

Technical Data Sheet

Ceramic Powders and Formulations for Passive Components Ultra Lowfire COG Type Dielectric Powders

Application

Ferro's COG type dielectric powders are designed for use in the manufacture of Class I MLCC and single layer capacitor components where COG TCC characteristics are required. These products are compatible with precious metal conductors and fire in air at the ranges indicated below.

Compatible electrode and termination ink products are also available from Ferro.

Most of these products are formulated and processed to be RoHS compliant unless noted otherwise. See individual Product Data Sheets for details.

PME COG Ultra Lowfire Products (Sintering Temps: 900 - 990°C; K-values < 60)

Product Code		ULF100	ULF140	VLF-220Aq4	ULF280	300NL	ULF310	VLF-440
Dielectric Type		P130 ¹	COG	COG	COG	COG	COG	COG
Dielectric Constant	@ 1 MHz	10	14	23	32	33	31	40
RoHS Compliant?		Yes	Yes	Yes	Yes	No	Yes	Yes
PbO Content	%	0	0	0	0	< 8%	0	0
Q*F Product		1000	6306	38,860	9500	n/a	n/a	25,590
Resonant Frequency (F _r)	GHz	10.9	8.8	4.77	6.3	n/a	n/a	4.45
Quality Factor	@ 1 MHz	≥20000	>10000	8,150	>50000	100,000	>100000	5,630
Dissipation Factor	% @ 1 MHz	≤0.005	≤0.010	<0.0008	≤0.002	≤0.005	≤0.001	0.001
Insulation Resistance (IR) at 25°C	GΩ	>20000	>20000	≥20000	>20000	>20000	>20000	≥20000
Insulation Resistance (IR) at 125°C	GΩ	>10000	>10000	≥20000	>5000	>20000	>10000	≥20000
Breakdown Strength	V/μm	>80	>80	>60	>80	>70	>80	>60
Particle Size	D50 μm	1.2	0.9	0.7	1.0	11.0	1.1	0.6
Surface Area	m ² /g	11.7	5.9	4.0	4.9	5.1	4.9	3.7
Powder Density ²	g/cc	3.2	4.5	4.0	4.5	4.6	4.7	4.5
Peak Firing Temperature	°C	940	900	940	960	960	960	990
Time at Peak Temperature	Hours	3	3	5	3	3	3	5
Electrode Composition	Ag/Pd	90/10	90/10 or 95/5	98/2	90/10	90/10	90/10	90/10
Ferro Electrode Ink Product		EL44-002	EL44-002 or EL44-115	EI-9802-Low-K-COG	EL44-002	EL44-002	EL44-002	EI-9010-Low-K-COG
Ferro Termination Ink Product ³		TM63-150	TM63-150	TM63-150	TM63-150	TM63-150	TM63-150	TM63-150
Comments		Formulated for solvent based slurries	Formulated for solvent based slurries	Formulated for water based & solvent based slurries	Formulated for solvent based slurries only	Formulated for water based & solvent based slurries	Formulated for water based & solvent based slurries	Formulated for water based & solvent based slurries

1 ULF100 TCC is typically in the +120 to +140 ppm range.

2 Helium Pycnometer.

3 Products shown are for platable applications. Other types are available.

PME COG Ultra Lowfire Products (Sintering Temps: 860 - 975°C; K-values > 60)

Product Code		ULF800	ULF840	ULF990	VLF-101
Dielectric Type		COG	COG	COG	COG
Dielectric Constant	@ 1 kHz	80	84	100	100
RoHS Compliant?		Yes	Yes	Yes	Yes
PbO Content	%	0	0	0	0
Dissipation Factor	% @ 1 kHz	0.05	0.040	0.030	< 0.08 (MHz)
Insulation Resistance (IR) at 25°C	GΩ	>20000	>20000	>20000	≥20000
Insulation Resistance (IR) at 125°C	GΩ	>10000	>20000	>5000	≥500
Breakdown Strength	V/μm	>60	>100	>80	>60
Particle Size	D50 μm	0.7	0.7	0.7	0.5
Surface Area	m ² /g	6.7	4.7	7.8	6.0
Powder Density ¹	g/cc	5.6	5.5	5.9	5.4
Peak Firing Temperature	°C	860	900	960	975
Time at Peak Temperature	Hours	3	1.5	2	5
Electrode Composition	Ag/Pd	90/10 or 95/5	90/10	90/10	95/5
Ferro Electrode Ink Product		EL44-002 or EL44-115	EL44-002	EL44-002	EL-9505-High-K-COG
Ferro Termination Ink Product ²		TM63-150	TM63-150	TM63-150	TM63-150
Comments			Nd free	Thin layer capable to 7 microns (fired)	

1 Helium Pycnometer.

2 Products shown are for platable applications. Other types are available.



EU RoHS Directive 2011/65/EU

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