



ESL ELECTROSCIENCE

CERAMIC TAPES &
THICK-FILM MATERIALS

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CERMET SILVER CONDUCTOR

9990

ESL 9990 silver conductor has been designed to give excellent adhesion properties when printed and fired on a variety of substrates including beryllia, ferrite and 99.5% alumina. This is achieved by means of a reactive bonding mechanism (MICRO-LOK[®]) which does not require glass frit and gives an excellent solder leach resistance compared with standard silver conductors.

PASTE DATA

Rheology: Thixotropic, screen-printable paste

Viscosity:
(Brookfield RVT, 10rpm,
ABZ Spindle, 25.5 ± 0.5 °C) 225 ± 25 Pa.s

Bonding Mechanism: Fritless, MICRO-LOK[®]

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 - 950°C in air
Optimum: 930°C
Time at peak: 10 min

Rate of Ascent/Descent: 50 - 60°C/min

Substrate for Calibration: 96% alumina

Thinner: ESL 401

ESL Europe 9990 9002-C

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See Caution and Disclaimer on other side.

TYPICAL PROPERTIES

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

Approximate Coverage: 100 - 125 cm²/g

Resistivity: 1.5 - 2.5 mΩ/□
(measured on a 100 mm x 0.25 mm conductor track)

Printing Resolution: 0.125 mm / 0.125 mm
(line/space)

Solder Wettability:
(RMA Flux, 5 sec. dip)

62Sn/36Pb/2Ag	(2205°C)	100%
10Sn/88Pb/2Ag	(3255°C)	
95Sn/5Ag	(2605°C)	
63Sn/37Pb	(2505°C)	

Solderability After Overglaze: 100%
(500°C, 5 min, 62Sn/36Pb/2Ag)

Solder Leach:
(No. of 10 sec. dips to double lowest resistance of 100 mm x 0.25 mm conductor)

62Sn/36Pb/2Ag	(220°C)	> 6 dips
63Sn/37Pb	(250°C)	

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

Initial pull strength:	7 - 11 kg
Aged 48 hours at 150°C:	6 - 9 kg

Ultrasonic Al Wire Bond: 7 - 10 g
(25µm wire)

Thermosonic Au Wire Bond: 6 - 10 g
(25µm wire)

ESL Europe 9990 9002-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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