FERRO
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Technical Information
GF08

Performance Colors & Glass

Frits for the Grinding Wheel Industry

For the production of grinding wheels, we offer special frits to help embed and bind the abrasive grain. Our frits and special glasses, depending on the field of application, are designed for different types of abrasives:

- corundum, also SG corundum
- silicon carbide
- CBN and diamond.

These frits can be used alone, or in combination with clay, kaolin, quartz, feldspar, nepheline syenite, or wollastonite. Recently also pure glasses are used for high-performance applications and for the reduction of the firing temperature.
Selection of frits depends on the specific purpose of the application, the type of abrasive grain, and the additives used, as well as the firing temperature, which is generally between 680 °C and 1300 °C.
In order to indicate softening characteristics, we show transformation temperature and flowing behaviour, as determined by a hot stage microscope.
The thermal expansion of these frits can be used to assess the tension between abrasive grain and binder.

Frits for the production of conventional grinding wheels

The frits listed in table 1 are recommended for the use in the production of conventional grinding wheels, i.e. corundum (incl. SG corundum) and SiC. Depending on the melting behaviour, they are suitable for normal firing conditions or for lower temperature firing cycles.

Our frit 90 739 F is specially developed for the application in combination with silicon carbide.

Special glasses for the ceramic bonding of superabrasives

Our special glasses listed in table 2 are intended for the application with superabrasives (CBN and diamond). Their wetting behaviour is excellent. Another improvement of the properties could be reached by using a ceramic-coated grain as offered by GE SUPERABRASIVES.
Our products 90 740 F, 90 741 F, and 90 742 F are glasses with a strong tendency to recrystallisation. By controlling the temperature the strength of the ceramic bond can thus be affected.
Blending of these glasses allows customer to tailor the ceramic to his special conditions and needs.

In our Technical Information GF01, „Specifications and properties of our glaze frits and glazes“, the measures and data from the tables are explained more detailed.

Table 1 Frits for the production of conventional grinding wheels

Product number	Density	C.T.E. (20-400°C)	Softening behaviour Tg	BS	HBT	Composition										Application
	g/cm³	x 10^{-7} / K	°C	°C	°C	Li_2O	Na_2O	K_2O	B_2O_3	Al_2O_3	CaO	MgO	BaO	ZnO	SiO_2	
90 158 M 90 158 F 90 158 E	2.4	87	519	660	750		B		A						A	Corundum
90 167 M 90 167 F	2.5	152	465	660	750		B	B	B	B	C				A	Corundum
90 263 M 90 263 F	2.5	129	442	570	710		B	B	A	B	B	B			A	Corundum
90 328 F	2.2	49	495	795	1270		B		A	B					A	Corundum, SiC
90 404 F	2.5	62	540	750	920		B		B		B	C		C	A	Corundum, SiC
90 5735 F	2.6	96	490	580	680	C	B	B	A						A	Corundum
90-3706909 (M)	2.8	105	490	620	720	C	B	C	B	C	B	B			A	Corundum
90 739 F	2.7	57	710	920	1160					B	B	C	B		A	SiC

A= >20%, B= 5-20%, C= <5%

C.T.E. = linear coefficient of thermal expansion BS = beginning of softening
Tg = transformation temperature HBT = half-ball temperature
Particle size: M = medium, F = fine, E = extra fine

Table 2 Special glasses for the ceramic bonding of superabrasives

Product number	Density	C.T.E. (20-400°C)	Softening behaviour Tg	BS	HBT	Composition												Application
	g/cm³	x 10^{-7} / K	°C	°C	°C	Li_2O	Na_2O	K_2O	F	B_2O_3	Al_2O_3	CaO	MgO	BaO	SiO_2	ZrO_2	TiO_2	Bi_2O_3	
40 582 TF*	2.5	68	422	780	870		B	C	B	B	B	C	C		A				Diamond, CBN
90 740 F	2.8	77	470	680	760	B			C	A					A	A	C		Diamond, CBN
90 741 F	2.7	84	498	620	740	C	B	C		B	B	C	C		A	C	C	C	Diamond, CBN
90 742 F	2.7	84	486	600	720	B	C	C	C	B	C	C	C		A	B	C	C	Diamond, CBN
90 743 F	2.6	60	702	890	1080		B	C		B	B	B	C	B	A			B	CBN, High Performance Application Corundum

*ready-to-use bonding, GHS symbol 07, H phrases 302, 332
A= >20%, B= 5-20%, C= <5%

C.T.E. = linear coefficient of thermal expansion BS = beginning of softening
Tg = transformation temperature HBT = half-ball temperature
Particle size: F = fine