

3M Advanced Materials Division

3M™ Boron Carbide

Typical Material Properties (Not for specification purposes)

Material Properties	Standard	Symbol / Unit	3M™ Boron Carbide
Density	DIN EN 623-2	ρ (g/cm ³)	>2.48
Porosity	DIN EN 623-2	P (%)	<0.5
Mean Grain Size		μm	<10
Phase Composition			B ₄ C, C
Vickers Hardness	DIN EN 843-4	HV 1 (GPa)	26
Knoop Hardness	DIN EN 843-4	HK 0.1 (GPa)	27
Young's Modulus	DIN EN 843-2	E (GPa)	410
Weibull Modulus	DIN EN 843-5	m	15
Flexural Strength, 4-pt Bending	DIN EN 843-1	σ_b (MPa)	460
Compressive Strength	DIN 51104	σ_D (MPa)	>2,800
Poisson Ratio	DIN EN 843-2	ν	0.18
Fracture Toughness (SENB)		K_{Ic} (MPa × m ^{0.5})	5
Coefficient of Thermal Expansion	DIN EN 821-1		
25°C – 500°C (77 – 932°F)		α (10 ⁻⁶ /K)	4.5
500°C – 1,000°C (932 – 1,832°F)		α (10 ⁻⁶ /K)	6.3
Specific Heat at 25°C (77°F)	DIN EN 821-3	c_p (J/g K)	0.94
Thermal Conductivity at 25°C (77°F)	DIN EN 821-2	λ (W/mK)	36
Thermal Stress Parameters	calculated		
$R_1 = \sigma_b \cdot (1 - \nu) / (\alpha \times E)$		(K)	204
$R_2 = R_1 \times \lambda$		(W/mm)	7
Specific Electrical Resistance at 25°C (77°F)	DIN EN 50359	ρ (Ω cm)	1

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The management system has been certified according to DIN EN ISO 9001, DIN EN ISO 50001, DIN EN ISO 14001.



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