

# Technical Data Sheet

## Ceramic Powders and Formulations for Passive Components Highfire X7R Type Dielectric Powders

### Application

Ferro's X7R type dielectric powders are designed for use in the manufacture of Class II MLCC and single layer capacitor components where X7R type 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 X7R Type Highfire Products (Sintering Temps: 1250 - 1310°C)

Product Code		X7P182H	X7R302H	X7R422H	HF-402	X5000
Dielectric Type		X7P	X7R	X7R	X7R	X7R
Dielectric Constant	@ 1 kHz	2000	3000	3800	3900	5000
RoHS Compliant?		Yes	Yes	Yes	Yes	Yes
PbO Content	%	0	0	0	0	0
Typical Fired Layer for DF < 2.5%	µm	12	8	9	≤ 2.0% at 20µm	≤ 10
RC Product at 25°C, 50V and 1kHz	ΩF	≥ 5000	≥ 3000	≥ 10,000	≥ 5000	≥ 20,000
RC Product at 125°C, 50V and 1kHz	ΩF	≥ 500	≥ 400	≥ 1000	≥ 500	≥ 1800
Breakdown Strength	V/µm	≥ 50	≥ 40	> 40	> 40	≥ 40
Particle Size D50	µm	1.0	1.0	1.1	0.7	1.4
Surface Area	m <sup>2</sup> /g	3.0	2.3	2.6	2.5	2.0
Powder Density <sup>1</sup>	g/cc	5.5	5.5	5.5	5.9	6.0
Peak Firing Temperature	°C	1280	1310	1310	1250	1290
Time at Peak Temperature	Hours	1.5	1.5	1.5	3.0	2.0
Electrode Composition	Ag/Pd	30/70	30/70	30/70	30/70	30/70
Ferro Electrode Ink Product		EL44-006	EL44-006	EL44-006	EI-3070-X7R	EL44-006
Ferro Termination Ink Product <sup>2</sup>		TM63-150	TM63-150	TM63-150	TM63-150	TM63-150

<sup>1</sup> Helium Pycnometer.

<sup>2</sup> Products shown are for platable applications. Other types are available.



EU RoHS Directive 2011/65/EU

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