

Technical Data Sheet

Electronic Component Materials Inner Electrodes for Multilayer Ceramic Devices

Application

Ferro offers a broad selection of conductor pastes suitable for many applications in multilayer and ceramic chip components. Ferro's in-house metal and glass formulation and R&D enables

us to tailor products to meet specific needs, including working closely with customers to develop the optimum processing methods such as screen printing, dipping, drying and firing.

Electrodes for Ultra-low Fire PME Passive Components (920 - 1020°C)

Product Code	EL44-016	EL44-126	EL44-002	EL44-128	EL44-115	EL44-130
Typical Applications	Ultra-low Fire Multilayer Devices	Ultra-low Fire Multilayer Devices	Ultra-low Fire Multilayer Devices	Ultra-low Fire Multilayer Devices	Ultra-low Fire Multilayer Devices	Ultra-low Fire Multilayer Devices
Metal Composition	85Ag/15Pd	85Ag/15Pd	90Ag/10Pd	90Ag/10Pd	95Ag/5Pd	95Ag/5Pd
Application Methods	Screen Printing	Screen Printing	Screen Printing	Screen Printing	Screen Printing	Screen Printing
RoHS Compliant	Yes	Yes	Yes	Yes	Yes	Yes
Typical Formulation Properties						
Viscosity in Pa-s at 20°C	20 - 40	25 - 35	30 - 35	25 - 35	30 - 35	25 - 35
Paste Wt-% Metal Content	52.0	52.0	52.5	52.0	52.0	49.0
Sintering Inhibitor	None	BaTiO ₃	ZrO ₂	BaTiO ₃	ZrO ₂	BaTiO ₃
Typical Processing Parameters						
Solvent Loss Replacement Additive	M1178	M1166	M1178	M1166	M1178	M1166
Printing Screen Mesh	325 - 400	325 - 400	325 - 400	325 - 400	325 - 400	325 - 400
Drying (Peak Temp / Time)	90°C / 10 min	90°C / 10 min	90°C / 10 min	90°C / 10 min	90°C / 10 min	90°C / 10 min
Firing (Peak Temp Range)	970 - 1020°C	970 - 1020°C	950 - 1000°C	950 - 1000°C	920 - 960°C	920 - 960°C

Electrodes for Low Fire PME Passive Components (1000 - 1140°C)

Product Code	EL44-040	EL44-111	EL44-135	EL44-024	EL44-001
Typical Applications	Low-fire COG MLCC	Low-fire BaTiO ₃ based MLCC	Low-fire BaTiO ₃ based MLCC	Low-fire BaTiO ₃ based MLCC	Ultra-low fire COG MLCC, PZT and Lead Relaxor
Metal Composition	70Ag/30Pd	70Ag/30Pd	70Ag/30Pd	75Ag/25Pd	80Ag/20Pd
Application Methods	Screen Printing	Screen Printing	Screen Printing	Screen Printing	Screen Printing
RoHS Compliant	Yes	Yes	Yes	Yes	Yes
Typical Formulation Properties					
Viscosity in Pa-s at 20°C	25 - 35	23 - 31	30 - 41	32 - 42	25 - 35
Paste Wt-% Metal Content	52.0	50.0	50.0	50.0	48.0
Sintering Inhibitor	ZrO ₂	BaTiO ₃	BaTiO ₃	BaTiO ₃ / ZrO ₂	ZrO ₂
Typical Processing Parameters					
Solvent Loss Replacement Additive	M1149	M1155	M1155	M1178	M1178
Printing Screen Mesh	325 - 400	325 - 400	325 - 400	325 - 400	325 - 400
Drying (Peak Temp / Time)	90°C / 10 min	90°C / 10 min	90°C / 10 min	90°C / 10 min	90°C / 10 min
Firing (Peak Temp Range)	1050 - 1140°C	1050 - 1140°C	1050 - 1140°C	1020 - 1100°C	1000 - 1060°C
Comments	Compatible with Ferro COG630L and COG900L Dielectrics		Compatible with Ferro AD302L, X7R212L and X7R262L Dielectrics		

Electronic Component Materials

Inner Electrodes for Multilayer Ceramic Devices

Electrodes for High Fire PME Passive Components (1180 - 1450°C)

Product Code	64820002	E1192	EL45-006	EL44-006	EL44-055
Typical Applications	Varistors, Actuators, and Other Multilayer Devices	Varistors, Actuators, and Other Multilayer Devices	Inner Electrode for High-fire PME COG MLCC	Inner Electrode for High-fire PME X7R MLCC	Inner Electrode for High-fire PME COG MLCC
Metal Composition	100% Pt	100% Pt	100% Pd	30Ag/70Pd	30Ag/70Pd
Application Methods	Screen Printing	Screen Printing	Screen Printing	Screen Printing	Screen Printing
RoHS Compliant	Yes	Yes	Yes	Yes	Yes
Typical Formulation Properties					
Viscosity in Pa-s at 20°C	43 - 53	48 - 57	29 - 36	29 - 37	25 - 35
Paste Wt-% Metal Content	60.0	70.0	52.0	50.0	53.0
Sintering Inhibitor	None	None	ZrO ₂	BaTiO ₃	ZrO ₂
Typical Processing Parameters					
Solvent Loss Replacement Additive	68100063	M1155	M1166	M1166	M1166
Printing Screen Mesh	280 - 380	325 - 400	325 - 400	325 - 400	325 - 400
Drying (Peak Temp / Time)	80-120°C / 10-15 min	40-50°C / 5-10 min	90°C / 10 min	90°C / 10 min	90°C / 10 min
Firing (Peak Temp Range)	1300 - 1450°C	1300 - 1450°C	1270 - 1340°C	1180 - 1250°C	1180 - 1250°C
Comments	Designed for Wet Stack Multi-layer Mfg Processes at 35 - 45°C	Designed for Wet Stack Multi-layer Mfg Processes at 35 - 45°C			



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