
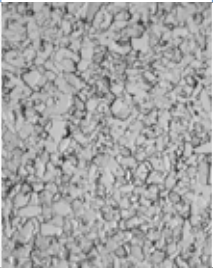
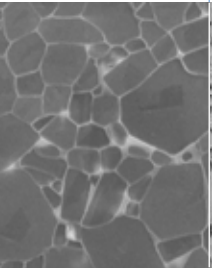
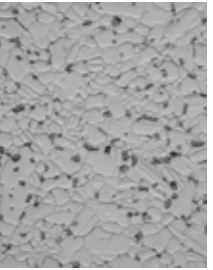


# 3M™ Ceramics for Ballistic Protection

Material properties	Standard	Symbol / Unit	3M™ Silicon Carbide (formerly known as EKasic®)			3M™ Boron Carbide
			Grade C	Grade F	Grade T	
Density	DIN EN 623-2	$\rho$ [g/cm <sup>3</sup> ]	> 3.15	> 3.15	> 3.21	> 2.48
Porosity	DIN EN 623-2	P [%]	< 2.0	< 2.0	< 1.0	< 0.5
Microstructure			coarse-grained, bimodal	fine-grained	fine-grained, biphasic	fine-grained
						
			100 μm	40 μm	2 μm	40 μm
Vickers hardness	DIN EN 843-4	HV 0.5 [GPa]	26	26	25	31
Young's modulus	DIN EN 843-2	E [GPa]	430	430	420	410
Sonic velocity	DIN EN 843-2	$v_1$ [m/s]	12,200	12,200	11,900	13,500
Compressive strength	DIN 51104	$\sigma_b$ [MPa]	> 2,500	> 2,500	> 2,500	> 2,800
Flexural strength, 4-pt bending	DIN EN 843-1	$\sigma_b$ [MPa]	400	400	550	460
Weibull modulus	DIN EN 843-5	m	10	10	15	15
Fracture toughness (SENB)		$K_{Ic}$ [MPa·m <sup>0.5</sup> ]	4	4	6	5
Poisson ratio	DIN EN 843-2	$\nu$	0.17	0.17	0.17	0.18
Coefficient of thermal expansion at 25 °C – 500 °C	DIN EN 821-1	$\alpha$ [10 <sup>-6</sup> / K]	3.8	3.8	4.1	4.5
Specific heat at 25 °C	DIN EN 821-3	$c_p$ [J/gK]	0.69	0.69	0.71	0.94
Thermal conductivity at 25 °C	DIN EN 821-2	$\lambda$ [W/mK]	130	130	80	36
Specific electrical resistance at 25 °C	DIN EN 50359	$\rho$ [Ω cm]	10 <sup>4</sup> – 10 <sup>5</sup>	> 10 <sup>8</sup>	10 <sup>3</sup> – 10 <sup>6</sup>	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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Issued: 09/15

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