

FRIALIT®-DEGUSSIT® High-Performance Ceramics

Material	Alumina Al ₂ O ₃						Zirconia ZrO ₂			Silicon Carbide SiC		Silicon Nitride Si ₃ N ₄	
	F99.7	DD 57	AL 23	AL 24	AL 25	FZT	FZM	FZY	FZM/K	SiC 198	SiC 198D	HP 79	GP 79
Structural properties:													
Density (g/cm ³)	≥ 3.9	≥ 3.9	3.70-3.95	> 3.4	> 2.8	≥ 4.05	≥ 5.7	≥ 5.5	≥ 6.0	3.1	3.1	> 3.23	3.21
Open porosity (%)	0	0	0	≤ 5	20-30	0	0	0	0	< 1	≤ 3	0	0
Grain size (µm)	10	10	10	40	70	5	50	30	0.5	-	-	-	1-5
Mechanical properties:													
Hardness (Knoop) (N/mm ²) (MPa)	23 000	23 000	23 000	-	-	20 000	16 000	17 000	18 000	21 000	26 000	17 000	17 000
Compressive strength (N/mm ²) (MPa)	3 500	3 000	3 500	1 000	300	3 000	2 000	2 000	2 200	1 200	> 3 000	3 000	3 000
Bending strength (N/mm ²) (MPa)	350	300	300-350	150	70	460	500	400	800	350	450	900	760
Weibull modulus	> 10	> 10	> 10	-	-	> 15	> 15	-	9	> 10	≥ 12	15	15
E-modulus E (GPa)	380	380	380	-	-	360	185	200	200	330	400	310	320
Poisson ratio ν	0.22	0.22	0.22	-	-	0.24	0.30	-	0.30	0.20	0.16	0.26	0.28
Thermal properties:													
Max. operating temperature in air (°C)	1 950	1 950	1 950	1 950	1 950	1 700	900	1 700	1 200	1 400	1 650	1 200	1 200
Specific heat 20°C (J/kg•K)	900	900	900	-	-	850	400	400	400	900	1 000	800	700
Thermal conductivity 100°C (W/m•K)	30	35 ***	30	-	-	25	2.5	2.5	2.5	90	125	28***	25***
Coefficient of expansion 20-1000°C (10 ⁻⁶ /K)	8.2	8.5	8.2	8.2	8.2	8.3	10.6*	10.9	10.8	4.4	4.5	3.2	3.2
Electrical properties:													
Specific resistance 20°C Ω•cm	10 ¹⁵	10 ¹⁴	10 ¹⁴	-	-	-	10 ¹⁰	10 ¹⁰	10 ¹⁰	10 ⁻¹	10 ⁷	10 ¹⁰	10 ¹¹
500°C Ω•cm	10 ¹¹	10 ¹⁰	10 ¹⁰	-	-	-	10 ⁴	4•10 ²	10 ²	-	-	-	-
1000°C Ω•cm	10 ⁷	10 ⁷	10 ⁷	-	-	-	84**	15	-	-	-	10 ⁷	10 ⁷
Colour:													
	ivory	red	ivory	ivory	white	white	yellow	white	white				

* at 20-900°C

** at 900°C

*** at 20°C

The data shown in the table above is valid according to German industrial standard DIN 40685, where the given values only pertain to the measured test specimen. The given values must be taken as a guideline value and may not be applicable to other shapes of the same material.