



WEAR RESISTANT TECHNOLOGY



Silcarb has been in the field of silicon carbide based ceramics for the last 40 years. We manufacture Nitride Bonded Silicon Carbide for Wear Resistant applications (WRT). Our NBSIC materials have various advantages and unique properties to outperform and extend the service life as when compared to traditional existing materials like metals, rubber, polyurethane and coatings. Silcarb manufactures wear resistant ceramics for industries ranging from mining, steel, power, copper, cement, defense, petrochemicals, etc.

NITROKAST™ SiC

Nitrokast™ SiC is silcarb's high performance nitride bonded silicon carbide ceramic with exceptional resistance to wear, abrasion, erosion. Nitrokast™ possess excellent thermal shock resistance and can withstand high temperatures. Nitrokast™ SiC has better hardness when compared to other materials and offer superior chemical resistance to alkalines and acids. Nitrokast™ SiC is an effective solution to harsh environments where conventional ceramics wear out or corrode at faster rates. The durability of Nitrokast™ SiC surpasses that of steel, high chrome, rubber, plastics and also other ceramics. Nitrokast™ SiC can be manufactured into the required design, shape and size with close tolerances. Since Nitrokast™ SiC is manufactured by the casting process, complex shapes like FGD nozzles, Pipes and bends, Hydrocyclone parts, Pump Parts like Impellers, Throat Bush, Frame Plate Liner, Ceramic Hose, Ceramic Belt Scrappers, Ceramic Grate Bar, etc...

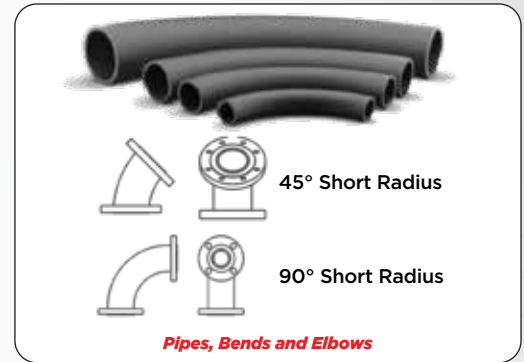
PROPERTY		SI Units	English Units
Chemical Analysis			
Silicon Carbide		76%	76%
Bond (Si ₃ N ₄)		25%	25%
Oxides		2.5%	2.5%
Bulk Density		2.75g/cm ³	171.67 lbs./ft ³
Young's Modulus (MoE)	20°C	233 GPa	33 x 10 ⁶ psi
Vicker's Hardness	20°C	24.0 GPa	3.8 x 10 ⁶ psi
Modulus of Rupture	RT	65 MPa	10 x 10 ³ psi
	1200°C	80.6 MPa	12 x 10 ³ psi
	1400°C	73.1 MPa	11 x 10 ³ psi
Thermal Conductivity	320°C	15.2 W/mK	110 (BTU·in)/(hr·ft ² ·°F)
	650°C	18.6 W/mK	128 (BTU·in)/(hr·ft ² ·°F)
	950°C	14.8 W/mK	96 (BTU·in)/(hr·ft ² ·°F)
	1150°C	15.2 W/mK	106 (BTU·in)/(hr·ft ² ·°F)
Thermal Expansion 30°C-	1500°C	3.8 x 10 ⁻⁶ /°C	1.5 x 10 ⁻⁶ /°F
Maximum Use Temperature		1,500°C	2730°F
Apparent Porosity		6%	6%
Specific Heat	RT	0.76 kJ/(kg·°C)	0.18 BTU/(lb·°F)

WEAR RESISTANT CERAMIC PRODUCTS

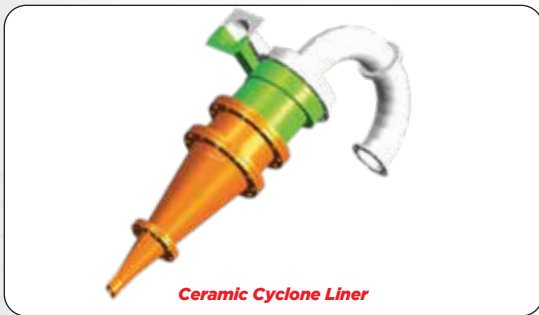
CERAMIC-LINED PIPES, BENDS AND ELBOWS

The use of NITROKAST™ - SIC ceramic-lined pipe and fittings is ideal in services that are prone to Erosive & Corrosive wear, where standard pipe and fittings would fail within a few months or less. NITROKAST™ - SIC ceramic-lined pipe and fittings are designed to outlast linings such as glass, rubber, basalt, hard-facings and coatings that are commonly used to extend the life of piping systems.

NITROKAST™ - SIC is formed by casting which allows to form a single part ceramic linings without any joints. The flow of material will be smooth without any changes in direction (as is typical with mitered bends) resulting in a less turbulent flow and increased wear resistance.



CERAMIC CYCLONE LINER



Ceramic Liners for Hydrocyclone Applications, NITROKAST™ - SIC solution for cyclone slurry separators can be manufactured as a single piece covered with Polyurethane and can be assembled just in weeks.

NITROKAST™ - SIC can be cast into complex shapes and then encased in polyurethane in-house, providing ease of installation, crack mitigation and added wear life. Ceramic cyclone parts – vortex finder, Spigot, Cylinder, Feed chamber, Overflow pipe, Lower and upper cone.

CERAMIC RUBBER HOSE

With lot of research work, we have developed **Flexible Ceramic Rubber Hose** using our NITROKAST™ - SIC ceramics, ceramic rubber hose can handle broad spectrum of material and requirements as per customer.

Reinforcement with NITROKAST™ - SIC ceramics & External with Smooth lining of natural rubber or combination as per requirements. NITROKAST™ - SIC ceramics can withstand high abrasion & corrosion action of material conveyed with high velocity.

Application:

- For transporting of solid particles like iron-ore, sand and gravel, dredged mud, cement, bentonite, alumina, silica, coal dust, ash, carbon black, mud slurry, etc by air, water or in the form of slurry in, mines, steel plants, coal washeries thermal power plants, cement plants and other heavy duty industries.



Nominal Bore	Outside Dia	Maximum Supply Length	Bending Radius	Working Pressure
Inch	mm	m	D	Kg/cm ²
2	50	70	6	10-15
4	100	120	6	10-15
6	150	170	6	10-15
8	200	222	6	10-15
10	250	185	6	10-15
12	300	340	6	10-15

CERAMIC SPRAY NOZZLES

In coal based power plants, they have the potentials to release SO₂ or SO₃ as a part of exhaust gas, removal of Sulphur Oxides using an alkali reagent such as wet limestone slurry, this process called FGD, which requires Ceramic Spray Nozzle to spray these chemicals for long hours continuously.

SILCARB has developed NITROKAST™ - SIC based FGD spray nozzle to withstand wear and corrosion and exhibit excellent mechanical strength. We can manufacture these spray nozzles as per customer design.



CERAMIC SCRAPER



At present WC coated with MS case Metal scrapers are widely used in Secondary scrapping system in Belt conveyors, these scrapper are in metal and always there is high chance to cut and wear-out the rubber Conveyors, these metal scrapper are more prone for rust during rainy seasons which can cause frequent breakdowns.

SILCARB is now introducing NITROKAST™ - SIC ceramic scrapers, to replace metal scrapers for better wear life and friendly to conveyor belts. NITROKAST™ - SIC ceramic scrapper can be easily mounted with Rubber or Polyurethane holders with easy installation, these ceramic scrapers can clean the belt up to 95% and extend the service life and decrease the down time.

CERAMIC WEAR COMPOUND

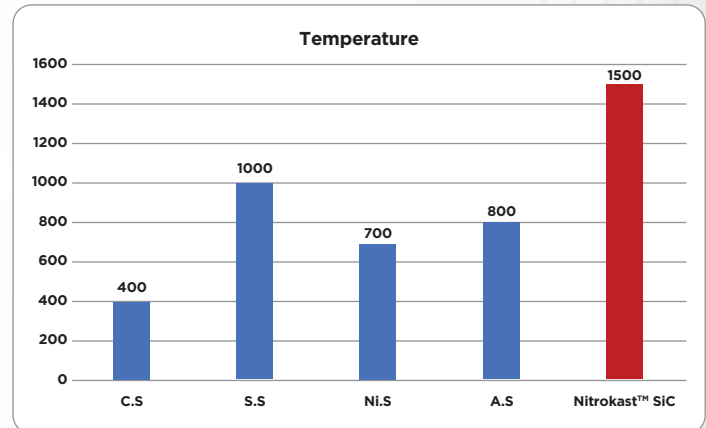
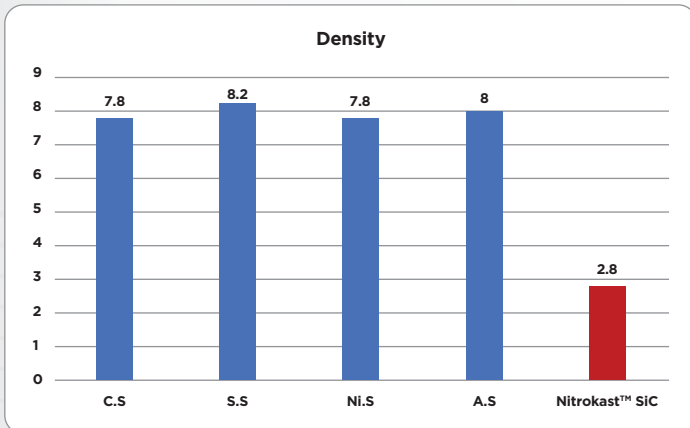
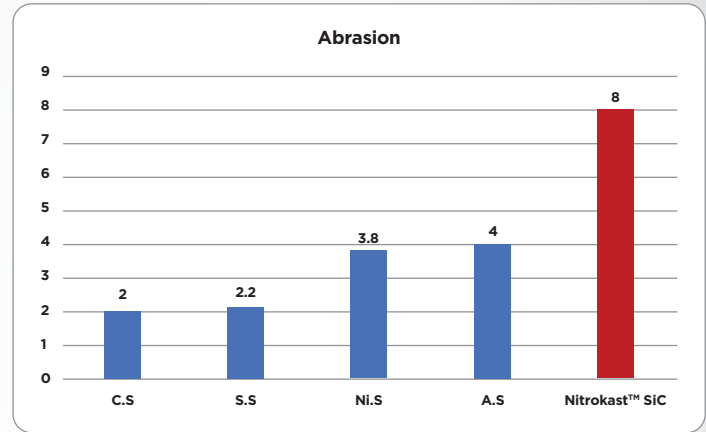
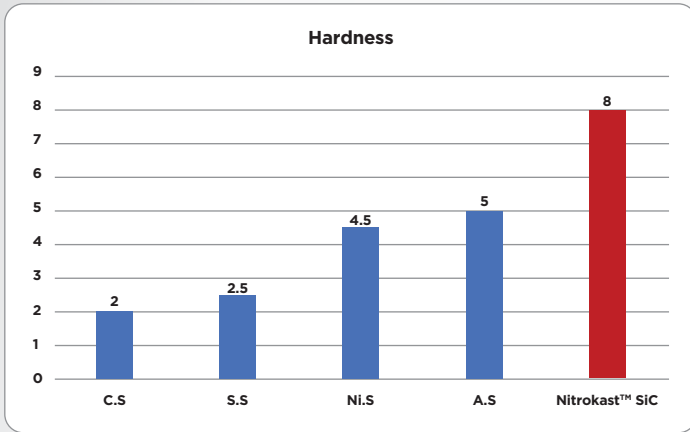
SILCARB has developed NITRO WEARKOAT™ compound with SIC grain doped with epoxy resin. This compound has formulated for applications where standard and traditional epoxy and grouting materials fail to perform. SILCARB has specially developed SIC based ceramic polymer coating wear compound named - NITRO WEARKOAT™ both Brushable and Trowellable.

The hardness of NITRO WEARKOAT™ - SIC grains is mixed with specially made resin and Hardener to form a in-seperable bond with superior mechanical properties to address Corrosion, Abrasion, Erosion which is a common problem worldwide in equipment failure.

NITRO WEARKOAT™ is a 2 part compound, it consist of Part A (Resin + SIC grains) and Part B (Hardener + SIC grains), both are separately packed and supplied, during application part A of 100 with Part B with 50 is mixed thoroughly and can be applied on surface like Steel, Rubber, Plastics, etc. NITRO WEARKOAT™ exhibit smooth, glossy with low friction coating, can be applied on components like fan blade, Pump impeller, FPLI, Throat bush, Sleeve, Cyclone parts, Pipes and Bends etc.



WEAR RESISTANCE MATERIALS AND ITS RELATIVE COMPARISON



MARKETS

- Coal-fired Power Generation
- Abrasive Material Handling
- Chemical Processing
- Food Processing
- Iron/Steel Manufacturing
- Powder/Bulk Solids Conveying
- Pulp & Paper Manufacturing
- Pulverizing & Grinding
- Pharmaceutical Industry
- Environmental Industries
- Cement Industry
- Fiberglass Industry
- Foundries
- Textile Manufacturing
- Wire Industry
- Fertilizer Industry

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