

# Hexoloy® SG Silicon Carbide

## Saint-Gobain Advanced Ceramics Structural Ceramics

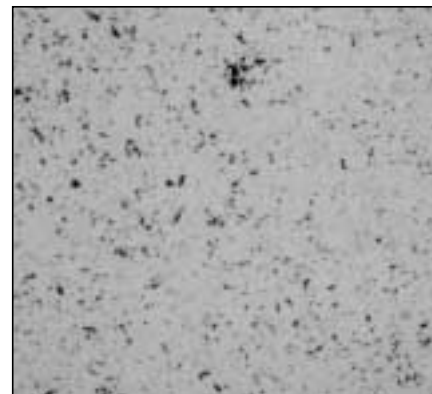
Hexoloy® SG Silicon Carbide is a unique electrically conductive analog of sintered silicon carbide.

### Technical Specifications

Property	Units	Measurement Technique	Value
Phases	–	X-ray Diffraction	SiC (6H, 4H, 15R), C
Density	gm/cm <sup>3</sup>	–	3.0
Hardness	kg/mm <sup>2</sup>	Knoop, 100 gm load	2800
Flexural Strength Room Temperature	MPa	ASTM C-1161, 4-point	311
Weibull Modulus	–	ASTM C-1161, 4-point	18
Young's Modulus	GPa	Pulse Echo	376
Shear Modulus	GPa	Pulse Echo	161
Poisson's Ratio	–	Pulse Echo	0.17
Fracture Toughness (Room Temperature)	MPa.m <sup>1/2</sup>	Indentation, 10 kg load	3.9
Coefficient of Thermal Expansion (RT-700°C)	10 <sup>-6</sup> mm/mm K	Dilatometry	4.6
Mean Specific Heat @ RT	J/g K	Laser Flash ASTM E 1461-92	0.65
Thermal Conductivity @ RT	W/m K	Laser Flash ASTM E 1461-92	118
Thermal Conductivity @ 200°C	W/m K	Laser Flash ASTM E 1461-92	92
Thermal Conductivity @ 400°C	W/m K	Laser Flash ASTM E 1461-92	70
Electrical Resistivity	Ohm-cm	–	1.0
Free Carbon	%	Combustion	5.35
Total Carbon	%	Combustion	34.6

The information recommendations, and opinions set forth herein are offered solely for your consideration, inquiry and verification and are not, in part or total, to be construed as constituting a warranty or representation for which we assume legal responsibility. Nothing contained herein is to be interpreted as authorization to practice a patented invention without a license.  
Hexoloy® is a trademark of Saint-Gobain Advanced Ceramics Corporation

### Hexoloy® SG SiC – 200X



Hexoloy® SG SiC offers a wide variety of desirable properties in one package including:

- Excellent hardness
- Corrosion resistance
- High temperature stability

**Saint-Gobain Advanced Ceramics**  
Structural Ceramics  
Hexoloy® Products  
23 Acheson Drive  
Niagara Falls, New York 14303  
Telephone: 716-278-6233  
Fax: 716-278-2373  
E-mail: [scd.sales@saint-gobain.com](mailto:scd.sales@saint-gobain.com)  
[www.hexoloy.com](http://www.hexoloy.com)

©2002 Saint-Gobain Advanced Ceramics  
All Rights Reserved  
Form No. B-1000  
12/02

# Hexoloy® SG Silicon Carbide for DC Magnetron Sputtering

## Saint-Gobain Advanced Ceramics Structural Ceramics

Hexoloy® SG Silicon Carbide is a unique electrically conductive analog of sintered silicon carbide that can be readily DC magnetron sputtered. Hexoloy® SG features high density and uniform electrical resistivity, less than 5 ohm-cm. It can be sputtered at high deposition rates compared to other ceramic target sources, with controllable thin film optical properties.

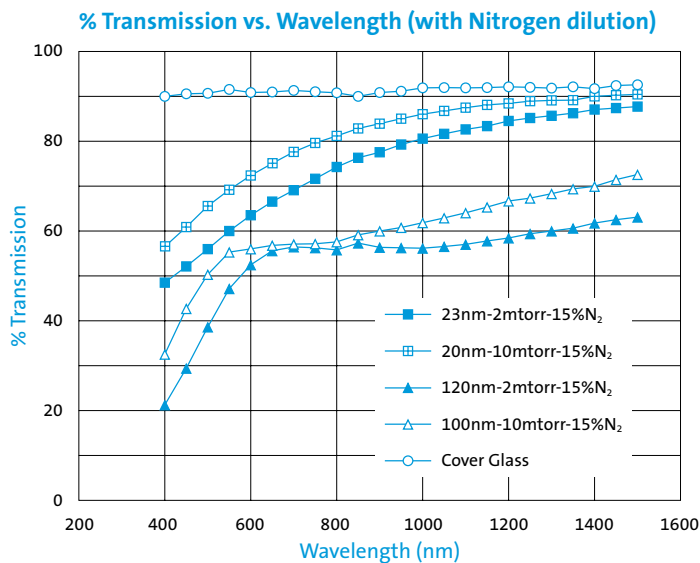
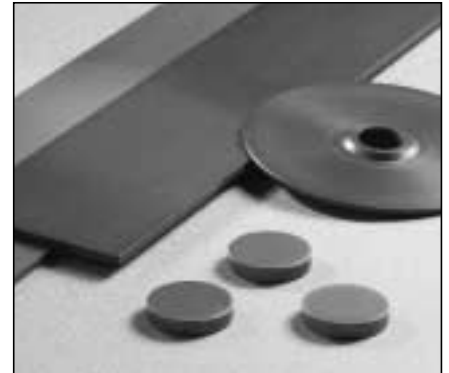
Hexoloy® SG SiC offers a wide variety of desirable properties in one package including:

- Excellent hardness
- High temperature stability
- Corrosion resistance
- Excellent film adhesion

Applications include:

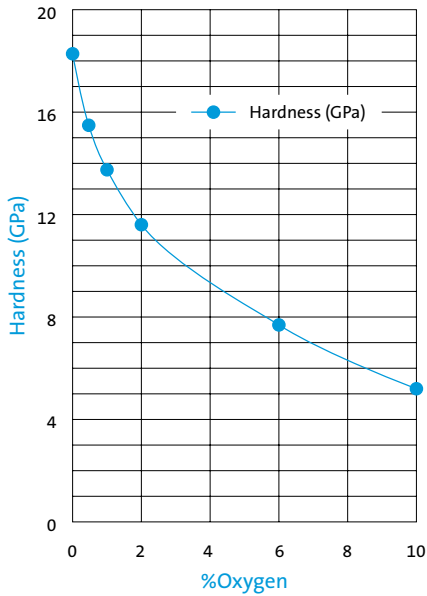
- Automotive Glass
- Eyeglass lens protective coatings
- Architectural Glass
- Electrochromic glass
- Data Storage Disks
- Packaging barrier layer
- Conductive transparent layers
- Thin film head

Hexoloy® SG SiC



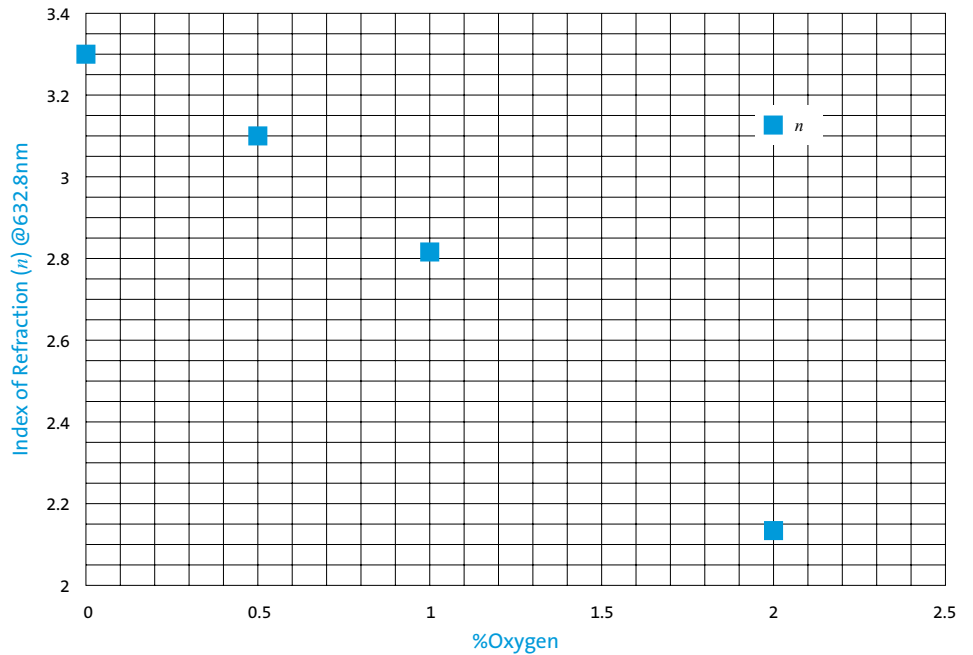
Si-C-N films on glass (23-120nm thickness deposited at 15% nitrogen and different total Ar/N<sub>2</sub> gas pressure (2mtorr and 10mtorr)).

### Hardness vs. %Oxygen



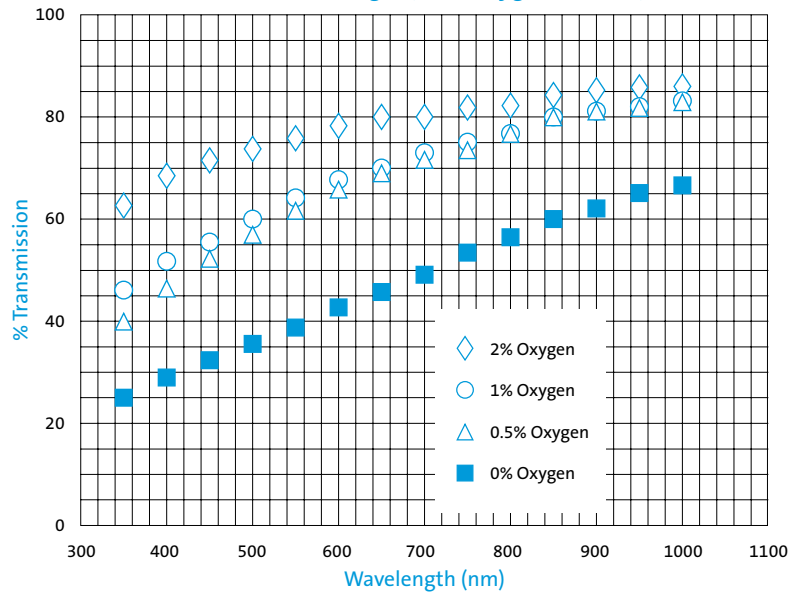
Thick Si-C-O films (1-2nm thickness) deposited at different % oxygen content of the total Ar/O<sub>2</sub> gas pressure for hardness measurements. A diamond Berkovitch indenter with applied loads from 50 to 100 μN was used to measure the mechanical hardness of the films. As a reference, standard values of bulk SiC and SiO<sub>2</sub> are ~24 GPa and ~6 GPa, respectively.

### Index of Refraction vs. %Oxygen



Si-C-O films index of refraction (@632.8nm) as a function of the % O<sub>2</sub> in Ar/O<sub>2</sub> sputtering gas mixtures.

### % Transmission vs. Wavelength (with Oxygen dilution)



Optical transmission as a function of wavelength for Si-C-O films (100nm thickness) in Ar/O<sub>2</sub> sputtering gas mixtures.

**Saint-Gobain Advanced Ceramics**  
 Structural Ceramics  
 Hexoloy® Products  
 23 Acheson Drive  
 Niagara Falls, New York 14303  
 Telephone: 716-278-6233  
 Fax: 716-278-2373  
 E-mail: [scd.sales@saint-gobain.com](mailto:scd.sales@saint-gobain.com)  
[www.hexoloy.com](http://www.hexoloy.com)

©2002 Saint-Gobain Advanced Ceramics  
 All Rights Reserved  
 Form No. B-1001  
 12/02

The information, recommendations, and opinions set forth herein are offered solely for your consideration, inquiry and verification and are not, in part or total, to be construed as constituting a warranty or representation for which we assume legal responsibility. Nothing contained herein is to be interpreted as authorization to practice a patented invention without a license.

Hexoloy® is a trademark of Saint-Gobain Advanced Ceramics Corporation