



ESL ELECTROSCIENCE

CERAMIC TAPES &
THICK-FILM MATERIALS

416 EAST CHURCH ROAD
KING OF PRUSSIA, PA 19406-2625, U.S.A

T: 610-272-8000
F: 610-272-6759

www.electroscience.com

MULTILAYER DIELECTRIC COMPOSITION

4929-G

RoHS Compliant*

ESL 4929-G dielectric is a non-porous blue multilayer dielectric with an excellent TCE match to 96% alumina. It is possible to print and fire many layers of this dielectric with minimal distortion of the substrate. Substrate sizes up to 150 mm x 100 mm x 1 mm can be used successfully with multiple large area prints of 4929-G. Screen gaps up to 1.8 mm are used with the large area screens (300 mm x 300 mm) that are necessary to print large circuits. This dielectric can be used in multilayer builds using gold or silver based products. Typical systems in use are 9695-G/4929-G/9635-G and 8844-G/4929-G/8846-G. Via filling should be carried out using 8835-VFG in gold based multilayer systems and with 9695-G in mixed metallurgy systems. It is possible to resolve 175 μ m vias using 4929-G. Both gold based and silver based conductors may be used as the resistor termination on top of the dielectric, but different resistor values and TCR shifts will be observed.

PASTE DATA

Rheology:

Thixotropic, screen-printable paste

Viscosity:

(Brookfield RVT, 10rpm,;
ABZ spindle, 25.5 \pm 0.5 $^{\circ}$ C)

375 \pm 25 Pa.s

Colour:

Light blue

Shelf Life (20 - 25 $^{\circ}$ C):

6 months

PROCESSING

Screen Mesh, Emulsion:

Gold bearing conductor:	325 S/S, 25 μ m
Silver bearing conductor:	200 S/S, 25 μ m

Levelling Time (20 $^{\circ}$ C):

5 - 10 min

Drying at 125 $^{\circ}$ C:

10 - 15 min

Firing Temperature Range:

850 - 950 $^{\circ}$ C in air

Optimum:

850 $^{\circ}$ C

Time at peak:

10 min

Total Firing Cycle:

1 hour

Substrate for Calibration:

96% alumina

Thinner:

ESL 401

ESL Europe 4929-G 0909-B

ESL Affiliates

ESL Europe (Agmet Ltd) • 8 Commercial Road • Reading • Berkshire • England • RG2 0QZ • Tel: +44 (0) 118 918 2400 • Fax: +44 (0) 118 986 7331 • Sales@ESLEurope.co.uk

ESL Nippon • Sukegawa Bldg. • 6th floor • 3-4 Yanagibashi 1-chome • Taito-ku • Tokyo 111, Japan • Tel: +81-3-3864-8521 • Fax: +81-3-3864-9270 • Sales@ESL-Nippon.co.jp

ESL China • Room #1707, Tower A, City Center of Shanghai • 100 Zunyi Road • Shanghai, China 200051 • Tel: +86-21-6237-0336 and 0337 • Fax: +86-21-6237-0338
ESLChina@eslshanghai.net

See Caution and Disclaimer on other side.

TYPICAL PROPERTIES

Fired Thickness:

(at least 2 layers between conductors on 96% alumina)

Gold based system	35 - 40 μm
Silver based system	45 - 50 μm

Approximate Coverage:

(40 μm thickness)

60 - 70 cm^2/g

Dielectric Constant (K) at 1 kHz:

(at 25°C)

7 - 10

Dielectric Constant (K) at 1 MHz:

(at 25°C)

6 - 8

Dissipation Factor at 1 kHz:

(depending upon conductor, at 25°C)

<0.4%

Insulation Resistance:

(at 100V DC)

>10¹¹ Ω

Breakdown Voltage:

(at 25°C in air)

> 1000V / 50 μm

Via Definition:

175 μm x 175 μm

Solder Wettability of Conductors over 4929-G Dielectric:

(RMA flux, 5sec. dip, 62Sn/36Pb/2Ag, at 220°C)

9635-G (Ag/Pd)	95 %
5837-G (Pt/Au)	85 - 90 %
9695-G (Ag/Pd)	85 - 90 %

For other information please see the relevant conductor data sheet

ESL Europe 4929-G 0909-B

*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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