



**Business Unit Tribology**

# **Carbon and Ceramic Technologies**



**Schunk Kohlenstofftechnik GmbH**



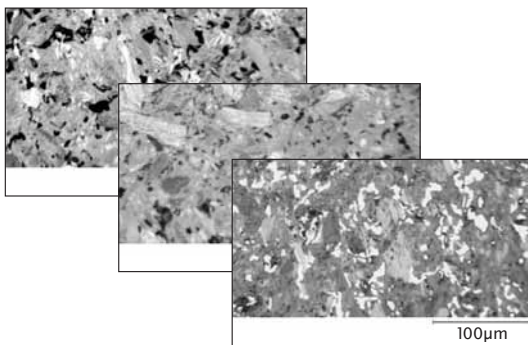
# Carbon and Ceramic Technologies

## The Schunk Business Unit Tribology

The Schunk business unit Tribology is your competent partner in all questions relating to materials for tribological applications – particularly seal rings, friction bearings and pump components.



With extensive know-how relating to both carbon graphite materials and silicon carbide materials, the business unit Tribology offers a broad range of products from a single source. This means combined competences with regard to friction materials in seals, pumps and compressors and both hard and soft friction partners and pairings.



*Different structures: non-impregnated, synthetic resin impregnated and metal impregnated materials*

The properties of carbon and graphite materials, such as sliding and dry running characteristics, a low coefficient of friction and resistance to wear (even under severe tribological conditions), chemical resistance, temperature resistance, good thermal conductivity, excellent thermal shock characteristics, excellent dimensional stability and a high resistance to fatigue, mean that our materials are problem solvers in a variety of applications.

Our materials are therefore used in a broad range of applications, including high and low temperature ranges, in the chemical and petrochemical industry, the food, pharmaceutical and cosmetics industry, in pumps, compressors and turbines, in aircraft and vehicle construction, in ship building, the paper industry, air conditioning technology, household appliances and in reactor technology.

New areas of application are exploited through the continuous further development of materials in our company.

We take your individual application conditions into consideration, can provide you with a comprehensive application engineering consulting service and will be more than

# Carbon and Ceramic Techn

happy to assist you in your new projects.

In addition to our own tribology test room for both application-orientated hardness tests and basic examinations, we also offer

you comprehensive testing in our physical and chemical laboratories.

Put us to the test – and we'll find a solution to your tribological problem too!



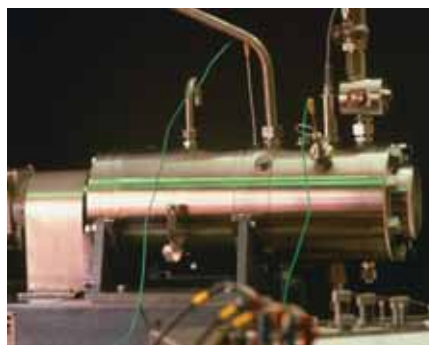
Seal ring test rig

### The tribology test room

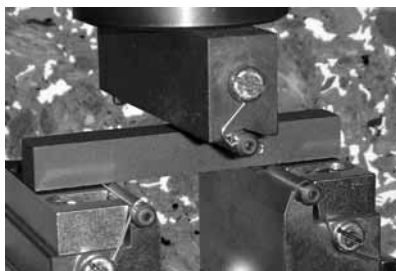
Whether basic examinations are required or specific application “endurance” tests, examinations of whether components should be run lubricated or technically dry – our air conditioned rooms make everything possible.



Pin-on-disc test rig



Test rig for blister tests with highly viscous oils as the medium to be sealed



### Our laboratories

Do you have a problem with material? Intensive examination precedes the solution:

- Microscopic analyses
- Strengths, E-modules, hardness
- Thermal analyses
- Sealing, surfaces, pore radii
- Chemical analyses
- Spectroscopy (FTIR, UV, OES)
- Material separation with GC-MS

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# Range of Material from hard to soft

Material	Unit	CarSiK					SiC30	FH				FE			FF
		SD	SD/C	NT	FT	CT		42ZH	82A	82ZH	71ZH	45Y	65	679PS	521
Characteristics	Unit	SSiC	SSiC-C	SiSiC		SiSiC-C	C-SiC	Carbon graphite				Electrographite			Resin bonded carbon
Bulk density	g/cm <sup>3</sup>	3.10	2.90	3.09	3.09	2.90	2.65	1.70	2.15	1.80	2.80	1.70	1.80	2.20	1.75
Porosity	%	-	-	-	-	<1	0,5	1	1	1	1	8	8	2	1
Flexural strength	N/mm <sup>2</sup>	390	120	280	300	120	140	60	90	75	75	40	45	90	60
Compressive strength	N/mm <sup>2</sup>	3800	3800	3000	2600	650	n.m.	210	350	250	170	100	110	210	150
E-module	GPa	400	260	360	360	260	140	18	26	24	27	12	13	20	20
Thermal expansion 20 – 200°C	10 <sup>-6</sup> /K	4.0	4.0	3.9	3.9	3.9	3.0	4.6	4.5	4.7	6.3	3.6	3.1	4.1	18
Thermal conductivity	W/mK	110	110	120	110	120	125	11	9	8	6	65	65	45	5
Temperature limit, oxidised	°C	1720	600	1380	1380	600	600	260	350	260	260	500	650	500	180
pH range		0-14	0-14	1-10	1-10	1-10	0-14	*	*	*		*			*
Chem. composition	% SiC	99	80	88	88	75	62	-	-	-	-	-	-	-	

\* Please refer to our brochure 39.12 for information on chemical resistance of carbon graphites and electrographites.

This table merely contains a 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. Other special materials are available for special applications.

We would be delighted to provide you with information on the comprehensive food and oxygen approval classes of our materials.

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