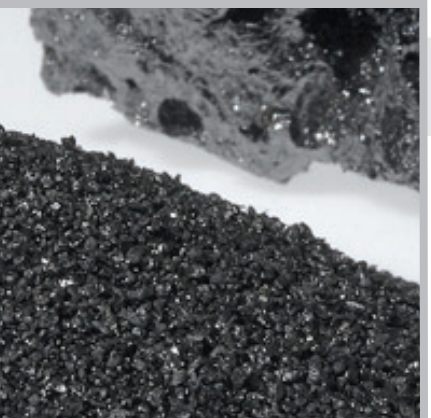
Washington Mills Grains & Powders

for Ceramic Armor



The ceramic powders that go into your proprietary formula are vital to the performance of your finished ceramic part. Engineering the right ceramic formula takes trial and error, as well as the support of a powder supplier who is willing to work with your R&D group in order to produce the right powder for your job. At Washington Mills, we will work with you to develop the right material for your ceramic armor application.

One of the largest manufacturers of fused minerals in the world, Washington Mills offers a full line of high quality silicon carbide and boron carbide grains and powders for producing ceramic armor. Washington Mills is the only manufacturer of alpha silicon carbide and boron carbide in the United States, and has the capacity to produce in large quantities to satisfy your toughest armor requirements.

Washington Mills is one of the world's largest silicon carbide micro grit producers with the technical skills and advanced equipment to produce single grit sizes and sub-micron powers. Our unique process technology and state-of-the-art micro grit facility allow us to carefully classify the grits to meet your specific requirements. Our silicon carbide manufacturing plants in the United States and Norway produce high quality silicon carbide crude and permit us to control the raw ingredients, chemistry and quality of the finished product.

Our experience in manufacturing boron carbide extends back to the beginning of the first boron carbide furnace in the United States. We continue to manufacture boron carbide to the highest specifications and with the utmost care. As one of the hardest man-made materials available that has a finite melting point low enough to permit its relatively easy fabrication into shapes, boron carbide makes an excellent material for ceramic armor.

Product development, analytical laboratory services and customer service you can count on are all part of the services you can expect from Washington Mills. Contact us today to discuss your boron carbide and silicon carbide ceramic powder needs.

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Tel: 716.278.6600 • Toll Free: 800.828.1666 • info@washingtonmills.com • www.washingtonmills.com

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Silicon Carbide and Boron Carbide Grains & Powders: Typical Technical Specifications

The following data represent "typical" technical specifications, but we can tailor our typical products to suit your specific requirements. We can match your technical specifications including: surface area, particle size distribution, grain shape, bulk density and chemistry.

SILICON CARBIDE Surface Chemical Values *(Typical Standard)*

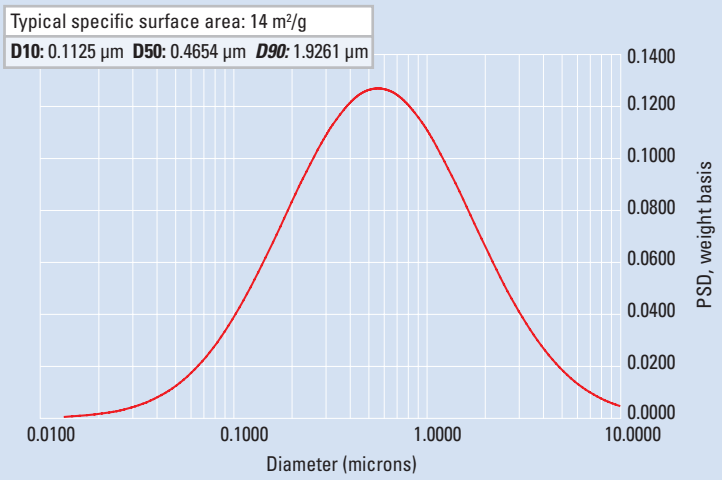
Product	Grits	% SiC	% Free C	% Si	%SiO_2	% Fe_2O_3
CARBOREX C-5	F 240 – F 1200	99.0	0.25	0.25	0.30	0.05
(Green)	1200 / Finer	99.0	0.25	0.25	0.30	0.05
CARBOREX C-6	F 240 – F 1200	97.8	0.30	0.80	0.60	0.20
(Black)	1200 / Finer	95.0	0.70	0.30	3.00	0.4

Surface chemical values for finer sizes available upon request

Typical Physical Properties

Hardness	
Moh's Scale	between 9 and 10
Knoop Scale	25.000 – 30.000 N/mm^2
Thermal Conductivity	
20° C	0.41 W/cm ° C
1000° C	0.21 W/cm ° C
Linear Thermal Expansion	
25 - 1000° C	5.1 x 10-6/ ° C
25 - 2000° C	5.8 x 10-6/ ° C
Specific Heat	
25° C	0.67 J/g ° C
1000° C	1.26 J/g ° C
Specific Density	3.21 g/cm^3
Bulk Density	0.7 – 1.7 g/cm^3

Particle Size Distribution-Sub-micron CARBOREX



BORON CARBIDE Typical Chemical Analysis

	High Purity	Technical
Total Boron	Min. 76.5%	70 - 73%
Total Carbon	21.5%	24%
Total B + C	Min. 98.0%	94%
Iron	.2%	2%

Typical Physical Properties

Crystallography	Rhombohedral
Color	Black
Specific Gravity	2.52
$Knoop_{100}$ Hardness	2800
Shape	Blocky – Angular
Melting Point	2350° C
Grading	FEPA 42-GB-1984 (R1993)

Standard sizes available and special sizes available upon request.

Call Washington Mills today to discuss your ceramic powder needs

P.O. Box 423, 1801 Buffalo Avenue, Niagara Falls, NY 14302 | Tel: 800.828.1666 | Fax: 716.278.6650

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