ORMET CIRCUITS, INC.

Technical Data Sheet

ORMET 710

April 2014

PRODUCT DESCRIPTION

Ormet 710 is the most recent product offering in Ormet Circuits' family of lead-free conductive pastes. **Ormet 710** is used to fill microvias that create z-axis interconnections between circuit layers in semiconductor packaging and printed circuit boards. The innovative metal matrix incorporates OCI's patented Transient Liquid Phase Sintering (TLPS) technology. The metallurgy of **Ormet 710** was specifically designed to maintain low and stable resistance in microvia applications and lead-free component assembly cycles. The higher metal loading vs. the Ormet 701 formulation provides lower, more stable, and more consistent resistance through the microvia interconnect. **Ormet 710** is most advantageously used in microvias ≤ 100 micron in diameter.

TYPICAL PROPERTIES

Property	Test Method	Value
Color 'As-received'	Visual	Copper color
Color 'Post-reaction'	Visual	Grey color[1]
Filler Type	Copper Filler and Tin Alloy Filler	
Nominal Particle Size	Hegman Gauge	< 20 microns
Viscosity	Brookfield TE Spindle @ 5 rpm	430 kcps
Thixotropic Index	Ratio of viscosity 1rpm / 10rpm	3.5
Approximate Specific Gravity		6 grams/cc
Electrical Resistivity	Volume Resistivity 4-point probe	35 μohm-cm
Thermal Conductivity	Laser Flash Diffusivity	>30 W/mK
CTE	TMA expansion mode	22 ppm/°C
Lap Shear	Copper to Copper (0.125 in^2 overlap)	3500 psi[2]
Weight Loss on Sintering	TGA	5%
Work Life	Application testing after RT storage	24 hours @ 25°C
Estimated Screen Life	Stencil print applications testing	8 hours
Estimated Storage Life		12 months < -10°C

---

[1] Surface may remain copper color if reacted in air or an atmosphere with sufficient oxygen to prevent fluxing of outer copper particles.
[2] SnPb solder paste tested as a control provided a value of 2200psi.

Ormet Circuits, Inc.
6555 Nancy Ridge Dr. Suite 200
858.831.0010
Website: http://www.ormetcircuits.com

Technical Data Sheet

ORMET 710

April 2014

TYPICAL APPLICATIONS

Ormet 710 is used in via fill applications to increase yield and reduce product manufacturing time in both conventional plated through hole (PTH) and plated microvia configurations. **Ormet 710** also enables an alternative z-axis interconnect solution in printed circuit boards for many advanced interconnection designs where plating processes are cost and/or yield prohibited. Some applications that may be candidates for **Ormet 710** include:

- Filling high-aspect ratio holes (down to 50um in diameter) where plating is a time consuming and low yield process
- Replacing plated through holes in high frequency applications
- Enabling the placement of blind and buried vias in multilayer substrates at lower cost and at a higher throughput and yield than sequential copper plating
- Interconnecting layers in via-in-pad PCB applications

MATERIAL DEPOSITION GUIDELINES

Ormet 710 can be applied by several techniques. Most frequently **Ormet 710** is applied using a printing process with a polyester-based stencil formed in-situ during the laser drilling process. **Ormet 710** can also be applied by dispensing or conventional stencil- or screen-printing. It is recommended that a metal blade squeegee be used during printing in order to minimize scavenging and to fill flush with the top of the hole. In some cases, a second filling step is performed after the first fill has been dried. A second filling step can provide additional volume of paste to ensure robust electrical contact between layers of the PCB while accommodating variations in b-stage adhesive flow during lamination. Please refer to Ormet's Applications Guide for additional detail.

SINTERING PROCESS GUIDELINES[3]

	Recommended Profile	Alternate Profiles
Solvent Removal (Drying)	**30 minutes @ 95°C**	**20 minutes @115°C** **60 minutes @ 75°C**
Sintering	**60 minutes @ 190°C**	**60 minutes @ 210°C**

[3] **Ormet 710** is often installed in vias formed in b-staged adhesive layers with the purpose of interconnecting two layers of multilayer substrate. Electrical interconnect and mechanical bonding is formed simultaneously during the lamination cycle. The prepreg/adhesive manufacturer's recommended lamination cycle should be followed without modification.

Ormet Circuits, Inc.
6555 Nancy Ridge Dr. Suite 200
858.831.0010
Website: http://www.ormetcircuits.com

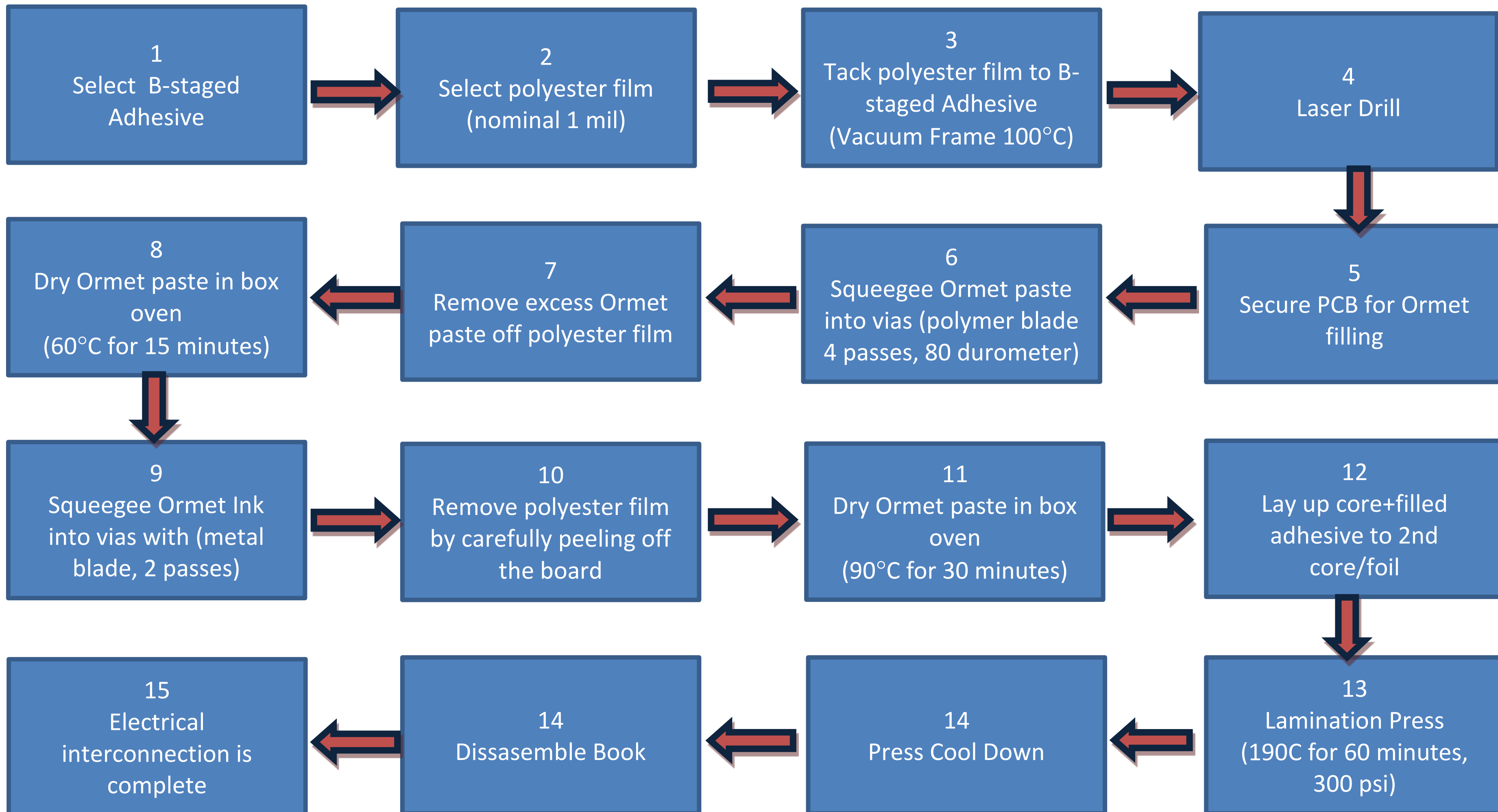
ORMET CIRCUITS, INC.

Technical Data Sheet

ORMET 710

April 2014

GENERIC PROCESS FLOW CHART for VIA FILL APPLICATION



Ormet Circuits, Inc.
6555 Nancy Ridge Dr. Suite 200
858.831.0010
Website: http://www.ormetcircuits.com

STORAGE AND HANDLING

Ormet 710 is supplied in 250 gram jars and a range of syringe and cartridge sizes. The storage temperature is -10°C MAX. **Ormet 710** must be stabilized to room temperature for 30 minutes before opening the jars for use.

GENERAL INFORMATION

The Material Safety Data Sheet (MSDS) contains safe handling information for this product. Please read carefully before handling or using this product.

The information provided in this Technical Data Sheet is believed to be correct and reliable; however, Ormet Circuits, Inc. does not assume responsibility for the user's implementation. Ormet Circuits, Inc. specifically disclaims all warranties expressed or implied including warranties for merchantability or fitness for use for a particular purpose, arising from sale or use of our products.

This product is covered by United States and foreign patents, both issued and pending, for the material compositions, applications and techniques for use. See the Ormet website for detailed patent information.

Ormet Circuits, Inc.
6555 Nancy Ridge Dr. Suite 200
858.831.0010
Website: http://www.ormetcircuits.com