

# Rogers Statement on Resistive Foil Visual Appearance and Resistivity Expectations

Rogers produces upon request a select number of copper clad laminates using commercially available, subtractively processed resistive foils. Resistive foil technology enables the use of planar resistors within the circuit boards that are made from our laminate products. The availability of these resistive foils varies depending on each particular copper clad laminate product offered by Rogers. However, in general Rogers uses both OhmegaPly® foil from Ohmega Technologies, Inc. (<http://ohmega.com/>) and TCR® foil from Ticer Technologies (<http://www.ticertechnologies.com/>). Rogers' customers are encouraged to research the specific resistive foil products that are available as well as the performance and processing details from each foil supplier prior to placing orders with Rogers.

While Rogers is not expert in the processing and use of planar resistors, the following statements are offered in the spirit of sharing the lessons learned from the many years of exposure that Rogers has had to these products. Rogers strongly encourages each customer to evaluate the suitability of the resistive foil technology for their specific design. Rogers takes no responsibility for such suitability or fitness for use. Rogers also takes no responsibility with respect to the processing and performance of these resistive layers. Questions related to the resistive layers are best answered by either the PCB fabricator or the resistive foil supplier. Rogers products manufactured with these resistive foils are offered on a "best efforts" basis for appearance. In addition, please take note of the following:

1. Resistive foils, as they are received from the manufacturer have been exposed to additional processing that is not experienced by standard electrically deposited copper foils. As such, there is a greater risk of visual anomalies appearing on the surface of resistive foil clad cores. The exposed foil surfaces are at greater risk of scuff marks, staining, or discoloration. These foils are available with Rogers' laminates on a best efforts basis with respect to appearance of the exposed copper surfaces. It is typical for the surface anomalies and discolorations to be removed during standard chemical preparation of copper surfaces.
2. It has been our observation that the sheet resistivity of the resistive foils on PTFE-based and RO4000® laminates can be higher than the manufacturer's stated nominal resistance by 10-40% on OhmegaPly and lower than the manufacturer's stated nominal resistance by 0-10% on TCR foils. This is caused by interactive and cumulative effects of the sheet resistivity selected, design requirements, and inner-layer prep/multi-layer bond process-related factors. Once established and assuming proper processing controls, the offset becomes reproducible. For these reasons Rogers advises that customers run a design/process-specific first article to determine the resistivity offset so that any necessary adjustments can be made to resistor sizes before an entire circuit board lot is released to production.

**The information in this data sheet is intended to assist you in designing with Rogers' laminates. It is not intended to and does not create any warranties express or implied, including any warranty of merchantability or fitness for a particular application. The user should determine the suitability of Rogers' laminates for each application.**

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