

Technical Data Sheet

Electronic Glass Powders Low Temperature Pb-based Glasses

Application

Ferro's low temperature Pb-based glasses are produced with a wide range of thermal expansion, firing temperatures and flow properties to meet a variety of applications. These can include hermetic sealing, encapsulation and coating of metal, ceramic,

and glass substrates and components; as well as use as binding agents for metal and ceramic pastes. Pb in glass is RoHS exempt and so these products can be used in RoHS compliant applications. Typical properties can be seen below.

Vitreous Low Temperature Pb-based Glass Powders

Product Code		EG 2928	IP 550	IP 530	CF 1417	CF 7570	CF 7555	IP 510	CF 8463
Composition Family		Pb-Zn-B	Pb-Si-B-Al	Pb-Si-B-Al	Pb-B-Al	Pb-B-Al-Si	Pb-B-Zn	Pb-Si-B-Al	Pb-B-Si
Peak Firing Temperature	°C	500	585	540	487	470	450	500	425
Time at Peak Temperature	minutes	15	10	10	15	25	15	10	15
CTE at 260 °C	$\times 10^{-7}/^{\circ}\text{C}$	66.5	65	80	87	84.5	87	98	102
CTE at Set Point	$\times 10^{-7}/^{\circ}\text{C}$	60	74.4	94	95	95.9	100	109	114
Softening Point	°C	470	551	498	427	447	415	425	388
Annealing Point (T_a)	°C	450	470	433	375	380	385	375	350
Glass Transition Temp (T_g)	°C	415	453	417	365	385	366	360	321
Powder Density	g/cc	5.30	4.40	5.20	5.60	5.40	5.70	6.10	6.20
Typical Powder Types		VEG	RWG	RWG	VSD	VSD	VSD	RWG	VSD
Typical Applications		Alumina & ZnO Overglaze & Sealing	Metal & Ceramic Bonding Agent	Metal & Ceramic Bonding Agent	Ferrite Sealing	Titanium, Dumet Sealing	Ferrites	Metal & Ceramic Bonding Agent	Ferrites

Crystallizing Low Temperature Pb-based Glass Powders

Product Code		CF 7578	CF 7575	CF 7572
Composition Family		Pb-Zn-B	Pb-Zn-B Composite	Pb-Zn-B
Peak Firing Temperature	°C	530	450	450
Time at Peak Temperature	minutes	60	60	60
CTE at 260 °C	$\times 10^{-7}/^{\circ}\text{C}$	73	83	97
CTE at Set Point	$\times 10^{-7}/^{\circ}\text{C}$	63.5	91.1	95
Softening Point	°C	445	370*	370
Annealing Point (T_a)	°C	400	313	313
Glass Transition Temp (T_g)	°C	329	310	310
Powder Density	g/cc	5.8	6.2	6.4
Typical Powder Types		VSD	VSD	VSD
Typical Applications		Fiber Optic Sealing	Soda Lime Glass, Dumet Sealing	Macor Sealing

* Refers to the softening point of the base-glass of the composite

Low Temperature Pb-based Glass Composites

Product Code		EG 2000	EG 2004	EG 3463	EG 4000	EG 2020
Composition Family		Pb-B-Zn Composite	Pb-B-Zn Composite	Pb-B-Si Composite	Pb-B-Zn Composite	Pb-B-Zn Composite
Peak Firing Temperature	°C	500	425	450	420	390
Time at Peak Temperature	minutes	10	10	10	15	10
CTE at 260 °C	$\times 10^{-7}/^{\circ}\text{C}$	48	66.5	72	81.5	84
CTE at Set Point	$\times 10^{-7}/^{\circ}\text{C}$	51.8	70	85	86	93.8
Softening Point ¹	°C	350	350	388	350	350
Annealing Point (T _a)	°C	325	325	334	325	325
Glass Transition Temp (T _g)	°C	315	315	321	315	315
Powder Density	g/cc	4.3	5.2	5.3	5.7	5.8
Typical Powder Types		VEG	VEG	VSD	VEG	VEG
Typical Applications		Kovar Sealing	Alumina, ZnO Sealing	Alumina Sensor Sealing	Soda Lime Glass Sealing	Steatite Sealing

¹ Refers to the softening point of the base-glass of the composite



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