

# Technical Data Sheet

## Electronic Glass Powders Passivation Glasses

### Application

Ferro's Pb-Silicate and Pb-Si-Borate passivation glasses are designed for use on transistors, thyristors and diodes. These products are formulated and processed to achieve very low alkali and iron levels and can be applied by a variety of techniques including Doctor Blading, Photo-Spin, Sedimentation, Screen Printing and Electrophoresis.

Ferro's Zn-B-Silicate passivation glasses are used for hermetic passivation of high voltage devices. They provide high junction temperatures and can be applied to wafers using electrophoresis and thick film methods. These products also possess low alkali and iron levels.

Ferro Passivation Glasses are also used for encapsulation of rectifiers using glass beading applications.

IP 745 is primarily used for single chip, low to medium voltage rectifiers. IX 2443 and EG 2730 are crystallizing glasses with thermal expansions closely matched to silicon for use on stacked-chip diodes for high voltage applications.

For applications requiring thicker layers or on large diameter wafers, composite "L" or "C" low expansions versions are available for most products. Due to the addition of low expansion fillers, they typically require a 25°C higher firing temperature.

Composites such as these are typically not suitable for direct application on the junction and so an underlying layer of the un-filled glass is recommended.

Typical Passivation Glass properties can be seen below.

### Pb-Si-Al Based Passivation Glass Powders

Product Code		IP 900	IP 750	IP 830	IP 745	IP 760
Composition Family		Pb-Si-B-Al Vitreous	Pb-Si-B-Al Vitreous	Pb-Si-B-Al Vitreous	Pb-Si-B-Al Vitreous	Pb-Si-B-Al Vitreous
Peak Firing Temperature	°C	890	755	815	690	710
Time at Peak Temperature	minutes	15	10	15	10	10
CTE at 260 °C	$\times 10^{-7}/^{\circ}\text{C}$	37.0	42.5	45.0	48.0	48.0
CTE at Set Point	$\times 10^{-7}/^{\circ}\text{C}$	38.5	46.5	50.0	53.5	54.0
Softening Point	°C	771	698	740	630	653
Annealing Point ( $T_a$ )	°C	670	600	571	540	550
Glass Transition Temp ( $T_g$ )	°C	520	462	544	458	475
Powder Density	g/cc	2.90	3.29	3.54	3.45	3.52
Typical Powder Types		RWG	RWG	RWG	RWG, DSD	RWG
Typical Applications		Wafer Passivation	Wafer Passivation	Wafer Passivation	Diode Encapsulation	Wafer Passivation

### Zn-B-Si-Pb Based Passivation Glass Powders

Product Code		IX 2443	EG 2730	IX 2218
Composition Family		Zn-B-Si-Pb Crystallizing	Zn-B-Si-Pb Crystallizing	Zn-B-Si-Pb Vitreous
Peak Firing Temperature	°C	700	720	670
Time at Peak Temperature	minutes	10	10	10
CTE at 260 °C	$\times 10^{-7}/^{\circ}\text{C}$	45.0	44.0	48.0
CTE at Set Point	$\times 10^{-7}/^{\circ}\text{C}$	33.0*	37.0*	57.0*
Softening Point	°C	618	615	612
Annealing Point ( $T_a$ )	°C	525	550	575
Glass Transition Temp ( $T_g$ )	°C	531	538	543
Powder Density	g/cc	3.96	3.90	4.03
Typical Powder Types		RWG	TF	REG, MVG
Typical Applications		Wafer Passivation	High Voltage Diode Encapsulation	Diode Encapsulation

\* Fired Thermal Expansion (CTE)



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