



CFCCARBON CO., LTD

C/C vs C/SiC properties

Product name: C/C; C/SiC

C/C type: weave/sewn;

C/SiC type: C/C+CVD/PIP

Main application: anti-ablation, thrust chamber, throat lining;
Structural materials

Comparison of C/C&C/SiC properties

No.	Characteristics	Items	C/C	C/SiC	Unit
1	Low density	density	1.8~1.9	1.9~2.0	g/cm ³
2	High strength	3points bending strength	170~200	500~700	MPa
3		Elastic modulus	55~65	70~85	GPa
4		Fracture toughness	65~80	26~32	MPa.m ^{1/2}
5	High temperature stability	C.T.E	<2.5	<2.5	10 ⁻⁶ .K ⁻¹
6		Thermal conductivity	>3	>3	W/(m.k)
7		Specific heat	>0.6	>0.6	J/(g.k)
8		thermal diffusion (RT-1200°C)	<2.8	<2.8	mm ² /s
9	anti-ablation; high temp resistance	anti-ablation property	7X10 ⁻³	5X10 ⁻³	g/s
10			13X10 ⁻³	10X10 ⁻³	mm/s

Ablation properties of C/SiC composites under different conditions

Items	Type	Density (g/cm ³)	Open porosity (%)	Ablation temperature(°C)	Ablation time (s)	Linear ablation rate (mm/s)	Weight ablation rate (mg/s)
1	PIP	1.90	≤10	2300	60	0.068	2.48
2	PIP	1.95	≤8	2300	60	0.066	3.23
3	LSI	2.10	≤5	2300	60	0.023	1.68
4	LSI	2.30	≤1	2300	60	0.012	0.34

Conclusion:

1. The test was done at temperature 2300°C.
2. At temperature 2300°C or higher, the LSI type C/SiC is better than PIP type C/SiC.
3. At temperature 2300°C or higher, the SiC will peels /falls off from the body C/SiC, Randomly /Unevenly.



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C/SiC: Temperature resistance under different temperatures

Temp resistance	air /oxygen °C	≤400	No oxidation
		400-800	micro oxidation
		800-1600	slightly oxidized
		1600-3000	speed up the oxidation
	Inert gases °C	2700	SiC start to gasify
		≤3200	carbon fiber still stable
	vacuum °C	2700	SiC start to gasify, more faster than in the inert air
		≤3200	carbon fiber still stable

Conclusion:

1. C/SiC material is stable at 1600-1800°C, or under 1600°C.
2. At 2600-2700°C or above, the SiC in the C/SiC is severely exfoliated and non-uniform!

Note: The above technical parameters are for reference only, and the performance indicators of different carbon fiber models and combined processes are different, which can be adjusted according to actual needs

Max size: W800-H1000-T50mm, or D800/700-H1000mm, other sizes to confirm!

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