



## ESL ELECTROSCIENCE

CERAMIC TAPES &  
THICK-FILM MATERIALS

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# CERMET SILVER CONDUCTOR

# 9912-K FL

**Lead, Cadmium and Nickel-Free\***  
**Excellent Fine-Line Capability**

ESL 9912-K FL is a fine-line printing silver conductor having a wide range of applications, for example chip resistors, consumer hybrids, potentiometers and heaters. It exhibits excellent line resolution printing 75 micrometer wide lines. Due to the wide firing temperature range, this conductor may be processed onto a variety of substrates including glass, Porcelain Enamelled Steel (PES), alumina and special ceramics.

## PASTE DATA

<b>Rheology:</b>	Thixotropic, screen-printable paste
<b>Viscosity:</b> (Brookfield RVT, 10rpm, ABZ Spindle, 25.5 ± 0.5 °C)	310 ± 20 Pa.s
<b>Bonding Mechanism:</b>	Mixed-bonded
<b>Shelf Life (20 - 25 °C):</b>	6 months

## PROCESSING

<b>Screen Mesh, Emulsion:</b>	325 S/S, 25 µm
<b>Levelling Time (at 20°C):</b>	5 - 10 min
<b>Drying Time (at 125°C):</b>	10 - 15 min
<b>Firing Temperature Range:</b>	On alumina/beryllia/ceramics: 850 - 930°C in air On Porcelain Enamelled Steel (PES): 625°C in air Optimum (alumina): 850°C in air Optimum (beryllia): 930°C in air Time at peak: 10 min
<b>Total Firing Cycle:</b>	1 hour
<b>Substrate for Calibration:</b>	96% alumina
<b>Thinner:</b>	ESL 401

(Note: furnace air must be clean, dry and oil-free)

ESL Europe 9912-K FL 0506-A

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See Caution and Disclaimer on other side.

## TYPICAL PROPERTIES

(measurement on alumina after firing at 850°C)

**Fired Thickness:** 12.5 ± 2.5 µm  
(measured on a 2 mm x 2 mm pad on 96% alumina)

**Approximate Coverage:** 100 - 125 cm<sup>2</sup>/g

**Resistivity:** < 2.5 mΩ/□  
(measured on a 100 mm x 0.25 mm conductor track at 12.5 µm fired thickness)

**Printing Resolution:** 0.075 mm / 0.075 mm  
(line/space)

**Solder Wettability:** 100 %  
(RMA flux, 5 sec. dip, (62Sn/36Pb/2Ag, 220 °C)

**Solder Leach:** > 5 dips  
(No. of 10 sec. dips to double lowest resistance of 100 mm x 0.25 mm conductor, 62Sn/36Pb/2Ag, 220 °C)

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

Initial pull strength: > 7.0 kg  
(on most ceramic substrates)  
Aged 48 hours at 150°C: > 6.0 kg

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\*None of the six substances referred to in the RoHS Directive (2002/95/EC) are used in the formulation of this product.

**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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