F99.7 hf

February 2025

Material Type: Alumina (α-Al_2O_3)
MECHANICAL AND PHYSICAL PROPERTIES OF THE MATERIAL (TYP.)

Characteristic	Standard	Specification	Unit	Value
Content			[%]	> 99.5
Density (ρ_b)	DIN EN ISO 18754		[g/cm³]	≥ 3.90
Open (apparent) porosity (π_a)	DIN EN ISO 18754		[vol-%]	0
Average size of crystallites (g_{mli})	ISO 13383-1	A1	[µm]	20
Flexural strength ($\sigma_{f,4}$)	DIN EN 843-1	Four-Point-Bending	[MPa]	350
Weibull modulus (m)	EN ISO 20501		[-]	≥ 10
Fracture toughness ($K_{1c,\ SEVNB}$)	DIN EN ISO 23146	SEVNB	[MPa·m^{0,5}]	3.5
Compressive strength ($\sigma_{c,m}$)	DIN ISO 17162		[MPa]	2500
Young's modulus of Elasticity (E)	EN 843-2	dynamic	[GPa]	380
Poisson's ratio (μ)	EN 843-2	resonance	[-]	0.22
Vickers Hardness (HV 1.0)	DIN EN ISO 14705	Procedure A	[GPa]	16.1
Maximum service temperature (T_{max})		in air	[°C]	1950
Mean coefficient of linear thermal expansion ($\bar{\alpha}$)	DIN EN ISO 17562	-100 - 20 °C 20 - 500 °C 20 - 1000 °C	[10^{-6}/K]	5.5 7.3 8.2
Specific heat capacity (c_p)	DIN EN 821-3	20 °C	[J/(kg·K)]	900
Thermal conductivity (λ)	DIN EN ISO 18755	20 °C 1000 °C 1500 °C	[W/m·K]	34.9 6.8 5.3
Dielectric strength	DIN EN 60243-1		[kV/mm]	> 30
Relative permittivity (ε_r)	DIN EN IEC 62631-2-1	70 MHz 180 MHz 30 - 40 GHz	[-]	9.8 9.8 9.8
Dielectric dissipation factor (tan (δ))	DIN EN IEC 62631-2-1	70 MHz 180 MHz 30 - 40 GHz	[10^{-4}/K]	3.8 2.5 1.4
Typical colour			[-]	white

The preliminary remark in DIN 60672-2 applies analogously to the property values given in the table, according to which the reported values apply only to the test specimens on which they were determined. Assignment to other forms is therefore only conditional permissible. The reference values given are to be understood as such. They refer to a temperature of 20 °C, unless otherwise stated.

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