FCT Ingenieurkeramik GmbH

FCT SiC Standard Materials

FCT-Denotation				SC-S	SC-HS	SC-HP	SC-EC
Material				Sintered SiC	High Strength SiC	Hot Pressed SiC	Electrical Conductive SiC*
Process				Pressureless Sintered	Pressureless Sintered	Hot Pressed	Pressureless Sintered
Color				**Black**	**Black**	**Black**	**Black**
Geometry				Three-Dimensional / Planar Components	Three-Dimensional Components	Planar Structures	Three-Dimensional Components
Maximum size				Ø 700 mm, Length 1500 mm	Ø 700 mm, Length 1500 mm	Ø 400 mm, Thickness 75 mm	Ø 700 mm, Length 1500 mm
Application				Mechanical Engineering, Chemical Plant Engineering and Construction, Solar and Semiconductor Technology, Milling Technology and Air and Space Applications	Mechanical Engineering, Chemical Plant Engineering and Construction, Solar and Semiconductor Technology, Milling Technology and Air and Space Applications	Mechanical Engineering, Chemical Plant Engineering and Construction, Solar and Semiconductor Technology, Milling Technology and Air and Space Applications	Mechanical Engineering, Forming Technology, Chemical Plant Engineering and Construction, Kiln Technology, Solar and Semiconductor Technology, Air and Space Applications
General Properties							
Chemical Composition				SiC	SiC	SiC	SiC
Sinter Additives / Fibre Content				C / B_4C	C / B_4C	C / B_4C	TiB_2 / C
Density ρ		[1]	(%)	> 3.12	> 3.12	> 3.10	> 3.15
Residual Porosity			(%)	< 3	< 3	0	< 3
Open Porosity Thereof			(%)	0	0	0	0
Grain Size (Length)			(µm)	1 - 10	1 - 10	1 - 5	1 - 10
Mechanical Properties							
Compressive Strength			(MPa)	> 3000	> 3000	> 3000	> 3000
Bending Strength σ	RT	[2]	(MPa)	450	550	420	360 - 550
Bending Strength σ	1000 °C	[2]	(MPa)	450	550	420	-
Bending Strength σ	1350 °C	[2]	(MPa)	400	450	400	-
Weibull-Modulus m				> 12	> 12	> 10	10
Youngs Modulus E			(GPa)	400	400	420	370
Hardness H	(HK5)	[3]	(GPa)	22.0	22.0	26.0	-
Fracture Toughness K_{Ic}		[4]	($MPam^{1/2}$)	3.0	3.0	3.5	4.0
Poissons Ratio ν				0.16	0.16	0.15	-
Thermal Properties							
Maximum Working Temperatures							
- Inert Atmosphere			(°C)	1900	1900	1900	1500
- Oxidising Atmosphere			(°C)	1600	1600	1600	1100
Specific Heat Capacitiy			(J/kgK)	670	670	670	-
Thermal Conductivity λ	(20°C)		(W/mK)	125	125	100	-
Coefficient of Thermal Expansion	RT-1000 °C		($10^{-6}K^{-1}$)	4.6	4.6	4.5	-
	RT ± 20 °C		($10^{-6}K^{-1}$)	3.3	3.3	2.5	-
Thermal Shock Parameter R_1		[5]	(K)	200	200	189	-
Thermal Shock Parameter R_2		[6]	(W/m)	25000	25000	18889	-
Electrical Properties							
Electrical Resistivity (RT)			Ωcm	10^{7}	10^{7}	10^{8}	5×10^{-3} - 10^{6} *
Dielectric Constant (1 MHz)			-	-	-	-	-

RT = Room Temperature
[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 according to DIN EN 843-4
[4] Calculated from crack length derived from Vickers hardness indentation, according to Niihara
[5] Critical temperature difference for an infinite high heat transfer (quenching)
[6] Thermal shock coefficient at finite constant heat transfer (slowly heating)

Date: October 2019

* Electrical Properties can be adjusted in a wide range according to individual requirements. If interested please contact our experts for detailed discussion!

The material characterisitics listed above are measured at testing samples. They cannot be transfered 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.

Further special SiC grades are available on demand. We also tailor your specific material solution !

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