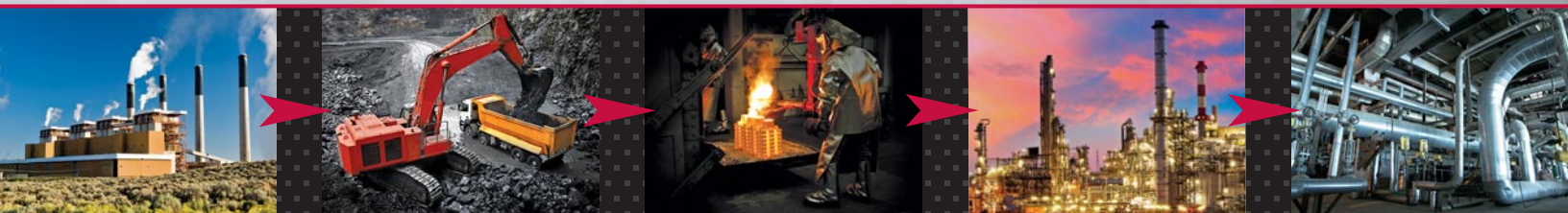


# Silicon Carbide Products, Inc.

Custom Silicon Carbide Components  
For High Performance Applications



**SCP**<sup>TM</sup>  
Silicon Carbide Products

# Silicon Carbide Products, Inc.

A Custom-Crafted Approach To  
Every Ceramic Component Project

Since 1994, Silicon Carbide Products, Inc. (SCP) has provided industrial customers with high quality, high performance ceramic components for use in coal-fired power plants, molten non-ferrous metals, mining, petroleum, and large component applications. We are known for the outstanding performance of our SCProbond™ silicon carbide materials and for our high level of customer service and satisfaction. A key component of SCPs success is our custom-crafted approach to every ceramic component project.

## *We manufacture our own materials.*

Not all silicon carbide materials are created equal. We use only our own high quality SCProbond family of silicon carbide materials to manufacture ceramic components that meet our customers' high performance requirements.

## *We take care of our customers.*

The SCP management team offers more than 80 years of combined ceramic engineering experience including consultation on application and design for manufacturability. Our experienced applications engineers, technical staff and customer service team also have the specialized knowledge and expertise essential for challenging industrial applications. We bring this experience to your project and work with you to develop the best solution for your needs.



The Silicon Carbide Products, Inc. (SCP) manufacturing facility in Horseheads, New York USA.



SCPs manufacturing facility is designed for efficiency and flexibility in the production of its diverse product mix.

*We do it right, start to finish.*

Our stringent process controls and attention to detail throughout the entire manufacturing operation ensure consistently high quality products proudly made in the USA to meet the needs of our worldwide customers.

*We deliver worldwide on time, every time.*

We are known for our 100% on-time delivery service goal to worldwide customers and for our ability to make components of complex design in a fraction of the standard industry turnaround time.



SCP's ceramic components are custom made for a variety of industrial markets.



SCP capabilities include the production of high quality ceramic components with complex geometries and tight specifications.

Strict attention to detail is included in every phase of the manufacturing operation. Here a molten metal protective sleeve is carefully removed from tooling.

Our manufacturing process includes ongoing training to maintain high standards and meet customer expectations and requirements.





## | The SCProbond™ Advantage

### High quality silicon carbide materials and components you can count on.

Silicon carbide is a synthetic material that exhibits high performance characteristics including: high hardness approaching that of diamond, high strength (gains strength at temperature), excellent chemical resistance, excellent thermal shock resistance and excellent wear resistance.

However, unlike metals and their alloys, there are no standardized industry performance criteria for silicon carbide. With a wide range of compositions, densities, manufacturing techniques and company experience, silicon carbide components can differ drastically in consistency, as well as mechanical and chemical properties. *Your choice of supplier determines the level and quality of the material you receive.*

At SCP, we design, develop and manufacture our own SCProbond™N and SCProbond™R silicon carbide materials to deliver excellent performance to meet a variety of extreme abrasive wear, corrosion, high temperature and thermal shock application requirements. SCProbond silicon carbide materials offer the following advantages:

- Material formulation determined by statistically designed methods.
- Exclusive use of consistent, high quality raw materials.
- In-house pattern-making, internally developed, multi-materials including rapid prototyping, 4 axis CNC routing and CMM measuring equipment.

- In-house working tooling for consistent high quality and flexibility.
- Process controls and monitoring details throughout the manufacturing operation.
- Proprietary furnace controls which optimize firing consistency and material performance; verification of results monitored for each cycle completed.

### SCProbond™ N silicon nitride bonded silicon carbide

SCProbond N™ is characterized by excellent wear properties in severe industrial environments. It exhibits good resistance to high temperatures even in demanding abrasive applications and has better impact resistance than most silicon carbide grades. Due to its unique properties and ability to be cast into final shape, this cost-effective grade is widely used as a workhorse in coal-fired power plants and in mining for bulk material handling and protective linings, as well as for non-ferrous molten metal contact.



SCProbond N severe wear components for coal-fired power plants and material handling.

SCProbond R hydrocyclone  
and spray nozzle components.

### SCProbond™ R reaction bonded silicon carbide

SCProbond R™ is characterized by high strength, high thermal conductivity and typically low porosity. It is serviceable to temperatures approaching the melting point of silicon at approximately 1450°C and is capable of conducting electricity. This grade is used in severe wear applications such as cyclone apexes, helix-type spray nozzles, burner nozzles and kiln furniture.



Process controls and attention to details are employed throughout the manufacturing operation including furnace loading, inspection and monitoring.



Working tooling is built from patterns prior to casting components.

Portable coordinate measuring equipment is used for inspection of complex geometries for quality confirmation, field fit patterns, design tool and reverse engineering.



SCP offers rapid prototyping capabilities to assist customers in assessing accurate component design for their application.



## SCP Ceramic Components for Industrial Markets

### Coal-Fired Powered Plants

SCProbond N has long been utilized as the preferred material for aggressive wear applications throughout coal-fired power plants. It is widely used in modern, well equipped facilities working to meet current regulatory demands, and in power plants committed to best practice with maximum performance, extended outage cycles and reduced unscheduled downtime. SCProbond N is utilized for burner barrel liners, wear blocks, quarl tile, conical diffusers and deflectors, fuel head distributors and transitions in the coal delivery side. It is also utilized in limestone slurry preparation and delivery side including hydrocyclone apexes, inlet heads and flue gas desulfurization spray nozzles. In addition, SCProbond N is being utilized in ash handling and pneumatic conveying for one piece continuous elbow sweeps, valve body liners and transitions. Wherever extreme abrasive wear and temperature resistance is required, SCProbond N excels and will provide maximum reliable performance.

### Typical Applications

- Ash handling elbows
- Burner barrel liners
- Centrifuge port liners
- Coal deflectors
- Conical diffusers
- Cyclones
- Flue gas desulfurization limestone slurry spray nozzles
- Hydrocyclone apexes
- Inlet heads
- Multi-port liners
- Pump components
- Transitions
- Valve bodies
- Vortex finders
- Wear blocks



(Above) SCProbond N components widely used for coal-fired power plant applications await furnace loading.



(Right and far right)  
Single orifice and dual  
orifice high volume spray  
nozzles for flue gas  
desulfurization (FGD)  
applications.



Burner barrel liner with  
weld holes for coal-fired  
power plant applications.



Valve body liner.

Port tile for centrifuge  
application.



SCProbond R spiral  
spray nozzle.



Wear block with dovetail  
mounting slot.

## SCP Ceramic Components for Industrial Markets

### Molten Non-Ferrous Metals

SCProbond material has unique non-wetting characteristics in non-ferrous molten metal contact applications. In addition, its outstanding abrasion and corrosion resistance, high temperature capability and low thermal expansion enable components



to outlast other materials in these harsh thermal cycling environments. SCProbond is used to protect key graphite pump components from premature failure in molten aluminum transfer applications. SCProbond reactor vessel linings for galvanizing protect equipment for increased service life and

improved operational performance. From pump sleeves to thermocouple protection tubes, SCProbond material provides reduced down time, lower labor costs, increased productivity, improved efficiency and reliable performance.



Molten metal pump stanchion and impeller protective sleeves with non-wetting properties.

### Mining Industry

SCProbond materials are the clear choice for the harsh conditions faced in the handling, sizing and transport of mined products. Our materials are known for their outstanding abrasion resistance, corrosion resistance and extremely

low thermal expansion. Multiple lining configurations and monolithic sweeps (elbows) are custom



manufactured according to specific process requirements. This ensures perfect fit, minimized joints and faster installation. These unique properties lead to reduced downtime, increased productivity and higher material throughput.



(Above) Mining and material handling components for severe wear applications



One piece elbow sweep for ash handling. One piece design reduces seams which are often the weak link in severe abrasive wear applications.

Dimensions: 14" (356 mm) I.D. x 51" (1,296 mm) O.A.L.



## Petroleum Industry

The petroleum industry requires ceramic components that can meet challenging abrasive material handling, extreme temperature and corrosion resistance requirements. SCProbond components manufactured for these applications are specifically designed for these demanding environments. Applications include material transport products, environmental gas handling components, including scrubber spray nozzles, and corrosion and abrasion resistant fabrication linings. SCProbond materials provide cost effective, customized solutions to keep facilities running profitably and at maximum performance. Benefits include reduced downtime, lower labor costs, increased productivity and improved efficiency.



## Large Component Capability

SCP has the capability for production of large, complex components from our premium SCProbond N material. Use of large components can provide reduced installation time in many applications. Most importantly, large components eliminate the multiple seams found in more traditional wear tile solutions, which are often the weak link in wear performance. Ask an SCP representative how we can assist you with value-added services for streamlining your sourcing requirements.

(Right) SCPs capabilities include the production of large and complex diverse components. Photo features 60" centrally located petroleum industry scrubber spray nozzle, mining industry hydrocyclone inlet head scroll, large sweeps, and Y and T sections for ash handling and bulk material transport.



Large Y pipe used for ash handling and material transport.



## | Customer Service & Quality

### Working in partnership with our customers

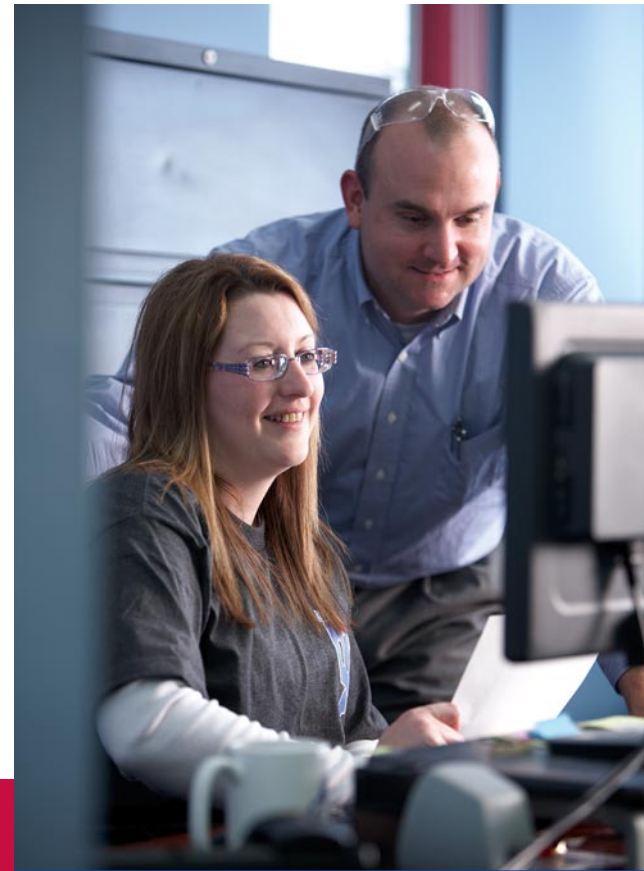
Customers with demanding industrial applications require a high level of service and support. Our reputation as a successful customer-oriented company has been built on consistency and responsiveness in meeting our customers' needs, including state-of-the art technology, attention to detail, timely communications and on-time delivery. Our sales and application engineers, as well as our customer advocates are knowledgeable and experienced and will work in partnership with you to find the best solution for your application. Our services also include:

- Consultation on application & design for manufacturability
- Order status
- Logistics coordination
- Quote support
- Order history, patterns & tooling on hand
- Monitoring of delivery performance metrics

At SCP, we make it easy for our customers to do business with us. We accept specs for quotes by email or fax and will contact you promptly – usually within 24 hours – for a follow-up discussion with an SCP sales engineer to review the proper product/application design and specification and to finalize your quote. Our Customer Service Department is available to assist you by phone, fax or email from 7:00 am to 4:30 pm EST Monday through Friday.

### Our commitment to quality

SCP is committed to meet or exceed the expectations of our customers. We monitor our progress and encourage customer input to measure our success and provide direction for improvement. We maintain ongoing continuous improvement initiatives as well as a quality management system that meets or exceeds the requirements of current ISO standards. At SCP, our goal is to maintain and improve the outstanding performance of our SCProbond silicon carbide materials and our high level of customer service and satisfaction.



Our knowledgeable and experienced customer advocates provide the clear communication between customers and operations that is key to our high level of customer service.



Dimensional checks are made throughout the manufacturing operation with special attention given to critical dimensions.

Careful packaging ensures components arrive intact at their final destination. Our 100% on-time delivery service goal includes international shipping expertise to worldwide locations.



## Your Source For High Performance Silicon Carbide Components

The SCP management team offers more than 80 years of combined ceramic engineering experience to help industrial customers develop successful solutions for their demanding performance requirements. Our early involvement in your project initiation process will directly result in improved quality, shorter lead times and best-fit for your application. For more information on SCP and how our experience can help develop solutions for your specific project requirements, contact us today.

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Careful timing and handling is employed throughout the casting process to ensure high quality.



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