

3M™ Boron Carbide

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		[μ m]	< 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		α [10 ⁻⁶ / K]	4.5
500°C – 1,000°C		α [10 ⁻⁶ / K]	6.3
Specific heat at 25°C	DIN EN 821-3	c_p [J/gK]	0.94
Thermal conductivity at 25°C	DIN EN 821-2	λ [W/mK]	36
Thermal stress parameters	calculated		
$R_1 = \sigma_b \cdot (1 - \nu) / (\alpha \cdot E)$		[K]	204
$R_2 = R_1 \cdot \lambda$		[W/mm]	7
Specific electrical resistance at 25°C	DIN EN 50359	ρ [Ω cm]	1

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The management system has been
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Issued: 09/15

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