



## **KODAK FLEXIBLE PRINTED ELECTRONICS** CONTRACT MANUFACTURING AND METAL MESH TCF

# Let us make your vision real

### **Sharing our expertise**

At Kodak, we've spent years developing our expertise and assets in the design and manufacture of fully additive, transparent, flexible electronics. And now we're sharing them with you. You may be looking to develop your own proof of concept or cost-effective prototypes. You may even be ready for full-scale production. Whatever your vision, our contract manufacturing services offer our groundbreaking EKTAflex functional print technology — plus our world-class cleanroom facility — to propel you on your path, without you having to risk major capital investment.

### **We can support you in producing**

- Conductive traces
- Active circuitry
- Surface heating
- Capacitive sensing
- Antennas, RFID, IoT
- RF shielding
- PV/solar cleaning
- Other micro-wire applications

Working on something else? Surprise us.

### **What we'll do**

We'll image your designs in ultra-high resolution to flexographically produce features that simply aren't possible with screen or inkjet printing — in production quantities. We'll even do this on both sides of a substrate simultaneously.

### **How we do it**

We've taken the huge advances we've made in flexography over the past decade to develop our EKTAflex functional printing tools. EKTAflex patterned plates can be used to print ultra-high-resolution features that can be finer than a human hair, on a wide range of substrates, from paper and plastic to metal foils, film and glass. This is the technology we've proven in our own manufacturing operations. And it's now available to you.

We use a highly productive, cost-effective roll-to-roll process to create conductive copper and non-conductive patterns on flexible substrates that can integrate into your products. Our extremely high resolution imager creates patterns at 12,800 dpi. We use a customized flexographic press to reproduce the patterns on flexible films, and we electroless plate the patterned films with copper and a neutral color passivation layer.

Our contract manufacturing team is here to make sure you get the most out of our experience and assets — turning your electronics design into a fully realized, remarkable, functional product.



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### Your patterns. Our process.

Our unique process provides superior conductivity relative to other techniques for creating thin copper microwire traces. And we can do so on thin, flexible and transparent substrates. Below demonstrates our typical results compared to sputtered and sintered materials. Our process also lets us control the width and thickness of copper traces to provide you with excellent light transmission and transparency while maintaining high conductivity. Below we show the levels of transparency you can expect. So if your electronics can benefit from very low resistivity and high transparency, then you've come to the right place.

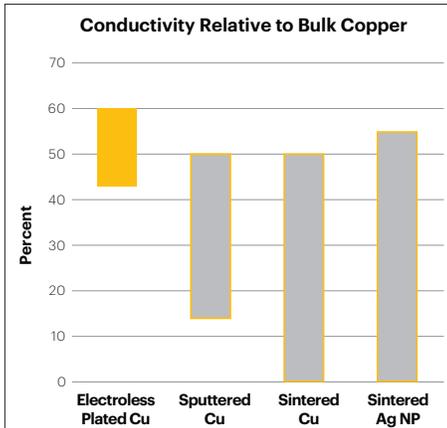


Figure 1. Typical conductivity for metal films relative to bulk copper as a percentage.

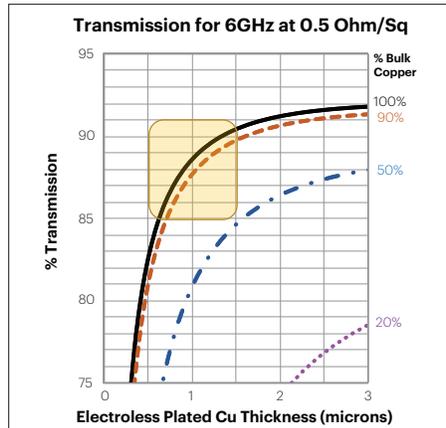


Figure 2. Optical transmission plotted versus micro-wire height for metal mesh conductors on an ideal substrate at conductivities from 20 to 100% bulk copper at 6 GHz operation and an effective RF sheet resistance of 0.5 Ohm/square.

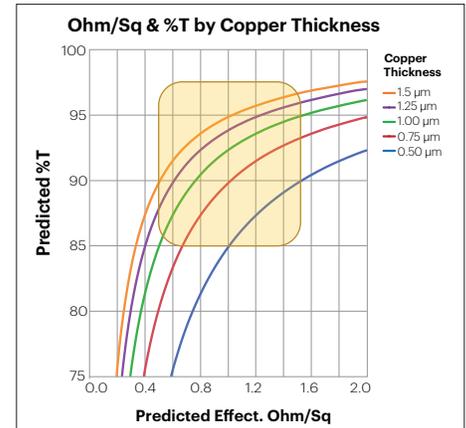


Figure 3. Predicted transmission and resistivity for electroless plated copper mesh at various line width/pitch ratios for Cu thickness from 0.5 μm to 1.5 μm. Transmission relative to ideal substrate.

The specifications in the table below are typical for our process. But if your ideas go in a different direction, don't hesitate to get in touch.

Pattern specifications	
Imaging resolution	Patterns imaged at 12,800 dpi: 2 μm edge definition, 4 μm isolated features
Copper feature width	Down to 7 μm
Conductive feature spacing	Typically 15-50 μm; varies depending on mesh designs and isolation requirements of conductive traces
Design area	337 mm x 566 mm
File input	CAD application output such as DXF, DWG or PDF
Number of inks	Up to 6 customer-specified; one conductive pattern per side
Substrate specifications	
Types	PET, heat-stabilized; others require verification
Thickness	50 μm to 125 μm (2-mil to 5-mil)
Width	17" roll width
Production specifications	
Copper plating	Cu thickness from .5 μm to 1.5 μm
Additional inks	UV curable flexographic inks
Passivation	Standard for environmental stability and color neutralization
Sides	Single-sided or double-sided
Finished format	Roll or sheets, liner on one or both sides

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