

Seal rings and bearings - Material data sheet CarSIK

		CarSIK-NT (SiSiC)	CarSIK-CT (SiSiC+C)	CarSIK-SD (SSiC)
Optical micrographs:				
Open porosity	vol.-%	0	0	0
Density	g/cm ³	3.09	2.90	3.10
Flexural strength (4-point)	MPa	280	120	390
Compressive strength	MPa	3000	650	3800
Young's modulus	GPa	360	260	400
Vickers hardness		2800	2800	2800
Coefficient of thermal expansion (RT - 400 °C)	10 ⁻⁶ /K	3.9	3.9	4.0
Thermal conductivity (RT)	W/mK	120	120	110
SiC content	weight %	88	75	99
free carbon	weight %	0	15	0
free silicon	weight %	12	10	0

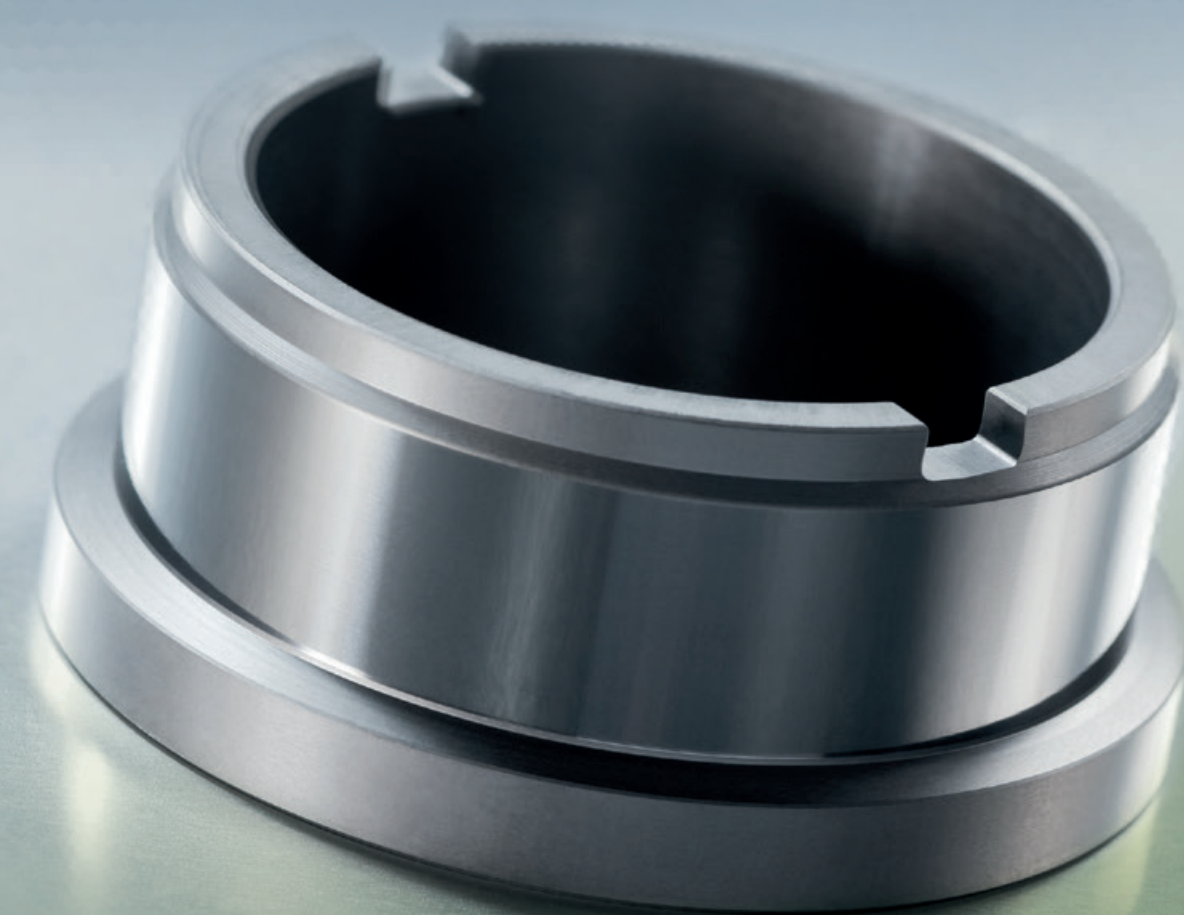
The Schunk Group is an internationally operating technology company. It offers a broad spectrum of products and services in the fields of carbon technology and ceramics, environment simulation and air conditioning technology, sintered metal and ultrasonic welding. The Schunk Group has bundled its expertise in the development, manufacture and application of carbon and ceramic solutions in the Schunk Carbon Technology Division.



Schunk Carbon Technology

Sealings and Bearings made of SiSiC and SSiC

Reliable under the toughest conditions



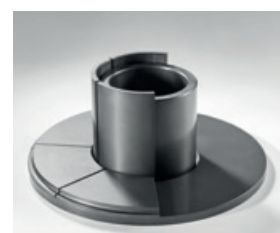
Seal rings



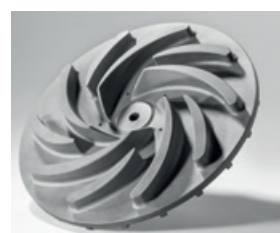
Bearings



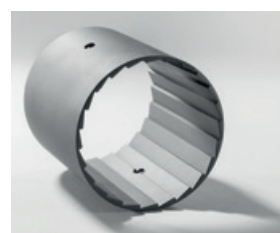
Seal rings



Combined axial/radial bearings



Pump impeller



Lining for extrusion machines

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Reliable under the toughest conditions: silicon carbide sealing rings and bearings

Tribological components, which are used in harsh environments, are constantly subjected to difficult conditions; whether in the petrochemical, chemical engineering, pump manufacturing or ship building industries. In addition to mechanical stress, there are also the effects of aggressive substances.

Schunk Ingenieurkeramik utilizes silicon carbide for tribological solutions. Our particularly robust CarSIK materials are distinguished by their extremely high resistance to corrosion and wear without premature material fatigue. They are therefore ideally suited for reliable operation in harsh environments. Due to our years of experience, we are able to manufacture a wide variety of components. Even complicated geometries, special components and large sizes are not a problem for us. We would be happy to advise you if you have any questions regarding material properties, applications and component design.



Reliable solutions using CarSIK sealing rings and bearings are in demand wherever material requirements are particularly high. In abnormally aggressive environments - such as oil production - silicon carbide guarantees better resistance to wear compared with metal.

Corrosion behavior of CarSIK

Agent	Chem. formula	Concentration %	CarSIK-NT		CarSIK-CT		CarSIK-SD	
			RT	50 °C	RT	50 °C	RT	50 °C
Acetone	CH ₃ COCH ₃	conc.	++	++	++	++	++	++
Acetyl chloride	CH ₃ COCl	conc.	++	++	++	++	++	++
Aluminum chloride	AlCl ₃	10	++	++	++	++	++	++
Ammonia, aqueous solution	NH ₃	conc. (25 %)	++	+	++	++	++	++
Ammonium chloride	NH ₄ Cl	25	++	++	++	++	++	++
Ammonium fluoride	NH ₄ F	20	+	-	+	-	++	++
Ammonium nitrate	NH ₄ NO ₃	50	++	++	++	++	++	++
Aniline	C ₆ H ₅ NH ₂	conc.	++	++	++	++	++	++
Aqua regia	HCl/HNO ₃	conc., 3:1	++	++	++	++	++	++
Benzoic acid	C ₆ H ₅ COOH	alcoholic sol.	++	++	++	++	++	++
Benzene	C ₆ H ₆	conc.	++	++	++	++	++	++
Boric acid	H ₃ BO ₃	cold sat. sol.	++	++	++	++	++	++
Bromine, aqueous solution	Br ₂	cold sat. sol.	++	++	++	++	++	++
Calcium oxide	CaO	cold sat. sol.	++	++	++	++	++	++
Carbon tetrachloride	CCl ₄	conc.	++	++	++	++	++	++
Citric acid	C ₆ H ₈ O ₇	50	++	++	++	++	++	++
4-chlorotoluene	CH ₃ C ₆ H ₄ F	conc.	++	++	++	++	++	++
Chromosulphuric acid	CrO ₃ /H ₂ SO ₄	conc.	++	++	++	++	++	++
Copper(II)-chloride	CuCl ₂	40	++	++	++	++	++	++
Copper(II)-sulfate	CuSO ₄	25	++	++	++	++	++	++
1,4-dioxane	C ₄ H ₈ O ₂	conc.	++	++	++	++	++	++
Ethanol	C ₂ H ₅ OH	conc.	++	++	++	++	++	++
Ethyl acetate	CH ₃ COOC ₂ H ₅	conc.	++	++	++	++	++	++
Fluorosilicic acid	H ₂ SiF ₆	conc.	++	++	++	++	++	++
Formic acid	HCOOH	conc.	++	++	++	++	++	++
Glycerol	C ₃ H ₈ O ₃	conc.	++	++	++	++	++	++
Hydrofluoric acid	HF	conc., 40	+	-	+	-	++	++
Hydrochloric acid	HCl	conc., 36	++	++	++	++	++	++
Hydrofluoric acid-nitric acid	HF/HNO ₃	conc., 3:1	-	-	-	-	++	+
Hydrogen peroxide	H ₂ O ₂	30	++	++	++	++	++	++
Iron(III)-chloride	FeCl ₃	45	++	++	++	++	++	++
Iron(II)-sulfate	FeSO ₄	25	++	++	++	++	++	++
Lithium hydroxide	LiOH	10	++	+	++	+	++	++
Magnesium sulfate	MgSO ₄	4	++	++	++	++	++	++
Mercury(II)-nitrate	Hg(NO ₃) ₂	10	++	++	++	++	++	++
Methanol	CH ₃ OH	conc.	++	++	++	++	++	++

++ resistant + partially resistant - not resistant -¹ solution boiling

Agent	Chem. formula	Concentration %	CarSIK-NT		CarSIK-CT		CarSIK-SD	
			RT	50 °C	RT	50 °C	RT	50 °C
Mixed acid	H ₂ SO ₄ +H ₃ PO ₄	conc., 1:1	++	++	++	++	++	++
Nitric acid	HNO ₃	conc., 65	++	++	++	++	++	++
Oleic acid	C ₁₇ H ₃₃ COOH	conc.	++	++	++	++	++	++
Oxalic acid	(COOH) ₂	cold sat. sol.	++	++	++	++	++	++
Phosphoric acid	H ₃ PO ₄	conc., 85	++	++	++	++	++	++
Phthalic acid	C ₆ H ₄ (COOH) ₂	alcoholic sol.	++	++	++	++	++	++
Potash lye	KOH/H ₂ O	30	-	-	-	-	++	++
Potash lye	KOH/H ₂ O	20	+	- ¹	+	- ¹	++	- ¹
Potassium chloride	KCl	cold sat. sol.	++	++	++	++	++	++
Potassium chromate	K ₂ CrO ₄	35	++	++	++	++	++	++
Potassium nitrate	KNO ₃	20	++	++	++	++	++	++
Potassium permanganate	KMnO ₄	5	++	++	++	++	++	++
Propionic acid	CH ₃ CH ₂ COOH	conc.	++	++	++	++	++	++
Pure acetic acid	CH ₃ COOH	conc.	++	++	++	++	++	++
Salicylaldehyde	C ₇ H ₆ O ₂	conc.	++	++	++	++	++	++
Silver nitrate	AgNO ₃	10	++	++	++	++	++	++
Sodium carbonate	Na ₂ CO ₃	15	++	++	++	++	++	++
Sodium chloride	NaCl	cold sat. sol.	++	++	++	++	++	++
Sodium fluoride	NaF	4	++	+	++	+	++	++
Sodium hydroxide	NaOH	10	+	-	+	-	++	+
Sodium hydroxide	NaOH	30	-	- ¹	-	- ¹	++	- ¹
Sodium hypochlorite	NaOCl	12,5 % free Cl	++	++	++	++	++	++
Sodium metaborate	NaBO ₂	20	++	++	++	++	++	++
Sodium peroxide	Na ₂ O ₂	10	++	++	++	++	++	++
Sodium sulfide	Na ₂ S	50	++	++	++	++	++	++
Sodium thiosulphate	Na ₂ S ₂ O ₃	40	++	++	++	++	++	++
Sulphuric acid, oleum	H ₂ SO ₄ +SO ₃	30 % free SO ₃	++	++	++	++	++	++
Sulphuric acid	H ₂ SO ₄	conc., 98	++	++	++	++	++	++
Sulphuric acid	H ₂ SO ₄	50	++	++	++	++	++	++
Sulphurous acid	H ₂ SO ₃	5-6 % SO ₂	++	++	++	++	++	++
Tartaric acid	C ₄ H ₆ O ₆	10	++	++	++	++	++	++
Tetrachloroethylene	C ₂ Cl ₄	conc.	++	++	++	++	++	++
Tetrafluoroboric acid	HF ₄	conc.	+	+	+	+	++	++
Trisodium phosphate	Na ₃ PO ₄	10	++	++	++	++	++	++
Urea	H ₂ N-CO-NH ₂	cold sat. sol.	++	++	++	++	++	++
Zinc chloride	ZnCl ₂	60	++	++	++	++	++	++

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