



Mechanical and physical properties of FRIALIT®-DEGUSSIT® Engineering Ceramics in comparison with hard metal and stainless steel.

Material	Aluminium oxide Al_2O_3		Zirconium oxide ZrO_2			Silicon carbide SiC	Silicon nitride Si_3N_4	Tungsten carbide	Stainless steel
	F 99,7	FZT	FZM	FZY	FZM/K	SiC 198	HP 79	Wc/Co	
Material structure properties:									
Density (g/cm ³)	3,9–3,95	4,1–4,15	5,7–5,8	5,5–5,8	6,0–6,1	3,1	3,2	15,0	7,9
Mechanical properties:									
Hardness (Knoop) (N/mm ²) (MPa)	23 000	23 000	17 000	17 000	17 000	21 000	17 000	14 000	2 000
Compressive strength (N/mm ²) (MPa)	3 500	3 000	2 000	2 000	2 200	1 200	3 000	5 000	200–490(δ)
Bending strength (N/mm ²) (MPa)	350	450	500	350	800	350	750	2 500	200–490(δ)
E-modulus E (GPa)	380	360	200	165	200	330	320	600	200
Thermal properties:									
Max operating temperature (°C)	1 950	1 700	900	1500	1 200	1 400	1 400	ca 200	ca 375
Specific heat 20 °C (J/kgK)	900	850	400	400	400	900	800	ca 500	ca 500
Thermal conductivity 100 °C (W/mK)	30	25	2,5	2,5	2,5	90	40	95	15
Coefficient of expansion 20–1000 °C (10 ⁻⁶ /K)	8,5	9	10	10,5	11	4,4	3,2	5,0	16,8
Electrical properties:									
Specific resistance 20 °C Ωcm	10 ¹⁵	—	10 ¹⁰	10 ¹⁰	10 ¹⁰	10 ⁻¹	10 ¹⁴	—	—
Specific resistance 500 °C Ωcm	10 ¹¹	—	10 ⁴	5 · 10 ³	10 ²	—	—	—	—
Specific resistance 1000 °C Ωcm	10 ⁷	—	—	5 · 10 ¹	—	—	—	—	—
Colour:	White	White	Yellow	White	White	Black	Black		