



# Electro-Science Laboratories, Inc.

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## CERMET SILVER CONDUCTOR

## 9912-A

ESL 9912-A is a mixed bonded silver paste particularly developed for chip resistors, consumer hybrid circuits, potentiometers and heater elements. Because of its wide firing temperature range, 9912-A may be processed on a variety of substrates including glass, porcelain enameled steel (PES), alumina, and beryllia. The 9912-A may be protected with ESL 4904 to prevent electrolytic silver migration.

### PASTE DATA

**RHEOLOGY:** Thixotropic, screen printable paste

**VISCOSITY:** (Brookfield RVT, ABZ Spindle, 10 rpm, 25.5°C±0.5°C) 150±25 Pa·s

**SHELF LIFE:** (25°C) 6 months

### PROCESSING

**SCREEN MESH/EMULSION:** 325/25 µm

**LEVELING TIME:** (25°C) 5-10 minutes

**DRYING AT 125°C:** 10-15 minutes

**FIRING RANGE:** 625°C-930°C

**alumina:** 850°C

**beryllia:** 930°C

**Porcelain enameled steel:** (in air) 625°C

**TIME AT PEAK:** 10 minutes

**RATE OF ASCENT/DESCENT:** 50°C-60°C/minute

**SUBSTRATE OF CALIBRATION:** 96% alumina

**THINNER:** ESL 401

9912-A 9810-C

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See Caution and Disclaimer on other side.

## TYPICAL PROPERTIES

<b>FIRED THICKNESS:</b>		9-14 $\mu\text{m}$
<b>APPROXIMATE COVERAGE:</b>		100-125 $\text{cm}^2/\text{gram}$
<b>RESISTIVITY:</b>		$\leq 3.0 \text{ m}\Omega/\text{sq.}$
<b>PRINTING RESOLUTION:</b> (Line/Space)		200 $\mu\text{m}$ x 200 $\mu\text{m}$
<b>SOLDER WETTABILITY:</b> (RMA flux, 5 sec. dip, 62 Sn/36 Pb/2 Ag, 220°C $\pm$ 5°C)		good - very good
<b>SOLDER LEACH:</b> (No. of 10 sec. dips to double resistance of 0.25 mm wide x 100 mm long conductor) (62 Sn/36 Pb/2 Ag, 220°C $\pm$ 5°C)		> 6 dips
<b>ADHESION:</b> (90° pull, 2.0 mm x 2.0 mm pads, 62 Sn/36 Pb/2 Ag, 220°C $\pm$ 5°C)	<b><u>Alumina</u></b>	<b><u>Beryllia</u></b>
<b>Initial pull strength:</b>	$\geq 65 \text{ N}$	$\geq 80 \text{ N}$
<b>Aged 48 hours at 150°C:</b>	$\geq 60 \text{ N}$	$\geq 70 \text{ N}$
<b>THERMOSONIC WIRE BOND:</b> (25 $\mu\text{m}$ Au wire)	$\geq 50 \text{ N}$	--
<b>ULTRASONIC WIRE BOND:</b> (25 $\mu\text{m}$ Al wire)	<b>Initial:</b>	$\geq 8 \text{ g}$
	<b>Aged 48 hours at 150°C:</b>	$\geq 5 \text{ g}$

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**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 vapors 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.

**DISCLAIMER:** The product information and recommendations contained herein are based on data obtained by tests we believe to be accurate, but the accuracy and completeness thereof is not guaranteed. No warranty is expressed or implied regarding the accuracy of these data, the results obtained from the use hereof, or that any such use will not infringe any patent. Electro-Science assumes no liability for any injury, loss, or damage, direct or consequential arising out of its use by others. This information is furnished upon the condition that the person receiving it shall make their own tests to determine the suitability thereof for their particular use, before using it. User assumes all risk and liability whatsoever in connection with their intended use. Electro-Science's only obligation shall be to replace such quantity of the product proved defective.