

Self-Adhesive Smart Film--Installation Guide



Installation Guide

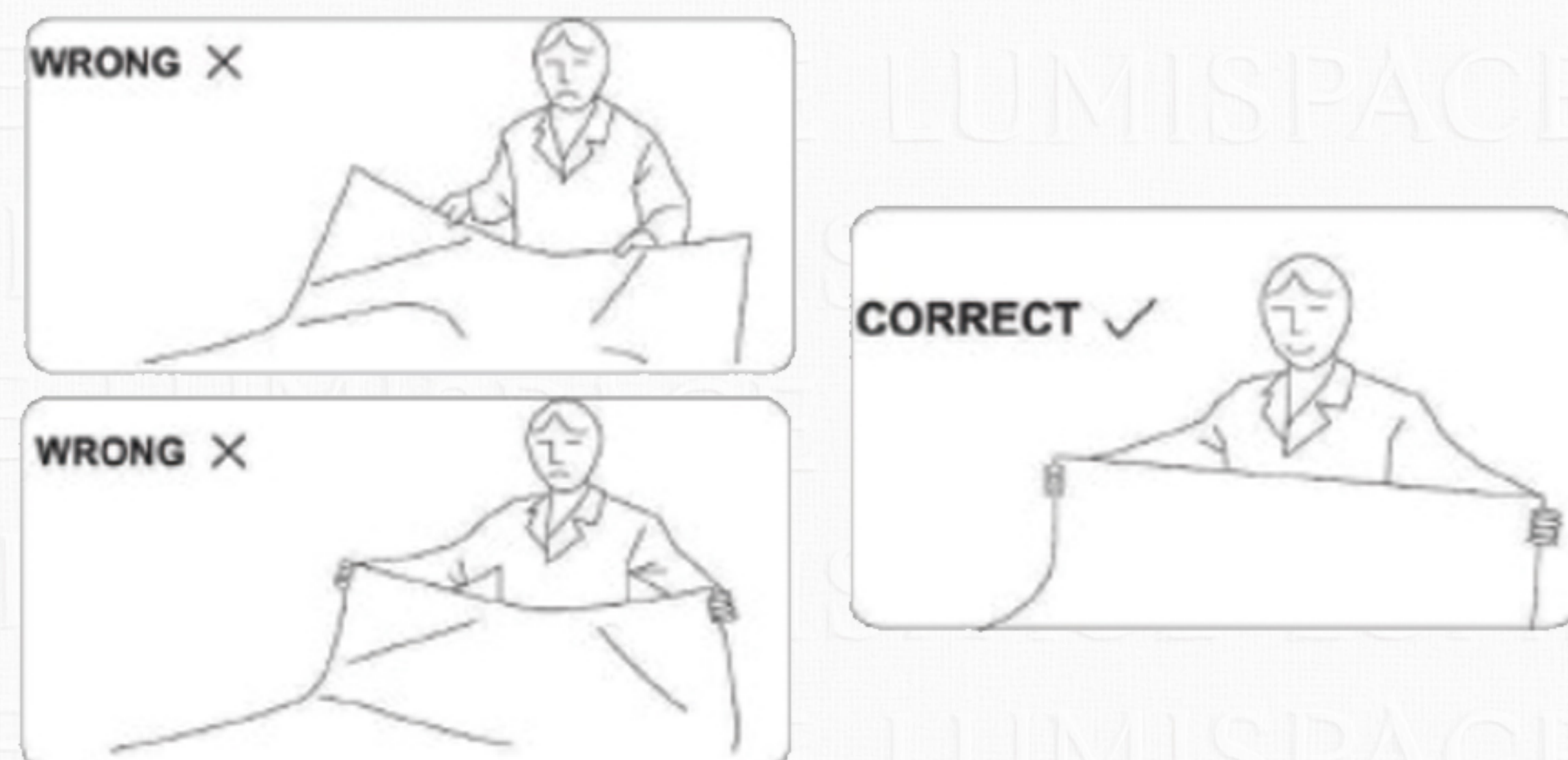
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Important Safety Instructions

Caution: Failure to comply with the following instructions may result in permanent damage to the Smart Film and void the product warranty. Read this section carefully before proceeding.

• **Handle with Care:** The Smart Film is a delicate electronic device. Always keep the film flat and straight. DO NOT fold, crease, or bend the film under any circumstances, as this will cause irreparable damage to the internal liquid crystal layer.



• **Dry Installation Only:** This product is designed for a dry installation process. The self-adhesive layer is formulated for direct application to glass surfaces only. DO NOT apply to polycarbonate, acrylic, or any other plastic materials.

• **Approved Cleaning Agents:** Use only 99% isopropyl alcohol for cleaning the glass surface prior to installation. Water is not recommended, ammonia-based glass cleaners, or any other chemical solutions, as they will compromise the adhesive and damage the film.

• **Clean Environment:** To ensure a flawless, bubble-free finish, conduct the installation in a clean, dust-free, and climate-controlled environment. It is recommended to keep air conditioning and fans turned off during the application process to minimize airborne particles.

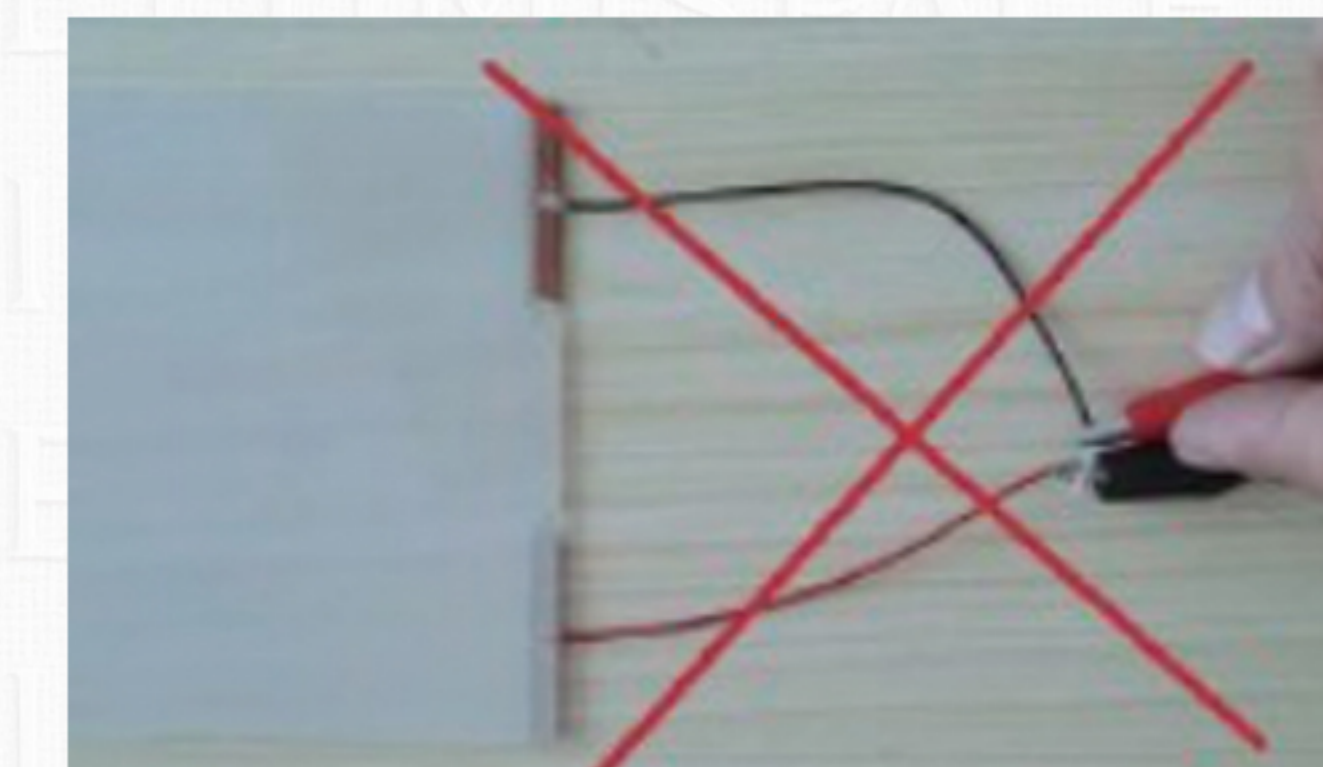
• **Sizing and Clearance:** For optimal fit, the Smart Film should be cut 2-3 mm (approx. 1/8") smaller than the visible glass area on all sides. This clearance is critical for proper edge sealing and to prevent contact with window frames.

• **Protective Liners:** The film is shipped with protective liners on both sides. The liner on the non-adhesive side must remain in place throughout the entire installation process to prevent scratches. The liner on the adhesive side should only be removed incrementally as the film is applied to the glass.

• **Electrical Safety:**

The film must be powered by a certified 60V AC transformer. Use of an incorrect power source will permanently damage the film.

Ensure the electrical contact strips (busbars) and their connecting wires Must not come into contact with metal window frames or any other conductive surfaces to prevent a short circuit.



DO NOT pull or apply tension to the busbar wires, as this can cause them to detach from the film.

• **Sealant Compatibility:** After installation, all edges must be sealed with a neutral-cure silicone sealant (e.g., Toshiba 381, Dow Corning 799). DO NOT use acid-cure silicone, as its chemical outgassing will delaminate and permanently damage the film.

• **Indoor Use Only:** The self-adhesive Smart Film is designed for interior applications only. It must not be exposed to direct sunlight, high humidity, or moisture for extended periods.

Pre-Installation Checklist

Tools & Materials Required

Proper preparation is key to a successful installation. Ensure you have the following professional-grade tools and materials ready before you begin.

Category	Item	Purpose
Cleaning	99% Isopropyl Alcohol	Glass surface cleaning and installation aid
	Lint-Free Microfiber Cloths	Cleaning and wiping without leaving residue
Application	Professional Glass Scraper	Removing stubborn debris from the glass
	Soft-Edge Squeegee (e.g., 3M Blue)	Applying pressure and removing air bubbles
	Hard-Edge Squeegee (e.g., 3M Gold) or Plastic Scraper	Removing stubborn air bubbles, especially at edges
	Low-Tack Masking Tape	Securing film position and masking for silicone application
	Nitrile Gloves	Preventing fingerprints and contamination of the adhesive

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Category	Item	Purpose
Finishing	Neutral-Cure Silicone Sealant (e.g., Dow Corning 799, Toshiba 381)	Sealing the film edges to prevent delamination
	Utility Knife with Snap-Off Blades	Precision trimming (if necessary)
Electrical	Wire Strippers & Soldering Iron (if extending wires)	Connecting and extending electrical leads

Initial Inspection & Preparation

- 1. Unbox and Inspect:** Carefully unbox the Smart Film on a large, clean, and flat surface. Inspect the film for any visible damage, creases, or defects that may have occurred during shipping. Do not proceed if the film is damaged.
- 2. Verify Dimensions:** Measure the film and the glass panel. Confirm that the film is 2-3 mm smaller on all sides than the glass area it will be applied to.
- 3. Functional Test:** Before installation, perform a functional test. Connect the film's busbar wires to the provided 60V AC transformer and power it on. The film should transition from opaque to clear. Power it off, and it should return to opaque. This confirms the film is functioning correctly before application.

Installation Procedure

Part 1: Glass Surface Preparation

A pristine glass surface is absolutely essential for a professional, bubble-free installation.

Do not rush this stage.

- 1. Initial Cleaning:** Thoroughly clean the glass with a standard glass cleaner to remove any initial dirt and grime. Use a glass scraper to carefully remove any adhered contaminants such as paint specks or silicone residue.
- 2. Final Decontamination:** Liberally spray the glass surface with 99% isopropyl alcohol. Using a clean, lint-free microfiber cloth, wipe the entire surface in a systematic, overlapping pattern (e.g., top to bottom, left to right). This step removes any remaining oils, residues, and static.
- 3. Final Inspection:** Allow the alcohol to fully evaporate. Inspect the glass from multiple angles to ensure it is perfectly clean, dry, and free of any dust or blemishes. Repeat the decontamination step if necessary.

Installer's Note: The quality of the final installation is directly proportional to the cleanliness of the glass. Invest adequate time in this preparation phase.

Part 2: Film Application

This process requires precision and patience. It is recommended to have two installers for larger film panels.

- 1. Positioning:** Carefully bring the film to the glass. Identify the adhesive side (it is typically protected by a removable liner and may be marked with a label).

2. Initial Adhesion: Peel back approximately 10 cm (4") of the protective liner from the top edge of the film, creating a starting strip. Be careful not to touch the exposed adhesive.

3. Alignment: Precisely align the top edge of the film with the top edge of the glass, maintaining the 2-3 mm clearance on the top and sides. Lightly press the exposed adhesive strip onto the glass, starting from the center and moving outwards, to tack the film in place.

4. Main Application: While one person slowly and steadily pulls the protective liner downwards, the second person uses a soft-edge squeegee to apply the film to the glass.

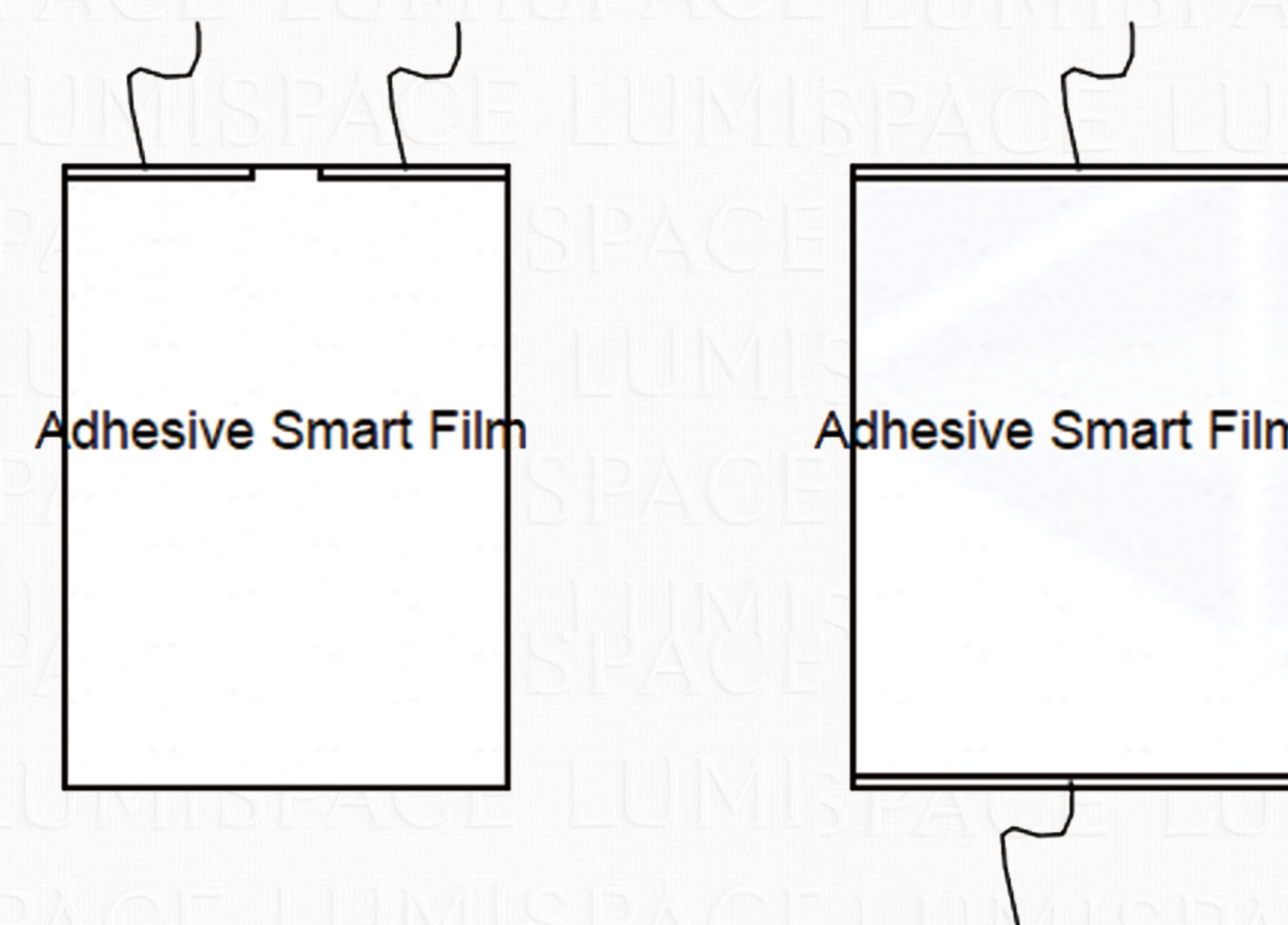
- Start from the top center and work your way down.
- Use overlapping, horizontal strokes.
- Apply firm, consistent pressure to force air out from between the film and the glass.

5. Bubble Removal: If you notice any air bubbles, carefully lift the nearest edge of the film, re-spray the area lightly with isopropyl alcohol (this temporarily neutralizes the adhesive), and re-apply with the squeegee. For stubborn bubbles near the edges, use a hard-edge squeegee to push them out.

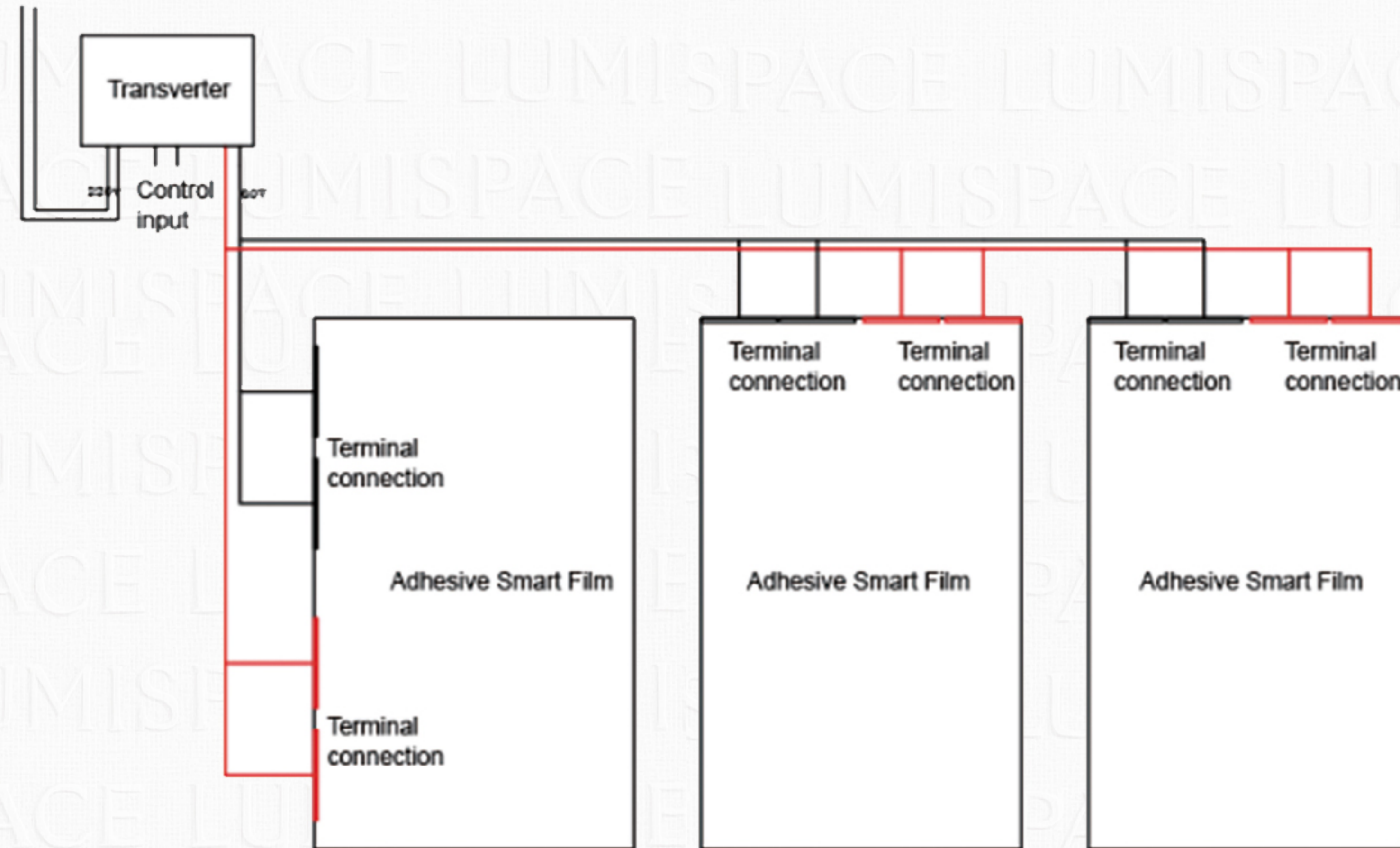
Caution: The adhesive is pressure-sensitive and will build its full bond strength over 24-48 hours. While it can be repositioned during the initial application, repeated lifting and re-applying can weaken the bond and stretch the film.

Part 3: Electrical Connection

- 1. Wire Routing:** Carefully route the busbar connection wires to the planned location of the transformer. Ensure wires are protected from damage and are not in contact with any metal framing.



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2. **Wire Extension (if required):** If the pre-attached wires are not long enough, they can be extended using a 22-24 AWG stranded wire. Solder the connections securely and insulate them with heat-shrink tubing.

3. **Transformer Connection:** Connect the lead wires from the film to the low-voltage output terminals (60V AC) of the transformer. Ensure the polarity is correct as per the transformer's manual. The transformer should be installed in an accessible, well-ventilated location by a qualified electrician in accordance with local electrical codes.

Part 4: Final Sealing

This is a critical final step to protect the film from moisture and delamination.

1. **Masking:** Apply low-tack masking tape to the glass, approximately 2 mm away from the edge of the Smart Film on all four sides. This will create a clean, uniform sealant line.
2. **Silicone Application:** Apply a continuous bead of neutral-cure silicone into the gap between the film edge and the masking tape. Ensure the bead makes full contact with both the film edge and the glass.
3. **Tooling the Sealant:** Use a sealant tooling spatula or a wet finger to smooth the silicone bead, creating a clean, concave profile. This ensures a proper seal.
4. **Remove Masking Tape:** Immediately and carefully remove the masking tape, pulling it away from the fresh sealant at a 45-degree angle.
5. **Curing:** Allow the silicone to cure completely as per the manufacturer's instructions (typically 24 hours). DO NOT operate the film until the silicone is fully cured.

Operation & Maintenance

Cleaning Instructions

Proper cleaning will significantly extend the service life and optical performance of the film:

1. **Power Off:** Always switch the film to its OFF (opaque) state before cleaning.
2. **Use Approved Cleaners:** Lightly spray a soft, lint-free microfiber cloth with either 99% isopropyl alcohol or a pH-neutral cleaner. DO NOT spray liquid directly onto the film or its edges.
3. **Wipe Gently:** Wipe the surface with minimal pressure. Avoid using abrasive materials, scrapers, or squeegees for cleaning, as they can scratch the surface.
4. **Dry Thoroughly:** Use a separate clean, dry microfiber cloth to gently dry the surface.

Notice: Never use ammonia-based cleaners, acids, or abrasive powders. Ensure the edges remain dry at all times.

Troubleshooting

Issue	Possible Cause(s)	Solution(s)
Film does not switch or flickers	1. No power to transformer 2. Loose wire connections 3. Incorrect voltage	1. Check circuit breaker and ensure transformer is receiving power. 2. Verify all wire connections are secure. 3. Confirm use of a 60V AC transformer.
Film has hazy or cloudy spots	1. Incomplete drying/curing 2. Moisture ingress	1. Allow film to cure for at least 48 hours. 2. Inspect silicone edge seal for damage and re-apply if necessary.
Small bubbles appear after install	Trapped air or dust	Most small air bubbles will dissipate naturally within 24-48 hours. For dust, the particle must be removed which requires re-application.
Film edges are delaminating	1. Improper or no silicone seal 2. Use of acid-cure silicone	1. The film must be sealed on all edges with neutral-cure silicone. Re-apply sealant if damaged. 2. This damage is irreversible.