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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 pastes	
VISCOSITY: (Brookfield RVT, ABZ spindle, 10 rpm, 25.5°C±0.5°C)	4151	260±30 Pa·s
	4152	240±30 Pa·s
	4153	220±30 Pa·s
COLOR:	yellow-tan	
SHELF LIFE: (at 4°C)	6 months	

PROCESSING

SCREEN MESH/EMULSION:	200 mesh/37.5 µm
LEVELING TIME:	10-15 minutes
DRYING AT 125°C:	10-15 minutes
FIRING TEMPERATURE RANGE:	850°C-930°C
	OPTIMUM: 900°C
	TIME AT PEAK: 10 minutes
RATE OF ASCENT/DESCENT:	60°C-100°C/minute

4150 Series 0304-B

ESL Affiliates

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See Caution and Disclaimer on other side.

SUBSTRATE OF CALIBRATION:	96% alumina
THINNER:	ESL 401
SCREEN CLEANER:	acetone, isopropanol, polar organic solvents

TYPICAL PROPERTIES

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

	4151	4152	4153
FIRED THICKNESS:	40-55 μm	40-55 μm	40-55 μm
DIELECTRIC CONSTANT (K) at 1 kHz: (Fired at 900°C, 9916 conductor, measured at 25°C)	300 \pm 10%	1,000 \pm 10%	2,400 \pm 10%
EIA DESIGNATION:	X7S	X7S	X7T
DISSIPATION FACTOR at 1 kHz: (at 25°C)	\leq 2.0%	\leq 2.0%	\leq 2.0%
INSULATION RESISTANCE: (at 100VDC)	$\geq 10^9\Omega$	$\geq 10^9\Omega$	$\geq 10^9\Omega$
BREAKDOWN VOLTAGE: (VDC/25 μm , 25°C in air)	≥ 200	≥ 200	≥ 200
RECOMMENDED CONDUCTORS:	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)	\leq -5%	\leq -5%	\leq -5%

Note:

X7S: C Range = \pm 22%, -55°C to +125°C
X7T: C Range = +22%, -33%, -55°C to +125°C

4150 Series 0304-B

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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