Industry

Carbon and Ceramic Technologies

schunk-carbontechnology.com

Schunk – A worldwide success. Always at your side.

Schunk is a global leading force in the development, production and use of carbon, ceramic, quartz and sintered solutions. Like no other, Schunk combines innovative strength and technological know-how with an extraordinary service orientation to supply a range of performances unique to the market.

Schunk is a partner who offers you all the technological possibilities of a globally active company and can implement your ideas pragmatically and tailor-made to your requirements – whether these are for industrial large-volume markets or highly specialized niche markets.

The Schunk Group

Empowering, idea-driven, collaborative – this is how the Schunk Group has made a name for itself as a globally-active technology group since 1913.

Empowering, because we build bridges for our customers to help them develop better products and conquer new markets with innovative technologies. Idea-driven, because innovations are a significant aspect of our company culture. Collaborative, because every employee of the Schunk Group is focused on the customer.

The Schunk Group is a globally operating technology company with a global business unit structure. The company is a leading supplier of products made of high-tech materials – such as carbon, technical ceramics and sintered metal – as well as machines and systems – from environmental simulation and air conditioning to ultrasonic welding and optical machines. The Schunk Group is active in a large number of key industries, from automotive, rail, aviation and marine technologies to solar and wind energy to the chemical and machine production industries. More than 9,100 employees in 29 countries are ready to serve you.

Schunk materials for tribological applications

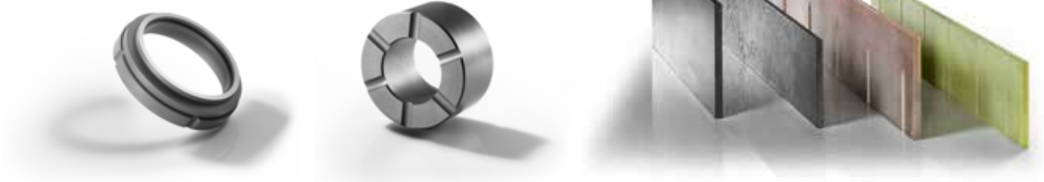
As a materials expert, we combine the competence for soft as well as hard sliding materials and their optimal combination for use in seal rings, pumps and compressors.

Almost every industry is familiar with at least one of the following problems or challenges:

- Reduction of lubrication losses
- Limited friction and applications under inadequate lubrication or even the realization of dry lubrication, i.e., without media
- Tribology in low-viscosity, poorly lubricating media
- Problems with corrosion and oxidation in aggressive media and/or at high temperatures
- Compatibility with food, etc.
- Requirements for dynamically loaded components such as high strength, dimensional stability, gas tightness, wear and abrasion resistance as well as demands for ever larger dimensions and more complex forms

As a specialist in carbon as well as silicon carbide materials, Schunk offers a wide range of products from one source. That means that there is a combined expertise in development, manufacturing and processing of hard and soft sliding materials and pairings, in particular for pumps, seal rings and compressors as well as generally for tribologically loaded mechanical parts.
Through continuous material advancements, Schunk is always developing new field of application for its materials.
In addition to our own tribology test facilities, for application-oriented endurance tests as well as principle studies, we also offer the possibility of extensive studies in our physical and chemical laboratories.

We offer comprehensive technical advice and would be happy to provide you with support on new projects. The characteristic properties of carbon and graphite materials, such as a low friction coefficient in conjunction with a variety of possible friction partners, high resistance to wear even under difficult conditions, chemical resistance, temperature resistance, good thermal conductivity, excellent thermal shock behavior, excellent dimensional stability and high fatigue strength turn Schunk Materials into problem-solvers for a countless number of applications. Silicon carbide materials in abrasive applications complete the product portfolio.
Thus, Schunk's materials have tapped into wide application areas: in the chemical and petrochemical industry; in the food, pharmaceutical and cosmetics industries; in the production of pumps, compressors and turbines; in aircraft and automobile construction; in the maritime sector; in the paper industry; air conditioning technology as well as in domestic appliances and in power plant technology.



Partner for development, technical application consultation and services

Challenge us – we will find a solution for your tribological problem!

The tribology test room

Mechanical seal test rig

Rotary vane pump

Pin-on-disc tribometer

Physical and chemical laboratory

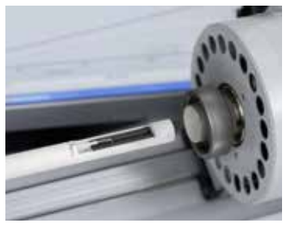
Do you need support in material related questions?
Intensive examination precedes the solution:

- Microscopic images, SEM, EDX, X-ray examinations
- Strength, E moduli, hardness
- Coefficient of thermal expansion
- Thermal analyses (TG, DSC, TMA, DTA, thermal conductivity)
- Densities, porosities, specific surface areas, pore size distribution
- Wet chemical analyses
- Spectroscopy (FTIR, OES)
- GC-MS analysis

Multi-element analysis

Flexural test
(Universal testing machine)

Microscope



Dilatometer

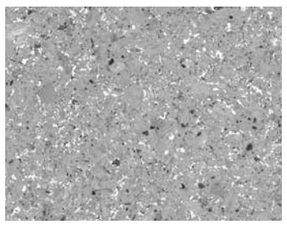
Range of materials – from hard to soft

Material		CarSIK				FH				FE			FF
		SD	NT	CT	SiC30	42ZH	82A	82ZH	71ZH	45Y	65	679PS	521
Characteristics	Unit	SSiC	SiSiC	SiSiC-C	C-SiC	Carbon graphite				Electro graphite			Resin bonded carbon
Bulk density	g/cm³	3.10	3.09	2.90	2.65	1.70	2.15	1.80	2.80	1.70	1.80	2.20	1.75
Porosity	%	-	-	-	-	1	1	1	1	8	8	2	-
Flexural strength	MPa	390	280	120	140	60	90	75	75	40	45	90	60
Compressive strength	MPa	3800	3000	650	500	210	350	250	170	100	110	210	145
Young's modulus	GPa	400	360	260	140	18	26	24	27	12	13	20	20
Thermal expansion 20-200 °C	10^{-6}/K	4.0	3.9	3.9	3.0	4.6	4.5	4.7	7.0	3.6	3.1	4.1	23
Thermal conductivity	W/mK	110	120	120	125	11	9	8	6	65	65	45	5
Temperature limit, oxidized	°C	1720	1380	600	600	260	350	260	260	500	600	500	180
pH range		0-14	1-10	1-10	0-14	*	*	*		*			*
Chemical composition	% SIC	99	88	75	62	-	-	-	-	-	-	-	-

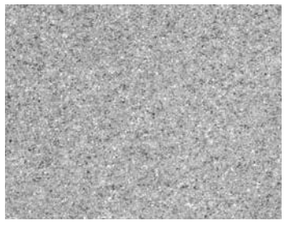
* More information about the chemical resistance of the materials is available upon request.

This table merely contains a small selection of standard materials.
The values specified are not binding, but rather typical values based on our experience.
Specific material and production variations should be taken into consideration.

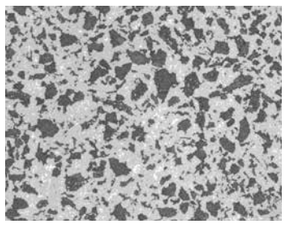
All Schunk materials are manufactured from raw materials that have undergone defined treatment or are chosen on the basis of exact specifications and which, in turn, are produced in manufacturing processes governed by precisely-determined specifications. You will find additional materials in our broschure „30.14 – Characteristics Standard Materials". Furthermore, additional materials are available for special applications. We would be pleased to inform you about drinking water and food approvals of our materials.



metal-impregnated material



high-strength carbon material



C-SiC composite material

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