

Dielectrics

IP 9117 E

REACH Compliant Multilayer Dielectric

Description

IP 9117 E is a permanent blue 850°C firing dielectric composition, displaying the following benefits:

Key Benefits

- Extremely dense, hermetic fired film allows for excellent electrical performance at a fired thickness of $\geq 40 \mu\text{m}$
- Excellent solderability and adhesion of Ag, Ag/Pd, Ag/Pt, Au and Au/Pt conductors on top of dielectric
- Resistors can be processed on top of dielectric
- Absence of the „Battery Effect“³.
- Free of cadmium and nickel
- Free of phthalate
- REACH⁴ and RoHS⁵ compliant

Processing

1. Spatulate well prior to processing. When stored in a refrigerator allow paste to come to room temperature prior to opening, to avoid condensation.
2. Print individual layers with a 200 – 325 mesh stainless steel screen. For best via resolution, a 325 mesh screen is recommended; whenever possible, a double wet pass of the squeegee is advised, to minimize pin holes.
3. Level at room temperature for 5 – 10 minutes
4. Dry at 150°C for 10 – 20 minutes
5. All layers of the interconnect structure should be fired separately. Fire in air, with a 30 – 60 minute cycle to a peak temperature of 850°C. Dwell time should be 9 – 11 minutes. Properties are unaffected by multiple re-firings.
6. General: Conductor and dielectric film thicknesses should be controlled carefully, to ensure high yield in production. Conductor thickness under dielectric film should not exceed 12 μm FFT.

Typical Properties (Paste)

| | |
|-------------|---|
| Form: | Thixotropic paste |
| Viscosity: | 45 – 75 Pas (23°C, D = 33 s ⁻¹) |
| Coverage: | c. 70 cm ² / g (40 μm FFT) |
| Shelf Life: | 6 months from date of shipment with correct storage (in a dry, cool (5 to 25°C) and dark place with container tightly shut) |

Typical Properties (Fired)¹

| | |
|--|--|
| Fired Film Thickness ² : (FFT) | $\geq 40 \mu\text{m}$ (3 separately fired layers) |
| Rel. Diel. Constant K: | 7.5 – 9.5 (25 ° C, 1 kHz) |
| Insulation Resistance: | $> 10^{12}$ Ohm x cm (25 °C) |
| Dissipation Factor: | $< 0.5 \%$ (25 °C, 1 kHz) |
| Breakdown Voltage: | $> 500 \text{ V @ } 40 \mu\text{m FFT}$ |
| Via Resolution: | $\geq 300 \mu\text{m}$ |

Compatibility

| | |
|-------------|--|
| Overglazes: | IP 9025 ST IP 9029 H |
| Conductors: | C 1200 D Series C 2000 Series C 1075 D C 1075 SD C 1075 SD (LPA 411-076) C 1076 SD C 1076 SD (LPA 609-022) C 5007 C 6012 |
| Resistors: | R 8900 D Series R 8900 (WP 09-XY) Series |

Thinner

HVS 507, HVS 100

Dielectrics

IP 9117 E

REACH Compliant Multilayer Dielectric

- 1 Typical properties based on laboratory test methods. For optimum results all materials should be fired in a profiled furnace supplied with dried, hydrocarbon and other contaminant free air (PP-1). Also depends in general on associated conductor materials employed, processing conditions and measurement methods.
- 2 Measured after printing with a 325 mesh steel screen; screen thickness and emulsion thickness combined was c.75 µm.
- 3 A separation of dissimilar conductor metallizations such as gold and silver is possible without blistering. This enables the use of more cost-effective, high conductive pure silver underneath the dielectric.
- 4 REACH compliant according to the Annex XIV (Feb. 17, 2011) of Commission Regulation (EU) No 143/2011 to Regulation (EC) No 1907/2006 of the European Parliament and of the council on the Registration, Evaluation, Authorisation and Restriction of Chemicals ("REACH") by European Chemicals Agency; we define a material as REACH compliant, as long as substances used are not recorded in the Annex XIV.
- 5 RoHS compliant according to Directives (European Union) No 2011/65/EC of Restriction of Hazardous Substances ("RoHS") and its subsequent amendments (including the exceptions No. 7. c. I. of the EU Directive e.g. related to Pb)

The descriptions and engineering data shown here have been compiled by Heraeus using commonly-accepted procedures, in conjunction with modern testing equipment, and have been compiled as according to the latest factual knowledge in our possession. The information was up-to date on the date this document was printed (latest versions can always be supplied upon request). Although the data is considered accurate, we cannot guarantee accuracy, the results obtained from its use, or any patent infringement resulting from its use (unless this is contractually and explicitly agreed in writing, in advance). The data is supplied on the condition that the user shall conduct tests to determine materials suitability for a particular application.

Europe [TH]
Heraeus Precious Metals GmbH & Co. KG
Thick Film Materials Division
Heraeusstr. 12 – 14
63450 Hanau
Germany
Tel: +49 (6181) 35 – 5466
E-Mail: th-info@heraeus.com
Internet: www.heraeus-thickfilm.com

Americas [TH]
Heraeus Materials Technology LLC
Thick Film Materials Division
24 Union Hill Road
W. Conshohocken, PA 19428
USA
Tel: +1 (610) 825 – 6050
E-Mail: techservice.hcd@heraeus.com
Internet: www.heraeus-thickfilm.com

Asia [TH]
Heraeus Materials Technology Shanghai Ltd.
No. 1 Guang Zhong Road
Zhuanquiao Town, Minhang District
201108 Shanghai
People's Republic of China
Tel: +86 (21) 3357 - 5688
E-Mail: th.hmts@heraeus.com
Internet: www.heraeus-thickfilm.com