

# FLEXIBLE PRINTED CIRCUITRY FROM MOLEX (CU FLEX MATERIALS EXPERTS)

Copper Flexible Printed Circuit (FPC) Technology is used in a variety of applications that demand high signal speed, power distribution, suitable temperatures, flexibility and space savings. Molex engineers successfully apply their material knowledge and expertise for handling these kinds of challenges in FPC production.

## COPPER FOILS

### ROLLED ANNEALED (RA) COPPER

Has an in-plane grain structure that provides greater copper elongation and flex ductility  
Supports tighter and more repetitive bending for applications requiring those attributes

### ELECTRO-DEPOSITED (ED) COPPER

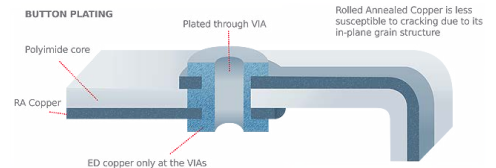
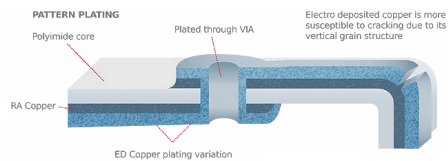
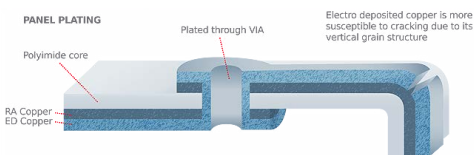
Has a vertical grain structure, which makes it less expensive than RA copper  
Is much easier to etch, allowing for greater circuit density and more repeatable trace widths

**Molex engineers employ 3 main copper plating technologies in the fabrication of copper FPCs: panel plating, pattern plating and button plating.**

Panel plating entails completely coating the top and bottom surfaces of the flex and via holes with ED copper. This plating process is the most widely used for copper flex circuitry because it provides the simplest, most economical method to interconnect the circuit layers. However, it is not recommended for applications where tight or repetitive bending is required, because circuits with ED copper are more susceptible to breakage due to ED copper's lower elongation and flex ductility.

When applications require high-density circuitry with smaller spacing between features, pattern plating is the preferred choice. Yet this option is not ideal for applications that involve the bending and folding of circuits, because it does not apply ED copper evenly over the circuit feature surfaces (as seen in the slight variation of the drawing). Pattern plating applies copper to the circuit features only, making the FPC easier to etch because etching is applied through only the base layer of copper and not the additional plated copper.

During the button plating process, the vias and the pads holding them are selectively electroplated with copper. This minimizes the amount of copper required but increases the number of processing steps. Button plating is primarily used in two applications: dynamic flex (the frequent bending of the flex circuit) and impedance control (high-signal speed applications). This type of plating process is a better choice for producing thinner, lighter, more flexible circuits whenever product reliability and performance are a must.



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Engaging with Molex engineers for FPC projects provides 3 central advantages:

- 1 A wealth of material knowledge and expertise
- 2 A real-time design analysis for optimizing design materials to meet the requirements of the application
- 3 A reliability lab that provides test capabilities to ensure products meet design requirements or otherwise define performance limits

## APPLICATIONS

**Automotive**

**Commercial Vehicle**

**Consumer**

**Industrial**

**Data/Computing**

**Medical**

**Telecommunications / Networking**



Commercial vehicle



Consumer application



Telecommunications

## THE MOLEX ADVANTAGE >

Our engineering team will review your project and recommend the optimal set of FPC materials. Molex is committed to finding the best FPC solution for your project.

# molex

[www.molex.com/capabilities/fpc.html](http://www.molex.com/capabilities/fpc.html)

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