

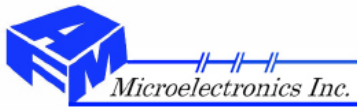


Dielectric Powder

AFM supplies the Ultra Low Fired ceramic powder for Multilayer Ceramic Capacitor (MLCC) and Single Layer Capacitor (SLC). The powder system includes COG and X7R formulation. Other formulation such as Z5U and Y5V are developing. All formulations are fired at lower than 920°C. Therefore, the inner electrode can be used 95 Ag/5 Pd or 100% Silver, which will dramatically, reduces the cost of MLCC.

All formulations are Lead(Pb), Cadmium(Cd), and Bismuth(Bi) free. The COG ceramic powder is for microwave application that has high Q, low ESR, at high frequency. This feature allows the MLCC can be used in cellular phone, communication device, microwave amplifier, Blue Tooth module, computer etc.

X7R formulation has very fine grain size and density structure. This feature allows the manufacture to make thinner ceramic sheets.



200C-ULF Powder (K20 Ultra-Low-Fire COG Dielectric)

Features

1. MgTiO₃ based ultra-low-fire COG dielectric
2. Dielectric Constant of 20-23
3. Excellent insulation resistance
4. High Q at high frequency
5. No Cd, Pb, Bi containing compounds

Typical Physical Properties

1. Particle Size (D50) 0.8-1.2um
2. Surface Area 2.0-4.0 m²/g
3. Specific Gravity 3.3-3.8g/cc
4. +325 mesh <0.5%

Typical Fired Electrical Properties

1. Dielectric Constant 20-23
2. Dissipation Factor(1MHz,1.0Vrms) 0.020%
Q(0402 14pf) @(1 GHz) 137
ESR 096 Ohm
3. TCC 0± 30ppm/°C from -55-125°C
4. IR at 25°C >5,000 Ohm-F
125°C >1,000 Ohm-F
5. Dielectric Withstanding Voltage >1000V/mil

Sample size available

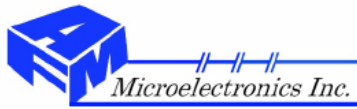
Processing Guidelines

(Detailed instructions available)

1. 200C-ULF is a fine particle size, deagglomerated powder. No further particle size reduction is required.
2. ZrO₂ media is recommended for mixing/milling operations. Contaminants such as aluminum oxides will result in degradation of electrical properties.
3. 50wt% ceramic /50% binder ratio is recommended as a starting point for casting using PVB or B7 acrylic binder systems.
4. Firing on ZrO₂ setters is recommended.
5. Firing temperature is in the 880-920°C range with a 2 hours soaking at peak temperature.

Compatible Materials systems

1. 200C-ULF is compatible with solvent base binder system.
2. 200C-ULF is compatible with commercially available 95%Ag/5%Pd or 100%Ag electrode system.



252X-ULF Powder (K2500 Ultra-Low-Fire X7R Dielectric)

Features

1. BaTiO₃ based ultra-low-fire X7R dielectric
2. Dielectric Constant of 2300-2700
3. Excellent insulation resistance
4. Resistant to physical defects
5. No Cd, Pb, Bi containing compounds

Typical Physical Properties

1. Particle Size (D50) 0.8-1.2um
2. Surface Area 2.0-4.0 m²/g
3. Specific Gravity 5.3-5.7g/cc
4. +325 mesh <0.5%

Typical Fired Electrical Properties

1. Dielectric Constant 2300-2700
2. Dissipation Factor(1MHz,1.0Vrms) 1.700%
3. TCC 15% (-55-125°C)
4. IR at 25°C >20,000 Ohm-F
125°C >2,000 Ohm-F
5. Dielectric Withstanding Voltage >600V/mil

Sample size available

Processing Guidelines

(Detailed instructions available)

1. 252X-ULF is a fine particle size, deagglomerated powder. No further particle size reduction is required.
2. ZrO₂ media is recommended for mixing/milling operations. Contaminants such as aluminum oxides will result in degradation of electrical properties.
3. 60wt% ceramic /40% binder ratio is recommended as a starting point for casting using PVB or B7 acrylic binder systems.
4. Firing on stainless steel or superalloy boat (which reduces the recurring cost of setters) is recommended.
5. Firing temperature is in the 850-900°C range with a 2 hours soaking at peak temperature.

Compatible Materials systems

1. 252X-ULF is compatible with solvent base binder system.
2. 252X-ULF is compatible with commercially available 95%Ag/5%Pd or 100%Ag electrode system.