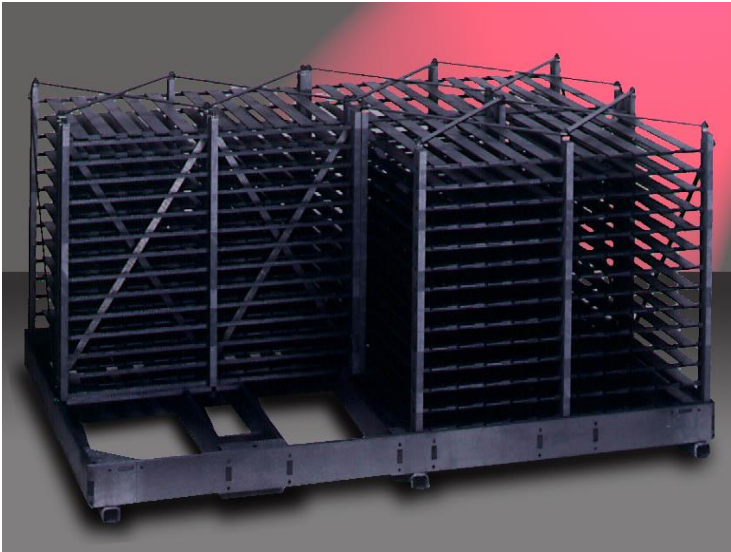


CCM™

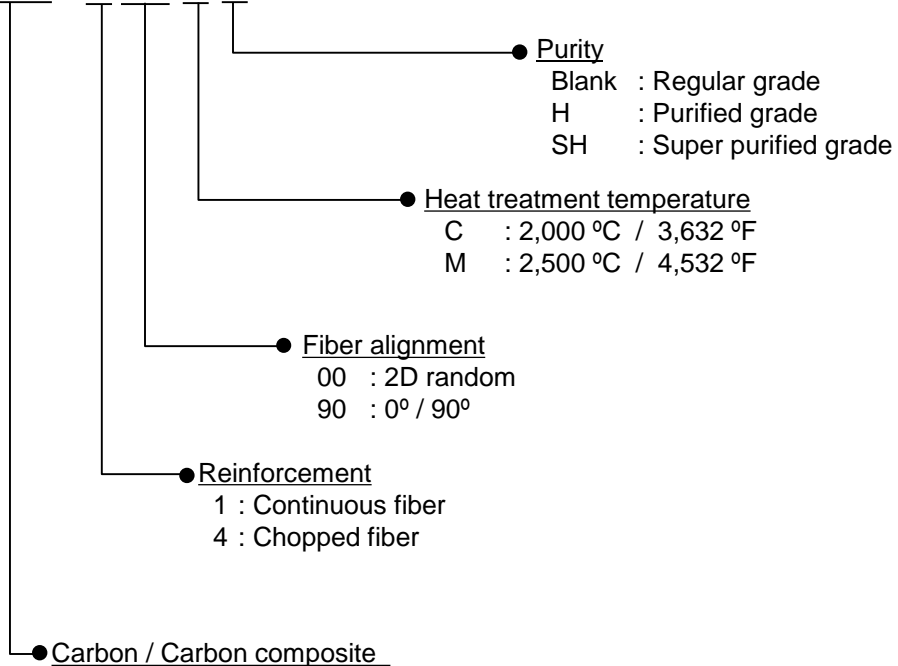
Carbon / Carbon Composite Carbon fiber reinforced carbon material



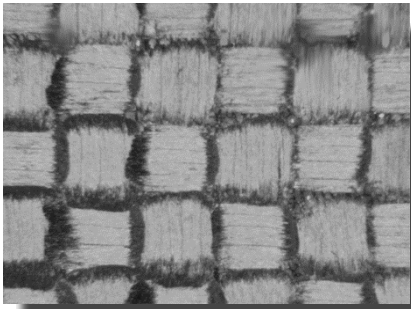
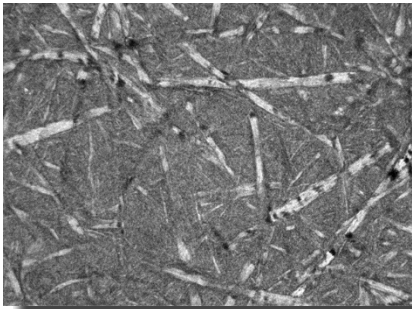
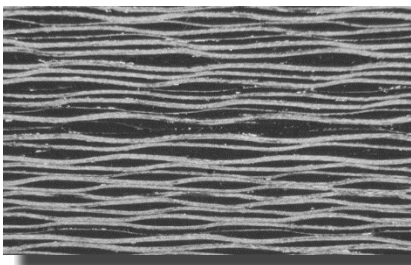
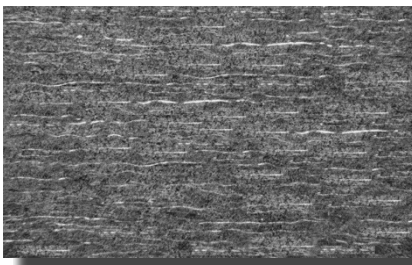
Since CCM's strengthened fiber and matrix are both composed of carbon, CCM possesses many advantages of the other conventional carbon based materials.

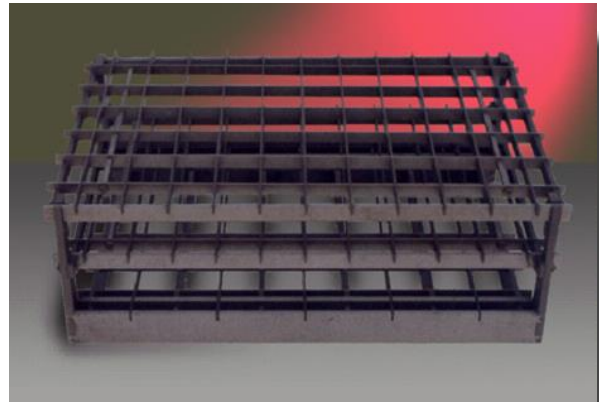
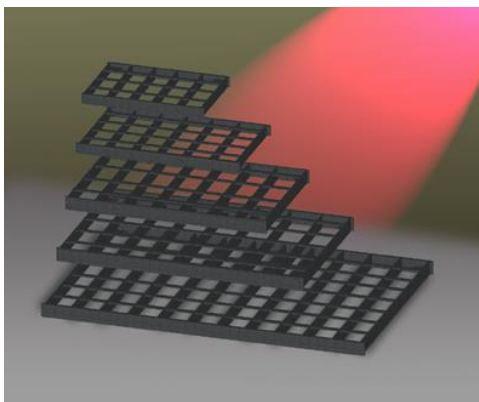
Furthermore, because it is a fiber reinforced composite material, CCM shows superior qualities such as excellent compressive strength and flexural strength when compared to other substitutes.

CCM - 1 9 0 C H



Structure and Characteristics

Product I.D.		CCM™-190C	CCM™-400C
Structure	In plane		
	Cross section		
Characteristics		Light in weight High flexural strength High thermal resistance High thermal shock High electrical conductivity High chemical resistance	
		High tensile strength High modulus	Isotropic in plane High interlaminar shear strength Precision machineability



Typical properties of CCM™-190C

Property	SI unit	US unit
Reinforcement	Continuous fiber	
Fiber alignment	0° / 90°	
Bulk density	1.60 g/cm ³	0.058 lb/in ³
Flexural strength	160 MPa	23.2 ksi
Flexural modulus	65 GPa	9.4 Msi
Tensile strength	260 MPa	37.7 ksi
Tensile modulus	80 GPa	11.6 Msi
Compressive strength	90 MPa	13.1 ksi
Interlaminar shear strength*1	6 MPa	0.9 ksi
Shore hardness	70	
Electrical resistivity*2	2200 × 10 ⁻⁶ Ω·cm	866 × 10 ⁻⁶ Ω·in
Coefficient of thermal expansion*3	0.2 (//) × 10 ⁻⁶ /K	
	5.7 (⊥) × 10 ⁻⁶ /K	
Thermal conductivity*2	27 (//) W/m·K	187(//) BTU·in/hr·ft ² ·°F
	4 (⊥) W/m·K	28 (⊥) BTU·in/hr·ft ² ·°F
Form	Plate Pipe Bolts & nuts Other irregular shape	

*1 Measured by compression loading of double-notched specimens

*2 Measured at room temperature

*3 Measured at room temperature - 800°C

(//) Measured parallel to the plane of the laminate

(⊥) Measured perpendicular to the plane of the laminate



Typical properties of CCM™-400C

Property	SI unit	US unit
Reinforcement	Chopped fiber	
Fiber alignment	2D random	
Bulk density	1.45 g/cm ³	0.052 lb/in ³
Flexural strength	140 MPa	20.3 ksi
Flexural modulus	35 GPa	5.1 Msi
Tensile strength	95 MPa	13.8 ksi
Tensile modulus	45 GPa	6.5 Msi
Compressive strength	90 MPa	13.1 ksi
Interlaminar shear strength* ¹	12 MPa	1.7 ksi
Shore hardness	80	
Electrical resistivity* ²	2300 × 10 ⁻⁶ Ω·cm	906 × 10 ⁻⁶ Ω·in
Coefficient of thermal expansion* ³	0.4 (//) × 10 ⁻⁶ /K	
	9.0 (⊥) × 10 ⁻⁶ /K	
Thermal conductivity* ²	23 (//) W/m·K	160(//) BTU·in/hr·ft ² ·°F
	17 (⊥) W/m·K	118 (⊥) BTU·in/hr·ft ² ·°F
Form	Plate Bolts & nuts	

*1 Measured by compression loading of double-notched specimens

*2 Measured at room temperature

*3 Measured at room temperature - 800°C

(//) Measured parallel to the plane of the laminate

(⊥) Measured perpendicular to the plane of the laminate



Standard dimensions of plate

Products I.D.	Width	Length	Thickness
CCM™-190C	1,000	1,000	0.8, 1.2, 1.5, 2.0, 3.0, 4.0,
	1,200	1,200	5.0, 6.0, 7.0, 10.0, 20.0, 30.0
CCM™-400C	900	1,000	1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 10.0, 20.0, 30.0

unit : mm

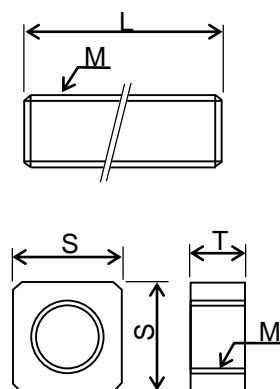
Maximum dimensions of pipe

Products I.D.	Diameter	Length
CCM™-190C	1,600	1,000

unit : mm

Standard dimensions of bolts & nuts

Products I.D.	nominal diameter	stud bolts	nuts	
		L (max.)	S	T
CCM™-190C CCM™-400C	M6	300	11±0.5	4±1
	M8	300	14±0.5	5±1
	M10	300	18±0.5	7±1
	M12	400	20±0.5	8±1
	M16	500	25±0.5	12±2
	M20	500	30±0.5	15±2



unit : mm

The above properties are based on our current information and should be considered as typical.
Nippon Carbon Co., Ltd. does not guarantee property data or suitability for any specific application.

 NIPPON CARBON CO., LTD.

2-6-1 Hatchobori, Chuo-ku, Tokyo
104-0032, Japan

Phone : +81-3-3552-6111

Facsimile : +81-3-3553-4694

URL : <http://www.carbon.co.jp>

E-mail : info@carbon.co.jp

