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CNCGLASS Technical Note

PDLC Film Cutting and Electrode Fabrication

This technical note describes the workshop method used by CNC Ucolin Interlayer Technology Co., Ltd. (brand CNCGLASS) to cut PDLC film and to make the electrode. The sequence covers sheet cutting, preparation of the film, silver-paste work on the screen, formation of the electrodes, and a power-on test.

Sheet cutting

Production cutting is carried out on a double-position table. The arrangement supports dimensional positioning, precise cutting, and large-size cutting, and it improves production efficiency.

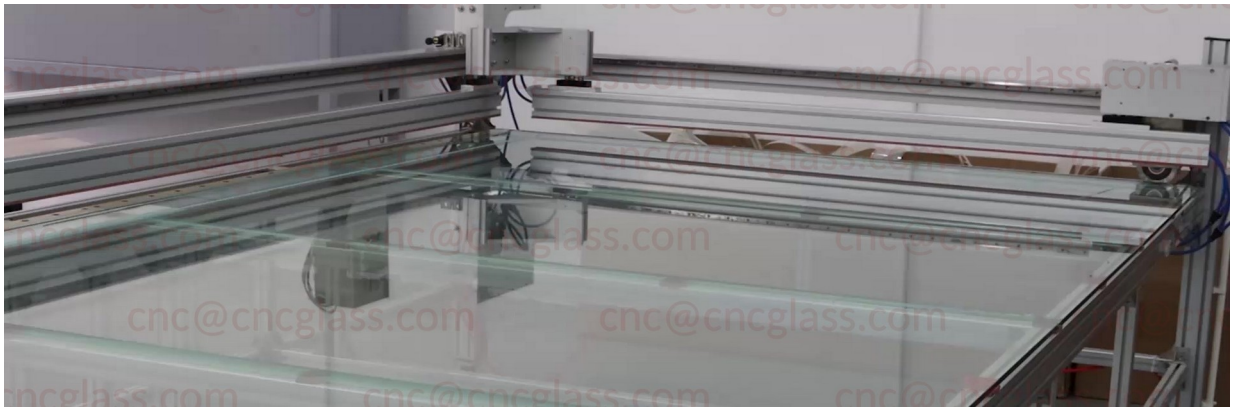


Figure 1. Double-position cutting table used for dimensional positioning and large-size cutting of PDLC film.



Figure 2. Positioning and precise cutting of PDLC film on the cutting table.

Tools and consumables

The items listed below are prepared before work begins.

Item	Notes
Electrode cutter	Prepared before production
Utility knife	Light stroke to remove the protective layer
Steel ruler	To measure a 5 mm width
Silver-paste mixing knife	To stir the silver paste
Spreading eraser	To spread the silver paste
Copper foil	Pasted after the conductive glue is applied
Pressing wheel	To fix the layers so they are connected
0.2 square meter high-temperature wire	Soldered, one end to the red wire and the other to the black wire
Tin wire	Prepared before production
Copper mesh	Welded together with the copper foil
Conductive glue	Applied before the copper foil is pasted
Dust-free paper	Prepared before production
99.8% alcohol	Prepared before production
Hair dryer	To cure freshly brushed silver paste quickly

Preparing the film edge

The first step is to prepare the PDLC film. A steel ruler, an electrode cutter, and a utility knife are prepared. A steel ruler is used to measure a 5 mm width. A utility knife then makes a light stroke, and the protective layer is removed for a length of about 6 cm. The cut is taken from the middle of the film. Care is required so that the ITO conductive layer is not scratched. The film is then turned over and the same work is repeated.



Figure 3. A steel ruler is used to measure a 5 mm width, and the protective layer is removed for a length of about 6 cm.

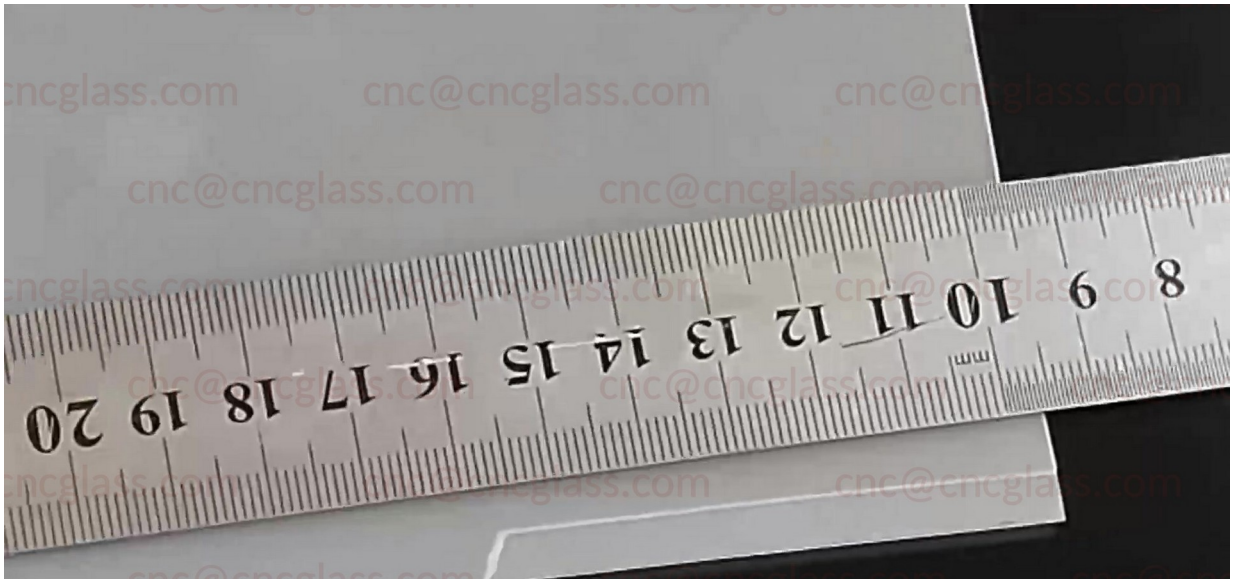


Figure 4. The cut is taken from the middle of the film so that the ITO conductive layer is not scratched.

Silver-paste electrode on the screen

The screen is prepared next, together with the silver paste, the silver-paste mixing knife, and the spreading eraser, for making the electrode. The paste is stirred for 10 minutes so that it is not too viscous.

High-temperature tape and double-sided tape are applied outside the silver-paste line, so that the film is held in a fixed position while the paste is brushed. High-temperature tape may also be attached to the screen so that the paste is brushed accurately on the wiped portion. The reverse face is treated in the same way.

Freshly brushed silver paste is not yet cured, so a hair dryer is used to cure it quickly. For a large-size film, a curing machine set to 113 degrees and a bake of 10 minutes are recommended.

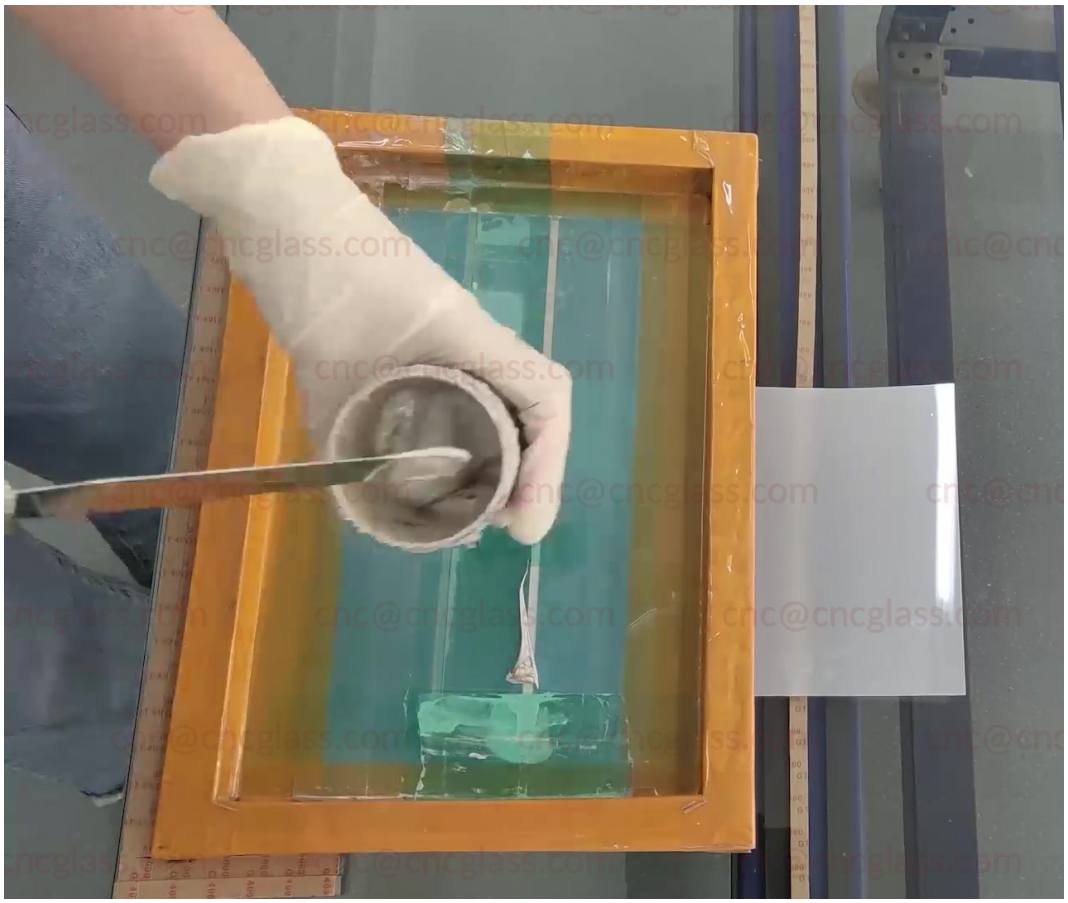


Figure 5. High-temperature tape on the screen, with silver paste applied along the electrode line onto the prepared film.

Copper mesh, conductive glue, and copper foil

The last, and most important, stage is to make the electrodes. Copper mesh, a pressing wheel, conductive glue, and copper foil are prepared. Conductive glue is applied and the copper foil is pasted in place; the reverse face is completed in the same way. The pressing wheel is then used to fix the layers so that they are connected to one another.

For workmanship, an electric welding machine is used to weld the copper mesh and the foil firmly together. A power-on test is then carried out to confirm that the PDLC film has been made properly.



Figure 6. A pressing wheel is used to fix copper foil to the film edge after conductive glue has been applied.



Figure 7. Power-on test of the finished PDLC film: one part of the sheet is cloudy and the other part is clear.

Lead-wire connection

A further method of making the electrodes is also used. An electric soldering iron is prepared, and the high-temperature wire is soldered so that one end is connected to the red wire and the other end to the black wire. After completion, the film is tested directly. The finished work is very clear. As in the method above, a nailer is also used so that the copper foil is stably welded and does not fall off.



Figure 8. Finished copper-foil electrode with the lead firmly welded in place so that the foil does not fall off.

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