



Micro Systems Technologies

## Liquid Crystal Polymer (LCP)

### HIGHLIGHTS

- Flexible ultra-HDI multilayer substrates
- Excellent high frequency properties
- Fully biocompatible
- Mixed-material combinations
- Additive thin film metallization
- Cavities, fold-lines and thinned bending zones
- Applicable for 3D shaping due to its thermoplastic characteristics



**DYCONEX**

an MST company

# Liquid Crystal Polymer (LCP)

## LCP Flex Printed Circuit Boards

Description	Production capability
Lines/spaces	25/35 µm
Microvias/pads Ø	50/250 µm
Thinnest starting material	25 µm
Thinnest dielectric thickness	25 µm
Conductor width tolerance	+/- 20%
Artwork to soldermask tolerance	+/- 25 µm
Layer count	4

Description	Leading edge capability
Lines/spaces	20/25 µm
Microvias/pads Ø	40/200 µm
Thinnest starting material	25 µm
Thinnest dielectric thickness	25 µm
Conductor width tolerance	+/- 10%
Artwork to soldermask tolerance	+/- 15 µm
Layer count	6-8

Min. PCB thickness	
2 layers	25 µm
3 layers	75 µm
up to 8 layers	325 µm

## Technical Data

Liquid Crystal Polymer (LCP) is a thermoplastic polymer material with unique structural and physical properties. It demonstrates simultaneously exceptional performance with respect to electrical, thermal, mechanical and chemical properties. LCP is the perfect match for technically demanding high frequency, harsh environment and direct implantable applications. Due to its thermoplastic characteristics it can be thermoformed – even as a complex multilayer flex with embedded thin film traces – to various shapes.

Remaining steadfast in its commitment to make the exceptional advantages of LCP available to the industry, DYCONEX has successfully developed and established viable volume production manufacturing processes and has acquired unmatched experience, competence and expertise in LCP applications since many years.

## Technological Highlights

### For high frequency applications

- Superior dielectric characteristics enabling high-frequency applications up to 110 GHz
- Combination of high-Tg LCP with high Tg LCP bondply or low-Tg LCP adhesive for high multilayer build-ups up to 10 layers
- Cost-competitive high-frequency FPC technology (relative to PTFE)
- Mixed-material combinations (LCP-Polyimide or LCP-BT-Epoxy)
- Thin film vacuum coating of special materials for sensor functionalities

### For biomedical applications

- Fully biocompatible according to ISO 10993-5 (in vitro cytotoxicity)
- Adhesiveless multilayer build-ups resulting in homogeneous structures up to 4-layer
- Thin film vacuum coating of noble metals

### For all applications

- Applicable for Ultra-HDI structuring supported by thin film technology
- Light-weight with high flexural endurance
- Low moisture absorption and low moisture permeability (near-hermetic)
- 3D forming to various shapes
- Special features: cavities, fold-lines, thinned bending zones
- Ultra-fine line flex cables



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Based in Switzerland, DYCONEX has been in the PCB business for more than 50 years and delivers leading edge interconnect solutions in flex, rigid-flex and rigid technology. DYCONEX core competence lies in the production of highly complex HDI, high-frequency and high-reliability circuit boards for medical, defense, aerospace, industrial and semiconductor applications. DYCONEX is an MST company.