



iSWITCH FILM INSTALLATION GUIDE



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INSTALLATION TOOLS

List of recommended items required for LC film application

It is not mandatory to have exactly same brands. However each item was used during smart film installation by Smart Glass Tech experts since 2016.

Nitrile Gloves



Tool Box



Isopropyl Alcohol



Shoe Covers



Soldering Kit



Wire



Flux Pen



Tape Measure



Wire Connectors



Solder



Shrink Wrap



Torch



Precision Knife



Snipps



Razor



Caulking Gun



Microfibre Cloth



Long Drill Bit



Glass Crapper



Squeegee



Mid Wire Stripper



Wire Stripper



Cleaning Razor



Liquid Tape



Drill Bit Set



Drill



Electric tape



Blue Tape



Super Glue



Double Sided Tape



Paper Towel



Plastic Drop Sheet



Silicone

FABRICATION & PACKAGING

Our self adhesive smart film has maximum size of each panel - 58" wide x 138" long.

During fabrication process each panel is cut by our custom pneumatic "slitter" with tolerance of 0.5mm

Each panel then carefully inspected by UV lamp for ITO imperfections, burned spots or other defects.

Electrodes "busbars" then fabricated using custom silver (highly conductive) compound and high quality copper tape. Using our out technological method "anchor" installed on each busbar stripe (please DO NOT solder wires on the anchor)

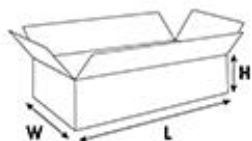
Red "pull" stickers installed on one or both sides for protective liner release.

Upon fabrication completion, PDLC panels are rolled on the drum one by one secured by stretch wrap. Each panel has label with number and size. 1/2" bubble wrap used for extra protection during transportation around the drum. Then square protective pads used, to secure drum in the shipping box and securely packaged.



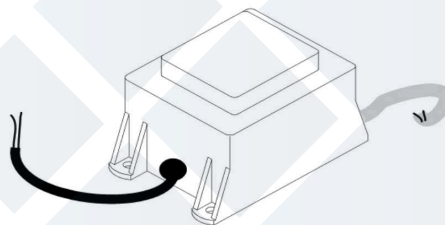
iSwitch Film drums box sizes :

1. 12 x 12 x 60"
2. 12 x 12 x 48"
3. 12 x 12 x 36"



* Please note - PDLC film panels are rolled on the drum by width, not by panel number indicated in the work order. In order to avoid possible damage during transportation, wider panels rolled first. Please check panel number before application.

Power transformers are normally placed inside the drum and securely packaged.



RECEIVING & UNBOXING

Before signing for and accepting the shipment from the carrier, the box should be inspected for shortages or damage.

If shortages or damage is found the shipping documentation should so be noted and the driver's signature obtained as a witness.

Smart Glass Tech Office should be notified of any short deliveries and/or damage to goods immediately or in any event within **24 hours** of delivery in order to pursue a claim with the carrier.

Smart Glass Technologies, LLC are not responsible for shortages or damage if the party taking delivery of the goods fails to inspect the consignment at the time of delivery.

Please open box carefully to avoid accidental film damage or cut.

We recommend to release 1/4'' of a box knife and cut along.

Be extra careful when removing bubble wrap from the drum.

Cut the tape around the drum cup to remove transformers.

Place drum vertically in secured area.

STORAGE

Smart Film can sustain damage between delivery and installation; therefore care should be taken when the product is being handled, in line with Smart Glass Tech recommended guidelines for the handling of smart film included in this document.

If the Film is not being installed immediately after un-crating, care must be taken to protect it and stored flat, out of direct sunlight, where the relative humidity is less than 80% and a near constant temperature between -20 and +50 °C in order to prevent the formation of condensation on the film.

HANDLING

- Never fold, bend or curve Smart Film.
- Always keep the film flat and straight as shown in picture
- Do not remove the protective liners until you are ready to install the film
- Wear Nitrile gloves when handling the film
- When handling films take particular care with the edges to avoid delamination



GENERAL INSTALLATION GUIDE

JOB SITE PREPARATION

When arrived on the job site, please make sure that the environment is clean. It is crucial to have clean floor and surroundings.

Find clean area for film unrolling. Place plastic cover on the floor or large table in the office and secure it with blue tape to prevent plastic sheet from moving or folding.

Unwind plastic wrap from the drum and begin unrolling first panel. Remove transparent tape that is holding PDLC slowly and unroll steady. There are few transparent tapes holding film on the other side, so be careful when removing last one.

Please pay attention to corners of the film when walking by film panel. If corner hit, it would cause permanent delamination. Test the film by connecting 48VAC to both busbars. Now you are ready for the next step.

Use panel number and size to locate matching glass pane. Please check size again to be sure there's no error.

*NOTE

If film size does not match the label on the panel, please report to head office immediately. If error found, film has to be returned to the factory and new film will be shipped next day. If technician trimmed or used film with incorrect label he bears full responsibility and claim will not be accepted.

GLASS CLEANING

Please inspect glass surface for scratches, drops or chips. If found, please note and take pictures.

Use thin wide razor and isopropyl alcohol to clean the glass surface first time. Then use microfibre cloth and alcohol to make surface perfect.

REPEAT THIS PROCESS until the surface is COMPLETELY CLEAN

It is extremely important stage, so please clean every inch of the glass surface. Don't forget corners and edge. If this process is done right, film application would go very smooth and fast.

If any dirt, lint or other particles are still remain on the glass, this would slow application. You would have to roll film up and manually remove each one of them creating risk of damage every time.

Upon glass cleaning, please wipe smart film on both sides, Now you are ready for application.

*Please don't forget to use nitrile gloves

FINAL INSPECTION & RECOMMENDATIONS

The installer should thoroughly inspect each piece of Smart Film prior to installation. Never attempt to install products which you consider to be incorrectly sized, damaged, scratched, abraded or deficient in any other way, in the first instance contact Smart Glass Tech for an initial assessment.

Any attempt to install a deficient product will signify acceptance of its suitability and as such cannot not be replaced.

Smart Film adheres to glass using a silicone based cling layer, and is a **DRY APPLY** product,

SMART FILM SHOULD NEVER BE WET APPLIED – THIS WILL IRREPARABLY DAMAGE THE FILM Film

Dimensions should be 2 to 3mm smaller in each dimension than the visual area of the glass it is being applied to.

NEVER ATTEMPT TO TRIM FILM ON SITE – Please contact Smart Glass Tech for advise. If Smart Film was trimmed on the job site, Smart Glass Technologies, LLC will not be liable. Trimmed smart film will null and void warranty.

The busbar or electrical connections should never be allowed to have contact with metal frames or trims.

Smart Film should never be installed in situations where it may be subjected to loading or pressure or mechanical stress, for example clamped between metal or plastic fittings, door furniture, and framework or subjected to any other form of concentrated mechanical loads or actions.

We recommend that the electrical connections are positioned and exit at the top of any installation.

When film is installed in environments where it may be subject to dampness or humidity, each edge must be completely sealed so as to be impervious to moisture ingress, and particular attention must be paid to sealing the bus bar edge.

We only recommend the use of SilGlaze 2 SCS2800 or Dow Corning AS7096N as a sealant for use with any of our products; this can be supplied by us upon request.

Customer specified holes and cut outs produced during the manufacturing process may cause the edge of the smart film to discolour slightly and as such will require 4-6mm coverage by a trim, escutcheon or bezel.

Great care should be taken when installing fixings and fittings to the film, metal parts should never have direct contact with the surface of the film and film should be cut to fit around fixings, fittings and furniture.

To avoid the risk of mechanical threaded fixing becoming loose over time the use of a high quality thread adhesive in line with the manufacturer's instructions should also be considered.

When two or more films are being applied side by side on a single piece of glass, a gap of 0.5 to 1mm should be left to prevent an electrical short damaging the film edges.

It is also recommended that the busbar tags of films being applied side by side are positioned with the same polarity adjoining each other (eg positive and positive or negative and negative).

FILM APPLICATION

Wipe down the protective liner applied to the self-adhesive cling layer of the Smart Film to remove any dust. Before commencing installation ensure the film fits the area to be filmed by carefully positioning it against the surface whilst checking for the required clearances.

Place step ladder 2' away from the glass pane. Fold smart film adhesive side out and carry to the glass. Be extremely careful with objects around you when carrying film.

Hold the film and step on the step ladder. Ask you assistant to stay at the bottom and help you to unwind the film. Secure top side and steady put bottom side down.

Release 5-7" of the liner and align the film.

Ask you assistant to help you to align the film according to the glass size and your size calculations.

Film has to be 1-2 mm away from the edge or polish corner. You can use blue tape to secure film along the glass edge.

When film is firmly aligned you can start pasting. Start applying film using vinyl scraper from the middle first to secure film. Then continue to sides.



When top portion is successfully applied, you can now continue pasting down. Release liner each 5" and repeat procedure. Please carefully inspect pasted film for bubbles or other imperfections.

When finishing panel installation be extremely careful. At the bottom, start leaning release to one side and continue to one corner.

Make sure you have access to release film if needed until very last moment. Corner has to be pasted very last.



* This method is highly recommended, especially in cases where there's a wide frame around the glass. If you do not lean release to the side, it would be very difficult to peel off the film in case of bubbles.

Upon completion of application, please check sides of the film around the perimeter. Make sure there is no bubbles.

TO MINIMIZE THE RISK OF DAMAGE TO THE FILM DO NOT REMOVE THE LINER FROM THE UPPER / NON ADHESIVE SURFACE UNTIL THE INSTALLATION IS COMPLETED

WIRING

PLEASE READ THESE SECTION IN CONJUNCTION WITH THE ELECTRICAL INSTALLATION NOTES TOWARDS THE REAR OF THIS GUIDE

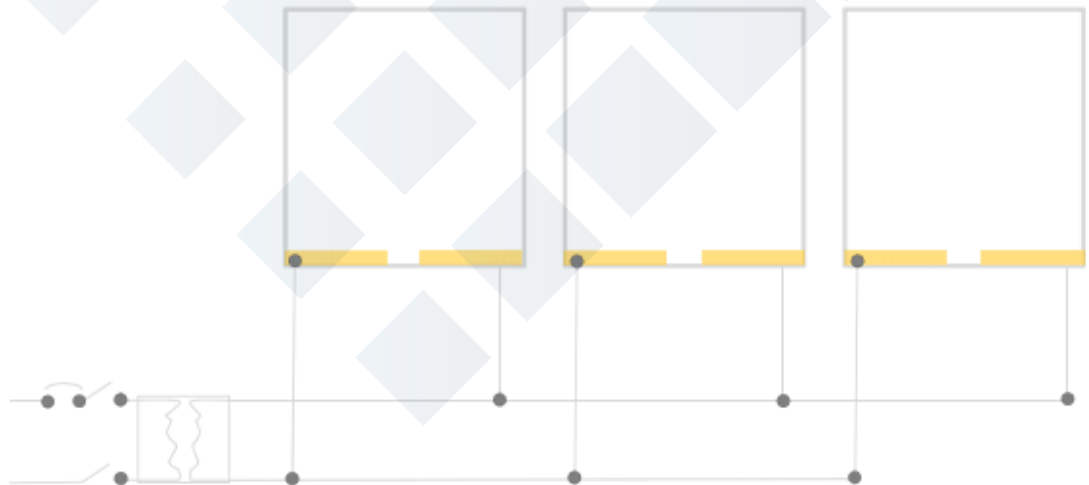
Once the installation of the film is satisfactorily completed, electrical installation can commence. Begin by carefully soldering the electrical cables to the copper busbars.

NOTE: Special “Anchor” is installed on each busbar.

DO NOT SOLDER TO ANCHOR

Solder a cable to one of the busbars (positive) and one on the (negative).
Use home run or parallel wiring method to connect all film panels.

It is recommended that the film is tested for correct operation at this stage by temporarily connecting the cables to the transformer and switch to ensure that the film is switching from opaque to clear. Once testing is complete, neatly fold/roll dedicated wires and attach to non conductive side by blue tape, this can prevent accidental pull.



* IT IS VERY IMPORTANT TO APPLY RECOMMENDED SILICONE AROUND FILM EDGES AND BUSBAR. THIS WILL PROVIDE INSULATION AND GLUE FILM EDGE INTO THE GLASS.

Please remove protective liner upon silicone application immediately.

To remove protective liner locate the top edge of the outer protective liner, (approximately 10-15mm below the busbar). Starting in one corner begin to ease the protective liner diagonally from the face of the smart film, until the liner is removed across its entire width. Slowly and smoothly in a downward motion, pull the liner from the surface of the smart film.

Apply a strip of narrow (5mm) clear double sided adhesive tape along the top of the film over the busbar to tack the cables in place. The bus bars and cables must be securely covered with a suitable nonconductive trim and sealed with sealant to prevent the ingress of moisture onto the electrical connections.

ELECTRICAL INSTALLATION NOTES

Smart Film is an electrical component and should be provided for in the electrical layout including the provision of fused spurs, switches, cable management and electrical connection boxes.

All installations must meet the requirements of local regulations and guidelines and be carried out by a qualified electrician.

Any metal framework close to or adjoining the wiring of the panel **MUST** be earthed.

Smart Film must **NEVER** be installed in direct contact with a metal frame. If in doubt consult a qualified electrician prior to commencing any installation work.

Before installation commences bus bars, connection leads and cables should be inspected to ensure the integrity of insulation.

Where ever possible it is recommended that the operation of Smart Film is tested prior to commencement of installation.

Great care should be taken to ensure that exposed bus bars, leads or cables do not come into contact with framework and any metal frames must be earthed and are totally sealed to prevent the ingress of moisture or water.

Smart Film operates at 48VAC, if the local mains voltage is higher than 110VAC a step down transformer is required.

Smart GlassTech manufacture and supply a range of thermally protected UL & CSA Certified isolating transformers. Failure to use Smart Glass Tech Transformers may result in irreparable damage to the Smart Glass/ acrylic or Film. (Data Sheets can be supplied upon request).

When connecting power supply please ensure that the device will not give unwanted tripping due to high inrush currents generated by the transformer(s).

It is imperative that the manual switch or remote control is wired into the circuit on the mains voltage side of the transformer; failure to observe this requirement may lead to irreparable damage of the iSwitch Film or Glass panels.

Before turning on the power to a new installation the electrician should test the resistance reading between the frame and the bus bar feed cables to ensure that the reading resistance is infinite. If this is not the case the short circuit should be found and insulated accordingly.

CLEANING & AFTERCARE

Once the Smart Film has been installed, the glazing contractor should make provisions to ensure that the films are protected from possible damage caused by the construction practices of other trades. Special care must be taken during the initial cleaning, cleaning during the construction period, or when film surfaces are severely soiled, in order to prevent marking or damage caused by abrasive contaminants.

In the event that the film surfaces become heavily contaminated with abrasive particles the surface of the film should initially be blown with a low pressure compressed air or electrical blower to remove as much of the contaminant as possible.

Any remaining surface contamination should be removed by gently flicking the surface of the film with a soft bristled cleaning/dusting brush.

Caution must be taken to ensure that any remaining abrasive materials do not become trapped and dragged across the film surface and the brush; otherwise the surfaces may be scratched.

For routine cleaning the film surface can be cleaned with Soft IPA wipes and/or a PH neutral, non-abrasive liquid glass cleaning product applied SPARINGLY to lint free, clean, soft cloth.

Do not allow any metal or hard parts of the cleaning equipment to contact the film surfaces. Please note that the plastic surface of the film can be marked or scratched if the care and cleaning instructions are not followed.

NEVER ATTEMPT TO CLEAN SMART GLASS OR SMART FILM WITH A WET CLOTH AND BUCKET OR OTHER WINDOW CLEANING TECHNIQUE WHICH DRENCHES THE SURFACE OF THE GLASS OR FILM.

THIS WILL CAUSE IRREPARABLE DAMAGE TO THE PRODUCT AND WILL INVALIDATE THE WARRANTY.

To ensure many years of problem free operation we recommend that Smart film is operated continuously (switched clear) for no longer than 16 hours in any 24 hour period.