



ESL ELECTROSCIENCE

CERAMIC TAPES &
THICK-FILM MATERIALS

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HIGH K CAPACITOR DIELECTRICS **4150 Series**

Low Temperature Capacitor Dielectric Pastes with Dielectric Constants Between 300 and 2400

ESL 4150 Series low firing temperature capacitor pastes are blendable to cover the range of dielectric constants from 300 to 2400 with X7S or X7T temperature characteristics and dissipation factors below 2%. The capacitors are compatible with low cost, all silver conductors such as ESL 9916. Optimum properties are achieved when the capacitors are overglazed to provide hermeticity.

PASTE DATA

Rheology:	Thixotropic, screen-printable paste	
Viscosity: (Brookfield RVT, 10 rpm, ABZ spindle, 25.5 ± 0.5 °C)	4151	260 ± 30 Pa.s
	4152	240 ± 30 Pa.s
	4153	220 ± 30 Pa.s
Colour:	Yellow - Tan	
Shelf Life (4 °C):	6 months	

PROCESSING

Screen Mesh, Emulsion:	200 mesh, 37.5 µm
Levelling Time (at 20°C):	10 - 15 min
Drying Time (at 125°C):	10 - 15 min
Firing Temperature Range:	850 - 930°C (in air)
	Optimum: 900°C
	Time at peak: 10 min
Rate of Ascent/Descent:	60 - 100°C / min
Substrate for Calibration:	96% alumina
Thinner:	ESL 401
Screen Cleaner:	acetone, isopropanol, polar organic solvents

ESL Europe (KOP) 4150 Series 0304-B

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See Caution and Disclaimer on other side.

TYPICAL PROPERTIES

(Properties based on capacitors of 1mm x 1mm electrode area)

	<u>4151</u>	<u>4152</u>	<u>4153</u>
Fired Thickness: (µm)	40 - 55	40 - 55	40 - 55
Dielectric Constant: (1 kHz, 25°C), K	300 ± 10%	1,000 ± 10%	2,400 ± 10%
EIA Designation:	X7S	X7S	X7T
Dissipation Factor: (1 kHz, 25°C), %	≤ 2.0	≤ 2.0	≤ 2.0
Insulation Resistance: (100 V DC), Ω	≥ 10 ⁹	≥ 10 ⁹	≥ 10 ⁹
Breakdown Voltage: (25°C in air), V/25 µm	≥ 200	≥ 200	≥ 200
Recommend Conductors:	ESL 9916, 9516		
Overglaze: (2 layers separately fired)	Acid plating resistant G-481 (green) or G-482 (black), fired at 600°C		
ΔC: (G-481 overglaze)	≤ -5%	≤ -5%	≤ -5%
Note:	X7S:	C Range = ±22%, -55°C to +125°C	
	X7T:	C Range = +22%, -33%, -55°C to +125°C	

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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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