



## ESL ELECTRO-SCIENCE

CERAMIC TAPES &  
THICK-FILM MATERIALS

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## MULTILAYER DIELECTRIC COMPOSITION

# 4913-G

### Cadmium-Free, Lead-Free, and Nickel-Free\*

Dielectric composition 4913-G is a cadmium-free, lead-free, and nickel-free non porous multilayer dielectric for use on alumina substrates. This dielectric may be used with selected silver or gold based conductors or combinations of these metals.

### PASTE DATA

|                                                                          |                                     |
|--------------------------------------------------------------------------|-------------------------------------|
| <b>RHEOLOGY:</b>                                                         | Thixotropic, screen printable paste |
| <b>VISCOSITY:</b><br>(Brookfield RVT, 10 rpm, ABZ spindle, 25.5°C±0.5°C) | 250±25 Pa·s                         |
| <b>COLOR:</b>                                                            | blue                                |
| <b>SHELF LIFE: (25°C)</b>                                                | 6 months                            |

### PROCESSING

|                                   |                  |
|-----------------------------------|------------------|
| <b>SCREEN MESH/EMULSION:</b>      | 200 or 325/37 µm |
| <b>LEVELING TIME: (25°C)</b>      | 5-10 minutes     |
| <b>DRYING AT 125°C:</b>           | 10-15 minutes    |
| <b>FIRING TEMPERATURE:</b>        | 850°C            |
| <b>TIME AT PEAK:</b>              | 10 minutes       |
| <b>RATE OF ASCENT/DESCENT</b>     | 50°C-60°C/minute |
| <b>SUBSTRATE FOR CALIBRATION:</b> | 96% alumina      |
| <b>THINNER:</b>                   | ESL 401          |

4913-G 0507-D

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See Caution and Disclaimer on other side.

## TYPICAL PROPERTIES

|                                                                                  |                                     |
|----------------------------------------------------------------------------------|-------------------------------------|
| <b>FIRED THICKNESS:</b><br>(at least 2 layers between conductors on 96% alumina) | 40-55 $\mu\text{m}$                 |
| <b>DIELECTRIC CONSTANT (K) AT 1 MHz: (25°C)</b>                                  | 8-11                                |
| <b>DISSIPATION FACTOR AT 1 MHz: (25°C)</b>                                       | < 0.5%                              |
| <b>INSULATION RESISTANCE: (at 100 VDC)</b>                                       | $\geq 10^{11} \Omega$               |
| <b>BREAKDOWN VOLTAGE:</b><br>(at 25°C in air)                                    | $\geq 800 \text{ V}/25 \mu\text{m}$ |
| <b>LEAKAGE CURRENT:</b><br>(In 1M NaCl solution/10 VDC bias/5 minutes)           | < 1 $\mu\text{A}/\text{cm}^2$       |

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\* Complies with RoHS, ELV, WEEE and CHIP 3 EC directives

**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.

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