



## ESL ELECTROSCIENCE

CERAMIC TAPES &  
THICK-FILM MATERIALS

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# CERMET SILVER/PALLADIUM CONDUCTOR

# 9638

ESL 9638 is a silver/palladium conductor specifically designed for use as an electrode in thick film capacitor structures. When this conductor is used with 4113 capacitor dielectric, the apparent dielectric constant (K) is increased by approximately 30%. Further information discussing thick film capacitor design is contained in a paper entitled "High Reliability Thick Film Capacitor Dielectrics" available upon request.

## PASTE DATA

**Rheology:** Thixotropic, screen-printable paste

**Viscosity:**  
(Brookfield RVT, 10rpm,  
ABZ Spindle, 25.5 ± 0.5 °C) 300 ± 25 Pa.s

**Bonding Mechanism:** Mixed-bonded

**Shelf Life (20 - 25 °C):** 6 months

## PROCESSING

**Screen Mesh, Emulsion:** 325 S/S, 25 µm

**Levelling Time (at 20°C):** 5 - 10 min

**Drying Time (at 125°C):** 10 - 15 min

**Firing Temperature Range:** 850 - 980°C in air  
Optimum: 930 - 980°C  
Time at peak: 10 min

**Rate of Ascent/Descent:** 50 - 60°C/min

**Substrate for Calibration:** 4113 Capacitor dielectric on 96% alumina

**Thinner:** ESL 401

ESL Europe 9638 9012-C

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See Caution and Disclaimer on other side.

## TYPICAL PROPERTIES

**Fired Thickness:** 11.0 ± 1.0µm  
(measured on a 2 mm x 2 mm pad on 96% alumina)

**Approximate Coverage:** 90 - 110 cm<sup>2</sup>/g

**Resistivity:** 15 - 25 mΩ/□  
(measured on a 100 mm x 0.25 mm conductor track)

**Printing Resolution:** 0.200 mm / 0.200 mm  
(line/space)

**Solder Wettability:** 90 - 100 %  
(RMA Flux, 5 sec. dip)  
62Sn/36Pb/2Ag (220°C)  
10Sn/88Pb/2Ag (325°C)  
95Sn/5Ag (260°C)  
63Sn/37Pb (250°C)

**Solids Content:** 90 - 100 %

**Solderability after Overglaze:** 90 - 100 %  
(500°C, 5 min., 62Sn/36Pb/2Ag)

**Solder Leach:** > 4 dips  
(No. of 10 sec. dips to double lowest resistance of 100 mm x 0.25 mm conductor)  
62Sn/36Pb/2Ag (220°C)  
63Sn/37Pb (250°C)

**Adhesion:**  
(90° pull, 2 mm x 2 mm pads, 62Sn/36Pb/2Ag)

Initial pull strength: > 6.0 kg  
Aged 48 hours at 150°C: > 4.5 kg

ESL Europe 9638 9012-C

**CAUTION:** Proper industrial safety precautions should be exercised in using these products. Use with adequate ventilation. Avoid prolonged contact with skin or inhalation of any vapours emitted during use or heating of these compositions. The use of safety eye goggles, gloves or hand protection creams is recommended. Wash hands or skin thoroughly with soap and water after using these products. Do not eat or smoke in areas where these materials are used. Refer to appropriate MSDS sheet.

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