

Material Data Sheet for Sintered, Electrical Conductive Silicon Carbide

1. Material

FCT Denotation	SC-EC
Material Description	Sintered, Electrical Conductive Silicon Carbide

2. General Properties

Chemical Composition	SiC (wt.-%)	≥ 75
	TiB ₂ + C (wt.-%)	≤ 25
Bulk Density	ρ [1] (g/cm ³)	> 3.15
Residual Porosity	(%)	< 3
Open Porosity	(%)	0
Grain Size	(μm)	1 - 10

3. Mechanical Properties

Hardness (HK 5)	[2] (GPa)	
Compressive Strength	(MPa)	> 3000
Bending Strength	σ (20 °C) [3] (MPa)	360 - 550
	(1000 °C)	-
	(1350 °C)	-
Weibull-Modulus	m	10
Fracture Toughness	K_{Ic} [4] (MPa ^{1/2})	> 4.0
Youngs Modulus	E (GPa)	370
Poisson Ratio	ν	0.17

4. Thermal Properties

Max. Working Temperature		
- Inert Atmosphere	(°C)	1500
- Air	(°C)	1100
Thermal Conductivity	λ (20°C) (W/mK)	95 - 85
Coeff. of Thermal Expansion	α RT-1000°C (10 ⁻⁶ K ⁻¹)	4.5 - 4.8
Coeff. of Thermal Expansion	α RT ± 20°C (10 ⁻⁶ K ⁻¹)	3.1 - 3.4
Thermal Shock Parameter	R_1 [5] (K)	180 - 260
Thermal Shock Parameter	R_2 [6] (W/m)	17100 - 22100

5. Specific Properties

Electrical Resistance (20 °C)	(Ωcm)	$5 \times 10^{-3} - 10^6$
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[1] Determination of density and porosity according to DIN 623-2

[2] Average value of 4-point bending strength at room temperature according to DIN EN 843-1

[3] Hardness by Knoop indentation according to DIN EN 843-4

[4] Determined by SEVNB method

$$R_1 = \frac{\sigma(1 - \nu)}{E\alpha}$$

[5] Critical temperature difference for an infinite high heat transfer (quenching)

[6] Thermal shock coefficient at finite constant heat transfer (slowly heating)

$$R_2 = \frac{\sigma(1 - \nu)}{E\alpha} \lambda$$

The material characteristics listed above are measured at testing samples. They cannot be transferred to components with different size, shape or surface properties. We reserve the right to alter properties within the scope of technical progress or new developments.