin side / glass air side.

Defect 6. Occasional bubbles

Cause: Unstable temperature control in the roll pressing machine

Solution: Perform regular maintenance on the roll pressing equipment, especially the heating tubes, and calibrate the console with the actual equipment temperature.

Defect 7. Dense bubbles at the edges

Cause: Vacuum bag leakage

Solution: No check for leakage after vacuum bag enters the autoclave, leading to bubbles in the laminated glass.

Issue 2: - Hammer Strike Test Failure, Low

Bonding(Adhesion) Strength with Glass:

Defect 1: High film moisture

Cause: Improper film storage

Solution: Control humidity in the lamination room below 30%, reseal unused SGP films after each opening to prevent moisture absorption.

Defect 2. Glass air and tin side distinction

Cause: No distinction between glass air side and tin side

Solution: 1. SGP material directly bonds with tin side (using ATTA direction - glass air side / glass tin side / SGP / glass tin side / glass air side). 2. For glass structures that cannot use tin side contact (e.g., non-float glass, multi-layer laminated glass, etc.), must use adhesion promoter.

Defect 3. Glass contamination

Cause: Insufficient glass cleanliness

Solution: 1. Water in the washing machine not replaced for a long time; 2. Insufficient air knife cleaning, leading to remaining moisture or dirt on glass. 3. Glass stored for too long, aged and "moldy".

Defect 4. Film separation from glass after pummeling

Cause: Improper autoclave parameters

Solution:

1. Autoclave pressure holding time too short, leading to insufficient SGP bonding (for laminated glass with total thickness greater than 30mm, minimum holding time 3.5 hours).
2. Actual autoclave temperature does not match set temperature, actual glass temperature inside below 130°C, even below 120°C.

Issue 3 - Delamination

Defect 1. Edge delamination of glass

Cause: Insufficient glass flatness, causing substandard film thickness.

Solution: For tempering process matching into the furnace, one glass with knife edge facing up, one set with knife edge facing down. The tempering process must ensure glass conformity.

Defect 2. Large-area delamination of glass

Cause: No distinction between glass air side and tin side, and no promoter used

Solution: Use ATTA direction for lamination - glass air side / glass tin side / SGP / glass tin side / glass air side. For glass structures that cannot use tin side contact (e.g., non-float glass, multi-layer laminated glass, etc.), must use adhesion promoter.

Defect 3. Delamination after installation

Cause: Insufficient adhesion

Solution: 1. For multi-layer laminated glass or thick glass lamination, autoclave pressure holding time too short, leading to insufficient SGP bonding (for laminated glass with total thickness greater than 30mm, minimum holding time 3.5 hours). 2. Actual autoclave temperature does not match set temperature, actual temperature inside below 130°C, even below 120°C.

Defect 4. Delamination after installation

Cause: Improper lamination operation

Solution: During the lamination forming process, due to improper glass configuration or insufficient tempering conformity, etc., forced lamination using heavy clamps or other tools on site, later glass rebound causing delamination.

Defect 5. Fine short delamination at edges

Cause: Improper trimming method

Solution: Standardize trimming operations. Use sharp blades, do not pull film by hand. Recommend using vacuum and bright edge treatment, no need for trimming after exiting autoclave.

Defect 6. Delamination at glass waist

Cause: Improper glass transportation

Solution: For extra-long glass, using only one strap or one clamp during lifting, causing severe bending at both ends, excessive stress concentration in the middle leading to glass damage.

Issue 4. Black Spots, Impurities**Possibility 1: Film**

Cause: Black spots, impurities on film

Solution: Check during lamination, promptly cut off if black spots or impurities found on film.

Possibility 2: Glass

Cause: Glass contamination

Solution: Inspect and clean the laminated glass before lamination.

Possibility 3: Assembly room environment

Cause: 5S requirements in assembly room not implemented properly

Solution: Timely clean and sweep the lamination room and conveyor belt to prevent dust from electrostatically adhering to the film surface.

Issue 5. Haze**Possibility 1: Cooling speed**

Cause: Slow cooling speed in autoclave cooling stage

Solution: Slow autoclave cooling speed leading to high product haze.

Regularly clean cooling water pipes with industrial oxalic acid, install cooling tower with appropriate flow. Try to shorten water paths and increase pipe diameter to ensure flow rate, replace condenser if necessary or use higher power water pump.

Possibility 2: Glass placement

Cause: Too small spacing between glasses

Solution: Increase spacing to at least 3cm to ensure smooth air circulation between glasses; uneven glass placement inside autoclave, some laminated glasses stuck together, causing uneven heat dissipation, local glass fogging; using metal rods or wooden spacers between glasses, affecting normal air flow. Leading to excessive laminated glass haze.

Possibility 3: Glass oil film

Cause: Oil contamination on glass surface leading to excessive glass haze

Solution: Properly run empty autoclave and shorten empty run cycle, ensure air compressor dryer and oil-water separator work normally, if conditions allow, select air compressor or lubricant that does not produce oil contamination.

Possibility 4: Local white fog on glass

Cause: Glass contamination

Solution: Dirty conveyor belt not cleaned timely, glass with roller marks, not discovered during lamination, found after exiting autoclave.

If you have any questions during the production process of SGP laminated glass, please contact our company's technical after-sales engineers!

**Sincerely,
Technical Services Department
Qun-An Group**