

# ClearOhm™

HIGH PERFORMANCE TRANSPARENT CONDUCTIVE MATERIAL



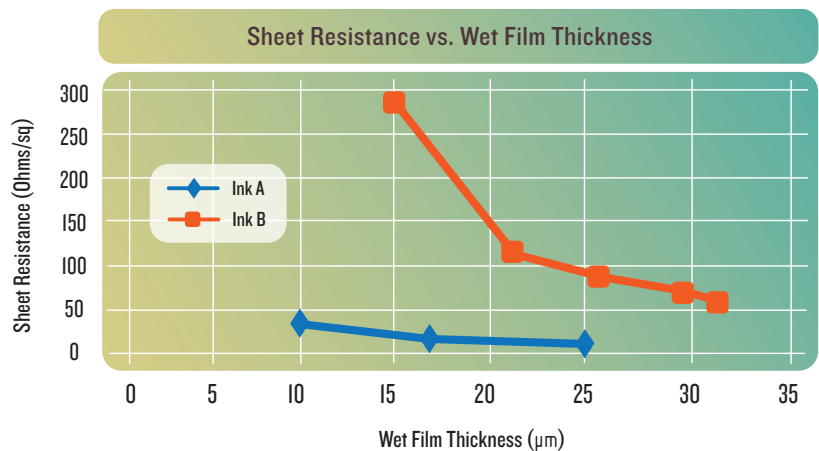
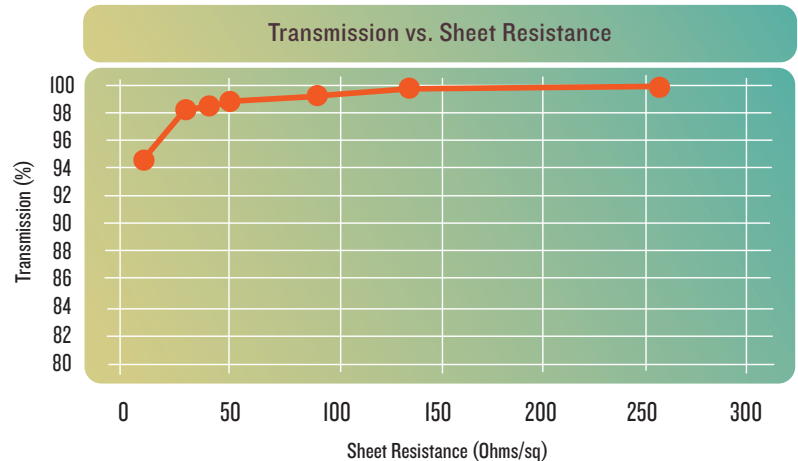
## COATING MATERIAL

**Cambrios ClearOhm™ Coating Material**  
Coating material for creating the industry's highest optical quality transparent conductive layers

- Low cost solution for touch panel, EMI shielding, E-paper, LCD, OLED lighting, OLED displays, Organic PV, thin film PV and other applications
- Wet processable solution compatible with industry standard coating processes and equipment
- High transmission over a wide range of sheet resistance (< 10 to 300  $\Omega$ /sq) meeting the requirements for many different applications
- Superior flexibility and ductility to improve yields and enable truly flexible products
- Low processing temperatures to enable use of substrates such as PET and applications requiring low temperatures
- Same throughput regardless of sheet resistance
- Low material and processing costs
- Solution coating for lower CapEx compared to ITO
- Tight quality control to ensure batch to batch reproducibility

### Application Support

Cambrios ClearOhm™ products are supported by our highly qualified and knowledgeable team dedicated to our customers' success. The Cambrios team is ready to work with you to develop a solution for your application.



Transmission and conductivity of ClearOhm based transparent conductive film can be easily tailored to your needs by simply varying coating parameters, such as wet film thickness, or by changing the initial solution formulation. The result is the ability to coat films with superior optical qualities over a broad range of sheet resistances without impacting production throughput.

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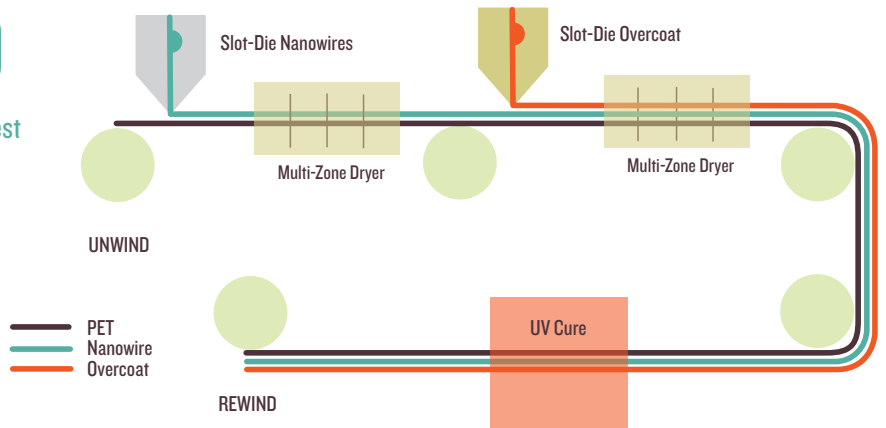


## COATING MATERIAL

Coating Process	Substrates	Applications
<p>ClearOhm™ formulations are available for many coating processes including:</p> <p>Spin Coating Slot Die on Sheet Roll to Roll Slot Die</p> <p>Under Development</p> <p>Gravure Printing Offset Printing Screen Printing Inkjet Printing Other</p>	<p>ClearOhm™ formulations have been optimized for many different substrates including:</p> <p>Glass PET</p> <p>Also Tested</p> <p>PEN PMMA PC TAC COC COP</p>	<p>High Sheet Resistance (up to 300 ohms/sq):</p> <p>Touch Panels EPaper EMI Shielding</p> <p>Low Sheet Resistance (&lt;50 ohms/sq)</p> <p>OLED Lighting OLED Displays LCD Thin Film Photovoltaic's Organic PV</p>

### ClearOhm Film™ Manufacturing Process

ClearOhm™ ink can be used to create the world's highest performance transparent conductive film using several different roll-to-roll wet coating processes. Process temperatures are < 120C.



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### ClearOhm Coating Material Properties

	Unit of Measure	Roll to Roll Slot Die Ink	Spin Coating Ink	Test Method
<b>Ink Properties</b>				
Nominal Viscosity (1000s <sup>-1</sup> , 25°C)	cP	15.3	22.4	TA 550 Rheometer – Cambrios Method
Nominal Surface Tension	Dynes/cm	37.2	35.5	Kruss K11 Easy Dyne Tensiometer – Cambrios Method
<b>Processing Temperature</b>				
Dry	°C	Multizone oven with max temp <120 °C	50	N/A
Bake	°C		140	N/A
Sheet Resistance Range	Ω/sq	<10-300	<10-300	Delcom 717 – Non Contact Conductance – Cambrios Method
Ink Shelf Life	Months	>6		N/A

For more information about ClearOhm Film products, please contact your Cambrios sales representative or e-mail [info@cambrios.com](mailto:info@cambrios.com).

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