

MATERIAL OVERVIEW | OXIDE CERAMICS

Properties	Standard	Specification	Unit	F99.7	FZT	DEGUSSIT AL23	DEGUSSIT AL24	DEGUSSIT AL25	FZM Mg-PSZ	FZM+ Mg-PSZ	DEGUSSIT FZY	Star Ceram® AT
Main component	-	-	-	α - Al ₂ O ₃	Al ₂ O ₃ , ZrO ₂	α - Al ₂ O ₃	α - Al ₂ O ₃	α - Al ₂ O ₃	ZrO ₂ , MgO	ZrO ₂ , MgO	ZrO ₂ , Y ₂ O ₃ , Al ₂ O ₃	Al ₂ TiO ₅
Colour	-	-	-	ivory	white	ivory	cream white	white	yellow	white	white	white
Density (ρ_b)	DIN EN ISO 18754	-	[g/cm ³]	≥ 3.90	≥ 4.10	3.70 - 3.95 ²⁾	> 3.40	> 2.80	≥ 5.70	≥ 5.75	≥ 5.60	3.32
Open porosity (π_o)	DIN EN ISO 18754	-	[vol.-%]	0	0	0	≤ 12	20-30	0	0	0	-
Average crystal size (g_{mil})	ISO 13383-1	A1	[μm]	10	5	10	40	70	50	25	30	-
Hardness (HV10)	DIN EN ISO 14705	Procedure A	[GPa]	17.3 ¹⁾	18.4 ¹⁾	17.1 ¹⁾	-	-	12.0 ¹⁾	11.8 ¹⁾	13.7 ¹⁾	5
Compressive strength ($\sigma_{c,m}$)	DIN ISO 17162	-	[MPa]	2500	3000	2500	1000	300	2000	2000	2000	-
Flexural strength ($\sigma_{f,4}$)	DIN EN 843-1	Four-Point-Bending	[MPa]	350	460	300 - 350 ²⁾	150	70	500	800	400	25 ³⁾
Young's modulus (E)	EN 843-2	dynamic	[GPa]	380	360	380	-	-	207	215	200	10
Poisson's ratio (μ)	EN 843-2	resonance	-	0.24	0.24	0.22	-	-	0.31	0.32	-	-
Fracture toughness ($K_{Ic, SEVNB}$)	DIN EN ISO 23146	SEVNB	[MPa·m ^{0.5}]	5	3.3	-	-	-	6.3	8.7	-	3 - 5
Weibull modulus (m)	DIN EN ISO 20501	-	-	> 10	> 15	-	-	-	> 20	> 20	-	> 60
Max. operating temperature	-	in air	[°C]	1950	1700	1950	1950	1950	900	900	1700	1000
Thermal conductivity (λ)	DIN EN ISO 18755	-	[W/(m·K)]	34.9	25	34.9	27.8	-	3	3.8	2.5 (100 °C)	1.4
Specific heat capacity (c_p)	DIN EN 821-3	-	[J/(g·K)]	900	850	900	900	-	400	400	400	-
Thermal expansion coefficient (α)	DIN EN ISO 17562	20 - 1000 °C	[10 ⁻⁶ /K]	8.2	8.3	8.2	8.2	8.2	10.6 (20 - 900 °C)	10.3 (20 - 500 °C)	10.9	1.0 ⁴⁾
Thermal shock resistance	DIN EN 820-3	R ₁ , Type A, in water	[°C]	180	-	-	-	-	-	-	-	1000 ⁵⁾
Dielectric strength	DIN EN 60243-1	-	[kV/mm]	> 30	-	20 - 30 ²⁾	-	-	-	-	-	-
Volume resistivity (ρ)	DIN EN 62631-3	-	[Ω·cm]	10 ¹⁵	10 ¹³ - 10 ¹⁴	-	-	-	10 ¹⁰	10 ¹⁰	10 ¹⁰	-

¹⁾ calculated

²⁾ dependent on manufacturing method

³⁾ based on design B

⁴⁾ standard: DIN EN 18755

⁵⁾ up to max. operating temperature

MATERIAL OVERVIEW | NON-OXIDE CERAMICS

Properties	Standard	Specification	Unit	Star Ceram® S	Star Ceram® Si	Star Ceram® AM-Si	Star Ceram® N3000 P	Star Ceram® N7000	Star Ceram® N7015
Main component	-	-	-	SSiC	SiSiC	SiSiC	Si ₃ N ₄	Si ₃ N ₄	Si ₃ N ₄
Colour	-	-	-	black / anthracite	dark grey / anthracite	dark grey / anthracite	black / dark grey	grey	black / dark grey
Density (ρ_b)	DIN EN ISO 18754	Procedure A	[g/cm ³]	3.13	3.06	3	3.24	3.22	3.23
Hardness (HV10)	DIN EN 843-4	-	[GPa]	25	20	-	14.4	15	15
Flexural strength ($\sigma_{f,4}$)	DIN EN 843-1	Four-Point-Bending	[MPa]	375	330	190	1150	750	950
Young's modulus (E)	EN 843-2	dynamic	[GPa]	395	380	350	300	300	300
Fracture toughness ($K_{Ic, SEVNB}$)	DIN EN ISO 23146	SEVNB	[MPa·m ^{0.5}]	3 ¹⁾	3.6	-	5.9	6.7	5.7
Weibull modulus (m)	DIN EN ISO 20501	-	-	> 10	> 10	> 10	> 10	> 15	> 15
Max. operating temperature	-	-	[°C]	1600	1350	1350	1200	1000	1200
Thermal conductivity (λ)	DIN EN 18755	20 - 100 °C Procedure B	[W/(m·K)]	125	180	185	21	20	20
Thermal expansion coefficient (α)	DIN EN ISO 17562	20 - 1000 °C	[10 ⁻⁶ /K]	4.5	4.0	2.3 (0 - 40 °C)	2.3 (40 - 400 °C)	3.4	3.3
Thermal shock coefficient	-	R _t	[K]	180	190	-	670	450	505

¹⁾ ICL

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