



## 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](http://www.electroscience.com)

# MULTILAYER DIELECTRIC COMPOSITION

## 4905-C 4905-CH 4905-CD

The ESL 4905-C Series dielectrics are nonporous blue multilayer dielectrics with an excellent TCE match to 96% alumina. It is possible to print and fire many layers of these dielectrics with minimal distortion of the substrate. Substrate sizes up to 150 mm x 100 mm x 1 mm have been used successfully with multiple large area prints of 4905-CD. Screen gaps up to 1.8 mm are used with the large area screens (300 mm x 300 mm) necessary to print large circuits. These dielectrics can be used in multilayer builds using gold or silver based products. Typical systems in use are 9695/4905-CH/9633-B and 8836/4905-CD/8836. Via filling should be carried out using 8835-VF in gold based multilayer systems and with 9697 in mixed metallurgy systems. It is possible to resolve 175  $\mu$ m vias using 4905-CD. 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

<b>Rheology:</b>	Thixotropic, screen-printable paste	
<b>Viscosity:</b> (Brookfield RVT, 10rpm, ABZ spindle, 25.5 $\pm$ 0.5 $^{\circ}$ C)	4905-C:	325 $\pm$ 25 Pa.s
	4905-CH:	325 $\pm$ 25 Pa.s
	4905-CD:	450 $\pm$ 25 Pa.s
<b>Colour:</b>		Blue
<b>Shelf Life (20 - 25 <math>^{\circ}</math>C):</b>		6 months

### PROCESSING

<b>Screen Mesh, Emulsion:</b>	Gold bearing conductor:	325 S/S, 25 $\mu$ m
	Silver bearing conductor:	200 S/S, 25 $\mu$ m
<b>Levelling Time (20<math>^{\circ}</math>C):</b>		5 - 10 min
<b>Drying at 125<math>^{\circ}</math>C:</b>		10 - 15 min
<b>Firing Temperature Range:</b>		850 - 950 $^{\circ}$ C in air
	Optimum:	850 $^{\circ}$ C
	Time at peak:	10 min
<b>Total Firing Cycle:</b>		1 hour
<b>Substrate for Calibration:</b>		96% alumina
<b>Thinner:</b>		ESL 401

ESL Europe 4905-C, 4905-CH, 4905-CD 0207-F

#### 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. • 6<sup>th</sup> 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 Au conductors on 96% alumina)

Gold based system	35 - 40 $\mu\text{m}$
Silver based system	45 - 50 $\mu\text{m}$

### Approximate Coverage:

(40 $\mu\text{m}$  thickness)

60 - 70  $\text{cm}^2/\text{g}$

### 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)

<0.25%

### Insulation Resistance:

(at 100V DC)

>10<sup>11</sup>  $\Omega$

### Salt Test:

Leakage current (10V DC in 1M KCl)

<1 $\mu\text{A}$

### Breakdown Voltage:

(at 25°C in air)

> 1000V / 50 $\mu\text{m}$

### Via Definition:

4905-C	250 $\mu\text{m}$ x 250 $\mu\text{m}$
4905-CH	250 $\mu\text{m}$ x 250 $\mu\text{m}$
4905-CD	175 $\mu\text{m}$ x 175 $\mu\text{m}$

### Solder Wettability of Conductors over 4905-C Series Dielectrics:

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

9633-B (Ag/Pd)	95 %
5837 (Pt/Au)	85 - 90 %
9695 (Ag/Pd)	85 - 90 %

For other information please see the relevant conductor data sheet

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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 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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