



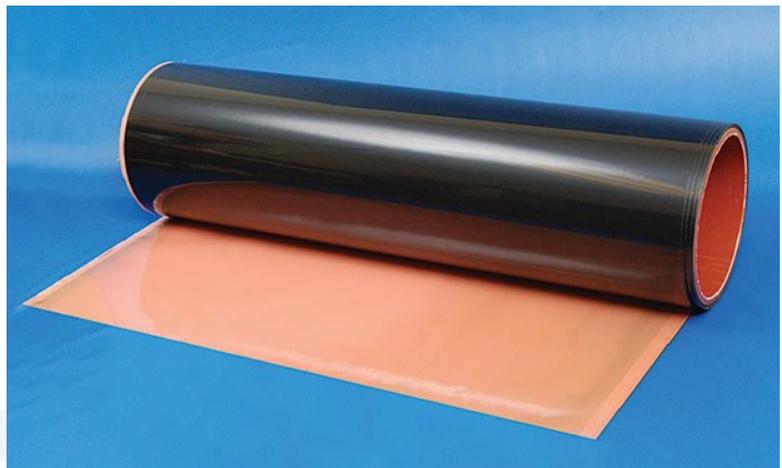
## **TR-Clad<sup>TM</sup> Metal Foil Clad Polyimide**

### **Light weight copper clad polyimide**

TR-Clad<sup>TM</sup> flexible laminates are both the lowest weight and lowest dielectric constant copper/polyimide laminates available. TR-Clad<sup>TM</sup> flexible laminates are made by direct coating CP1<sup>TM</sup> Polyimide onto copper or aluminum foils resulting in an adhesiveless material. TR-Clad<sup>TM</sup> can be made with polyimide layer thicknesses as low as 2 microns and using copper foil with thicknesses as low as 9 microns or aluminum foil as low as 4 microns. The low dielectric constant of the CP1<sup>TM</sup> Polyimide coating reduces cross talk between circuit traces and allows for the fabrication of finer features. Additionally, TR-Clad<sup>TM</sup> can be made with electrically conductive polyimide for ESD level conductive applications. TR-Clad<sup>TM</sup> is made to order and can be custom tailored with polyimide and metal foil thicknesses to meet your needs.

### **Characteristics**

- Low thickness and weight
- Low dielectric constant polyimide
- Low moisture uptake
- High heat stability
- Etchable copper



### **Applications**

- Antennas
- Flex circuits
- Advanced composites

## Typical Properties of TR-Clad™

### Physical and Mechanical Properties

| Property   | ASTM Method | Value       | Units     |
|--|-------------|-------------|-----------|
| Tensile Strength (12 µm CP1/9 µm copper foil, 23°C)            | D882-02     | 136 (19.7)  | MPa (ksi) |
| Young's Modulus (12 µm CP1/9 µm copper foil, 23°C)             | D882-02     | 10.8 (1566) | GPa (ksi) |
| Tensile Elongation at Break (12 µm CP1/9 µm copper foil, 23°C) | D882-02     | 1.5         | %         |

### Optical Properties

|   |                      |      |   |
|---|----------------------|------|---|
| Solar Absorptance (12 µm CP1/9 µm copper foil)            | E903-96 <sup>1</sup> | 0.67 | - |
| Solar Absorptance (ESD Grade, 12 µm CP1/9 µm copper foil) | E903-96 <sup>1</sup> | 0.95 | - |

<sup>1</sup> Data weighted to air mass zero solar irradiance values in ASTM E490-00a

### Thermal Properties

|  |         |    |        |
|--|---------|----|--------|
| Linear CTE (-80°C—+225°C, 12 µm CP1/9 µm copper foil)            | E831-06 | 20 | ppm/°C |
| Linear CTE (-80°C—+225°C, ESD Grade, 12 µm CP1/9 µm copper foil) | E831-06 | 24 | ppm/°C |

### Material Availability

- Material available in continuous rolls of film up to 50 inches wide
- 9-70 micron copper foil thicknesses available
- 4-100 micron aluminum foil thicknesses available
- 4-15 micron polyimide thicknesses available. Other thicknesses available upon request
- TR-Clad™ is available with nonconductive or ESD conductive polyimide available
- TR-Clad™ can be delivered on removable protective liner for easier handling
- TR-Clad™ is a highly customizable material. Contact us with your specific needs today

**Warranty.** The information contained herein is believed to be accurate and reliable. However, the user is responsible for determining the suitability and use of the final formulations/products.

NeXolve warrants that its products will meet specifications, but not merchantability or fitness for use.

**For more information contact:**

NeXolve  
290 Dunlop Blvd, Building 200  
Huntsville, AL 35824  
Phone: 256-836-7780  
[www.nexolvematerials.com](http://www.nexolvematerials.com)

