

1.0 PURPOSE

- 1.1 The purpose of this document is to define the specifications and requirements for OhmegaPly® Laminates and OhmegaPly RCM®.

2.0 SCOPE

- 2.1 This document applies to all OhmegaPly RCM copper foils and OhmegaPly Laminates constructed with OhmegaPly RCM copper foils.

3.0 REFERENCED DOCUMENTS

- 3.1 IPC-4101, Specifications for Base Materials, as amended.
3.2 IPC-4562, Metal Foil for Printed Wiring, as amended.
3.3 IPC-4811/2, Specification for Embedded Passive Devices, as noted.
3.4 IPC-TM-650, Test Method, as specified.

4.0 DEFINITIONS

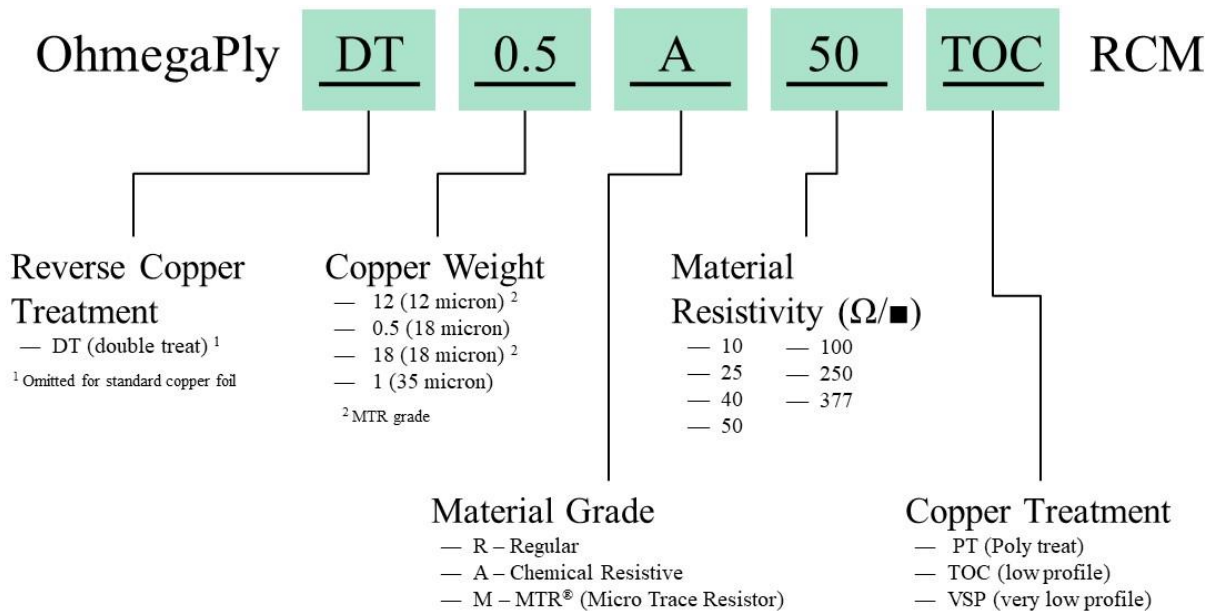
- 4.1 OhmegaPly RCM consists of a thin-film Nickel-Phosphorus (NiP) layer electrodeposited on the matte side of a single or double treated ED copper foil. See the OhmegaPly Data Sheets for the composition, physical and electrical properties of this alloy.
- 4.2 OhmegaPly Laminate is any substrate utilizing one or more OhmegaPly RCM layers.
- 4.3 The OhmegaPly layer once imaged and etched will create a planar resistor. This resistor when laminated inside a multilayer printed circuit board is called a “buried resistor” or an “embedded resistor”.

5.0 OHMEGAPLY SPECIFICATIONS

- 5.1 Copper foil shall meet or exceed the requirements of IPC-4562 HTE Class III for all OhmegaPly applications.
- 5.2 Copper foil shall be 1/3 (12um), 0.5 (18um) or 1.0 (35um) ounce per square foot.
- 5.3 The general RCM description is specified by the sheet resistivity ohmic value followed by the manufacturing percent tolerance. The percent tolerance is computed from the resistivity midpoint and range measured at periodic intervals throughout the manufacturing process. The following lists the current OhmegaPly sheet resistivity offerings:

- a. 10 ohms/square +/-3%.
- b. 25 ohms/square +/-5%
- c. 40 ohms/square +/-5%
- d. 50 ohms/square +/-5%
- e. 100 ohms/square +/-5%
- f. 250 ohms/square +/-10%
- g. 377 ohms/square +/-10%

5.5 The specific RCM description includes the base copper weight or thickness, NiP grade, NiP ohmic value and base copper foil roughness.



5.6 The base laminate and core thickness shall be specified by the customer and shall meet the requirements of IPC-4101 as amended.

5.7 The copper peel strength shall be tested in accordance with IPC-TM-650 Method 2.4.8 Condition A, at room temperature.

6.0 OHMEGAPLY INSPECTION CRITERIA

6.1 Copper foil shall meet the requirements of IPC-4562A and laminates shall meet the requirements of IPC-4101 except as specified herein or as specified in the procurement document.

6.2 All defects described below are acceptable within the 0.5inch (13mm) border of the cut panels. Edge ripple or other defects due to cutting of copper foil shall be acceptable within 0.25inch (6.5mm) from the edge.

- 6.3 Pits and Dents shall conform to class “A”. No defect allowed greater than 0.040inch (1mm) in diameter.
- 6.4 Fingerprints are not acceptable.
- 6.5 Surface cosmetic defects are acceptable as indicated below:
 - 6.5.1 Stains, shiner and scuff marks are allowed on double treat foil as long as there is not a complete loss of treatment.
 - 6.5.2 Scratches are allowed that do not penetrate the base copper foil (fingernail or thin cotton glove “snag” test).
 - 6.5.3 Black spots (charred organic contaminants visible after lamination) are acceptable less than 0.040inch (1mm) in diameter.
 - 6.5.4 The inspection criteria for any localized chemical etching of the double treatment shall be that of a pit.
- 6.6 Creases and handling dents in the laminate are not acceptable.

7.0 TRACEABILITY

- 7.1 RCM sheets are serialized with a seven-digit number consisting of a four-digit Cycle number followed by a three-digit Sheet number, i.e. 1357-523.
- 7.2 Traceability shall be kept by the laminator either by re-stamping the serial number on the cut panels or not fabricating/trimming the sheets after lamination leaving original stamp visible.

8.0 LOT CERTIFICATION

- 8.1 Material Lot Certification Test Reports for OhmegaPly laminate or OhmegaPly RCM foil shall accompany each shipment of OhmegaPly product. The Lot Certification shall indicate the nominal resistance value, sheet serial numbers and test results for ohmic value and percent tolerance.

9.0 RETURN AUTHORIZATION

- 9.1 In the event of a rejection a “Return Authorization” (RA) number and shipping instructions must be obtained prior to return shipment.

10.0 AUTHORITY AND PRECEDENCE

- 10.1 This document is released by Ohmega Technologies, Inc. for general use. It is subject to revision without notice. In the case of conflict between this document and any other, the purchase order or other procurement document and any referenced specification shall take precedence.

NOTES:

- ! OhmegaPly RCM® and or OhmegaPly® Laminate is exported from the United States in accordance with the Export Administration regulations. Diversion contrary to United States law prohibited.

All OhmegaPly products are in compliance with RoHS and REACH SVHC.

Technical data sheets indicating the properties of the Nickel-Phosphorus alloy are available upon request. Test methods and typical values generally meet or exceed IPC-4811/2, Specification for Embedded Passive Devices.