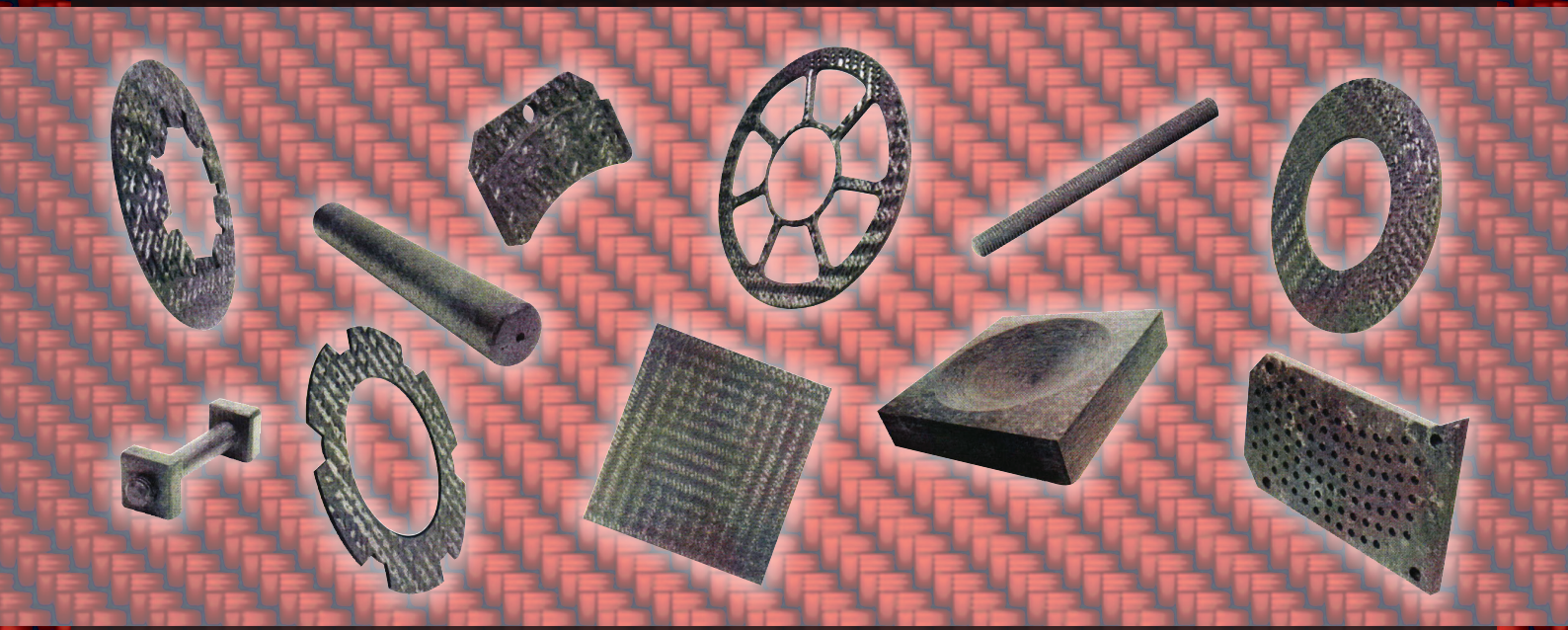
SEMCO CARBON

CARBON/CARBON COMPONENTS

aerospace quality | custom formulations | fast lead times



ATTRIBUTES

- Thermal shock resistant
- Corrosive environment tolerant
- Endures vibration
- Thermal conductivity options
- Excellent electrical conductivity
- Fracture tough
- Shorter lead times; weeks not months
- Better machinability, longer tool life
- Temperature stability 2000˚C / 3600˚F
- Complex shapes possible

SIZE OFFERINGS

- Square sheets to 17.0” (43,18cm)
- Discs to 24.0” (60,96cm) diameter
- Thickness from 0.125” (3,175mm) to 5.000” (12,70cm)

APPLICATION CONSIDERATIONS

Semco’s Carbon/Carbon material coefficient of thermal expansion (CTE) is similar to graphite but less than that of stainless steel; therefore, minor changes to your process may be required to account for the difference. The competitive tensile strength of C/C composite material and the lower CTE imparts greater compressive forces into the parts relative to traditional stainless steel clamping materials. An evaluation is recommended in such situations. Semco Carbon can help you design a test, create a shape, and evaluate a change.

QUESTIONS?

Toll Free: 800-420-5740 | cs@semcocarbon.com | 3000 Leavitt Road, Building #1, Lorain, OH 44052

SEMCO CARBON / CARBON MATERIAL PROPERTIES

PROPERTY	UNITS	DIRECTION	SHD	SHL	SLD	SLL
Bulk Density	g/cc		1.75	1.65	1.75	1.65
Total Porosity	%		8%	13%	8%	13%
Flexural Strength	ksi	in plane	21.0	15.0	25.0	20.0
	ksi	perpendicular	17.0	12.0	18.7	15.0
Compressive Strength	ksi	in plane	17.0	12.0	29.0	25.0
	ksi	perpendicular	10.0	8.0	12.4	10.0
Tensile Strength	ksi	in plane	15.0	10.0	15.0	10.0
Thermal Conductivity	W/m-K	in plane	60.0	50.0	11.0	7.0
	W/m-K	perpendicular	25.0	20.0	8.0	3.1
Heat Capacity	J/kg-K	50˚C	850	850	850	850
	J/kg-K	250˚C	1,300	1,300	1,300	1,300
Secant Value CTE	$(˚C)^{-1}$	in plane	1.0×10^{-6}	1.0×10^{-6}	1.9×10^{-6}	1.9×10^{-6}
(ambient to 1500˚C)	$(˚C)^{-1}$	perpendicular	7.0×10^{-6}	7.0×10^{-6}	9.3×10^{-6}	9.3×10^{-6}
Flexural Modulus	msi		4.0	4.0	4.0	4.0
Young's Modulus	msi		5.2	5.2	5.2	5.2
Electrical Resistivity @ 17˚C	ohm-cm	in plane	1.35×10^{-3}	2.40×10^{-3}	2.80×10^{-3}	3.87×10^{-3}
Hardness	Rockwell 15X		90	65	95	70
Ash Content	ppm		21	21	7,000	7,000

H Series (SHD, SHL) has greater oxidation resistance, higher thermal conductivity and is stable to 2000˚C / 3600˚F
L Series (SLD, SLL) has lower conductivity, higher strength and is stable to 1500˚C / 2700˚F
SHL and SLL have shorter lead times and lower price

SEMCO CARBON

LEGEND

g/cc	grams per cubic centimeter
ksi	1,000 pounds per square inch (21 ksi = 21,000 psi)
W/m-K	watts per meter kelvin
J/kg-K	joules per kilogram kelvin
msi	1,000,000 pounds per square inch (4 msi = 4,000,000 psi)
CTE	coefficient of thermal expansion
Rockwell 15X	Hardness Test HR15X - depth of indentation made by a 0.250" Dia steel ball with 15 kg force applied and expressed in 0.001 mm
ppm	parts per million

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