

Instec offers a wide variety of empty liquid crystal test cells for scientists and engineers. Varieties include:

- Homogeneously aligned parallel, anti-parallel, and 90° twist cells
- In Plane Switching (IPS) cells aligned both parallel and perpendicular to the electric field
- Homeotropic (also known as vertically aligned) cells
- ITO patterned cells with no alignment layer at all
- Cells without ITO and PI, available by special order

The production of small batches of liquid crystal cells is a long labor intensive process for even a well equipped R&D lab, which costs researchers both time and money. The quality of these handmade cells depends critically on the skill and experience of the maker. In contrast, Instec's cells are produced by automated processes on industry standard equipment in industry standard clean rooms. The result is a repeatable, reliable, high quality cell. We sell these cells in quantities from one to many thousands.

Each of Instec's cells has a patterned electrode so that the active area is known exactly. The cells have a low parasitic capacitance, and the active area can be completely filled with the liquid crystal material. The cell gap of each individual cell is uniform to $\pm 0.2 \mu\text{m}$. Physical dimensions, average cell gap, and pre-tilt angles vary depending on cell type, please refer to the below chart. The adhesive used in construction of these cells is rated to 200°C.

For critical testing applications, Instec offers individually calibrated liquid crystal cells. These cells are measured optically for the spacing and electronically for the capacitance. Each calibrated cell is shipped along with the measured data.

Part Number	Cell Type	ITO Area (mm)	Cell Gap (μm)	Physical Dimension (mm)	Cell Holder
LC1-6.8	Homogenous Alignment, 90° Twist	5 × 5	6.8	15.25 × 20.25 × 2.25	LCH-S3 LCH-S4
LC3-5.0	Homogenous Alignment, Parallel Rubbing	5 × 5	5.0	15.25 × 17 × 1.5	
LC2-5.0	Homogenous Alignment, Anti-Parallel Rubbing	5 × 5	5.0		
LC4-6.8		5 × 5	6.8		
LC2-9.0		5 × 5	8.7		
LC2-20.0		5 × 5	20.0		

The above liquid crystal cells can be used alone or with Instec's LCH-S3 and LCH-S4 cell holders to connect to BNC cables. Note that the user will still need to attach wires to the cell itself e.g. via clips or conductive epoxy.

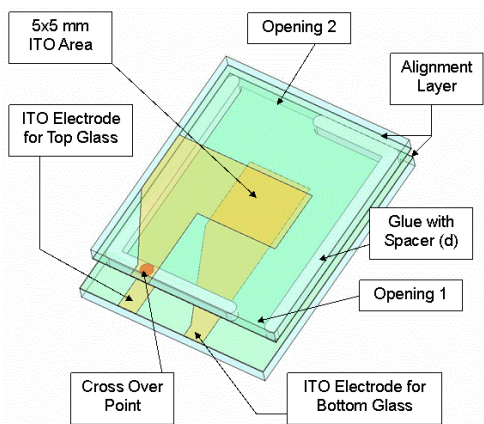


Figure above shows the structure of LC1 liquid crystal cell, 90° twist aligned.

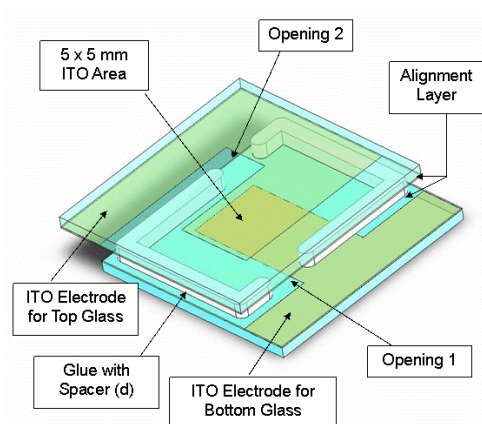


Figure above shows the structure of LC2, LC3, and LC4 liquid crystal cells.

Part Number	Cell Type	ITO area (mm)	Cell Gap (μm)	Physical Dimension (mm)	Cell Holder
SA025A \underline{ddd} uG180	Homogenous Alignment	5 × 5	2.0 to 20.0	21 × 25 × 2.25	LCH-S2
SA100A \underline{ddd} uG180		10 × 10	3.0 to 20.0		
SB100A \underline{ddd} uT180	Homeotropic Alignment*	10 × 10	5.0 to 20.0		
SA100A \underline{ddd} uNOPI	No PI (Patterned ITO)	10 × 10	3.0 to 20.0		
IPS01A \underline{ddd} uGVE	In-Plane-Switching, Homogenous Alignment, Perpendicular Rubbing to Electric Field W1=10μm, W2=20μm	~10 × 10	3.0 to 20.0		
IPS01A \underline{ddd} uGPE					
IPS02A \underline{ddd} uGVE	In-Plane-Switching, Homogenous Alignment, Perpendicular Rubbing to Electric Field W1=15μm, W2=15μm	~10 × 10	3.0 to 20.0		
IPS02A \underline{ddd} uGPE				In-Plane-Switching, Homogenous Alignment, Parallel Rubbing to Electric Field W1=15μm, W2=15μm	~10 × 10

*Vertical aligned (VA) cells for negative anisotropic dielectric constants NLC.

To order the above liquid crystal cells, Type SA, SB, and IPS, the cell gap represented by \underline{ddd} in the part number needs to be specified. For example, SA100A085uG100 indicates a cell gap of 8.5μm. Please contact Instec for currently available cell gaps.

The liquid crystal cells in the table above can be similarly attached to LCH-S3 and LCH-S4 cell holders as Type LC1, LC2, LC3, and LC4 liquid crystal cells. In addition, the Instec LCH-S2 cell holder can be used to electrically connect to the above cells without the need to attach wires directly. An aperture in the cell holder allows for optical access to the liquid crystal cell. The cell holder mates with many of Instec's side loading microscope hot and cold stages or can be used by itself.

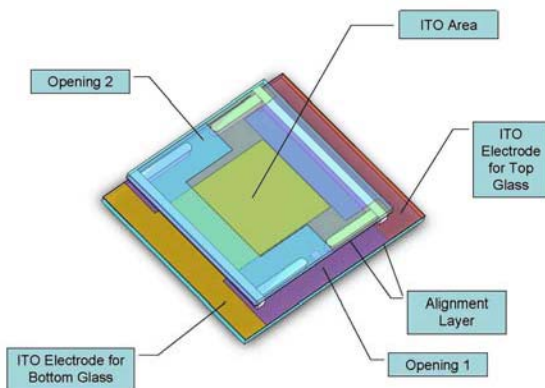


Figure above shows the structure of Type SA and SB liquid crystal cells.

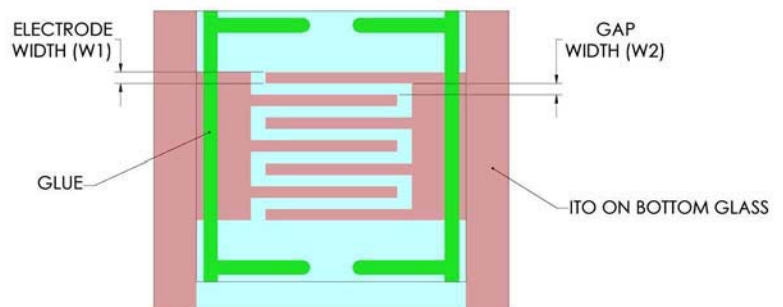
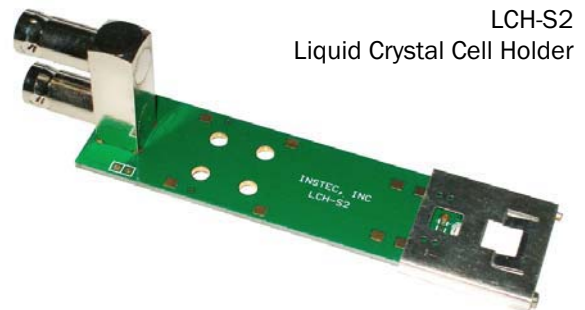


Figure above shows the structure of IPS liquid crystal cells.

IPS01: W1=10μm, W2=20μm

IPS02: W1=15μm, W2=15μm



LCH-S2
Liquid Crystal Cell Holder

How to Use Instec Liquid Crystal Cells

There are two openings on Instec liquid crystal cells. Place a very small amount of liquid crystal material on one opening of the Instec empty cell. The capillary force will pull liquid crystal material into the empty cell. It may take a few minutes before the cell is fully filled. The process may be quickened by heating the cell up to or above the isotropic phase transition temperature of the liquid crystal material. You may observe the filling process by noting the difference in reflection between the filled and unfilled portions of the cell. Once the cell is filled, in order to insure good alignment, please cool down slowly, especially near the phase transition temperature.