



# Beams und Profiles By Far the Best Carrying Factor

## Advantages

- No porosity, therefore excellent oxidation and corrosion resistance
- Very good thermal shock resistance
- High modulus of rupture
- Stability of shape up to the maximum operating temperature (excellent long term creep-resistance)
- Low mass
- High degree of reliability and economy in service
- High surface quality
- Clean inner surfaces (no residue from the siliconizing process)

# Technical Data

CarSIK-Z/CarSIK-G			Microstructure
Bulk density	(g/cm <sup>3</sup> )	3.09	<b>CarSIK-Z</b> (extruded) 
Apparent porosity	(Vol. %)	0	
Modulus of rupture/4-point loading	(MPa)	280	
Design stress value	(MPa)	65	
Weibull modulus		10	
Compressive strengths	(MPa)		
Modulus of elasticity	(GPa)	1,000	
Vickers hardness	(MPa)	360	
		SiC 25,000	
		Si 9,000	
Thermal expansion	20'-1,000 °C	4,9 x 10 <sup>-6</sup>	<b>CarSIK-G</b> (slip cast) 
Coefficient	(1/°C)		
Thermal conductivity (W/mK)	100 °C	160	
	1,200 °C	24	
Specific heat (J/kgK)	RT	600	
	1,300 °C	1,200	
Limit of application	(°C)	1,380	
Chemical composition			
(wt. %)	SiC	88	
	Free Si	11	

Dark phase = SiC  
Light phase = free Si

The values quoted above were determined on test specimens and cannot generally be applied to all shapes.

Process modifications are introducing a wide range of possible applications for construction elements in the form of beams and profiles.

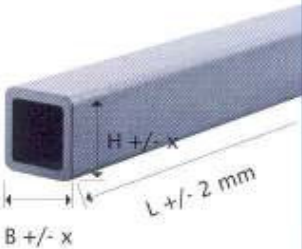
The result of this has been a more efficient use of the available kiln space and a saving in energy due to a reduction in the thermal mass.

Silicon-infiltrated, reaction-bonded SiC (RBSiC) is a material which has a high

degree of reliability and economy in service and it therefore deserves special consideration for use at temperatures up to 1,380 °C.

In comparison with such materials as recrystallized silicon carbide (RSiC) and silicon nitride-bonded silicon carbide (NSiC), silicon-infiltrated, reaction-bonded SiC (RBSiC) ensures optimum longterm performance within the temperature

range specified because of its excellent properties. Typical applications for this product are support elements and posts for kiln car superstructures, beams for two-channel kilns, joining systems for roof insulation as well as complete transport carriages.

Cross-section		Wall thickness	Tolerances		Moment of resistance	Max. length	Legend
H (mm)	B (mm)	(mm)	x (mm)	wall (mm)	(mm <sup>3</sup> )	(mm)	
80	80	9	1,4	+1/-0.5	40,789	4,200	
80	60	8,5	1,4	+1/-0.5	32,557	4,200	
60	60	7	1,2	+1/-0.5	21,254	4,200	
60	50	7	1,2	+1/-0.5	18,326	4,200	
60	40	6	1,0	+1/-0.5	15,398	4,200	
50	50	6	1,0	+1/-0.5	13,883	4,200	
50	40	6	1,0	+1/-0.5	11,545	3,700	
50	30	6	1,0	+1/-0.5	9,208	3,700	
40	40	6	1,0	+1/-0.5	8,106	3,700	
40	30	6	1,0	+1/-0.5	6,354	3,700	
40	20	6	1,0	+1/-0.5	4,602	3,700	
35	35	6	1,0	+1/-0.5	5,813	3,700	
30	30	6	1,0	+1/-0.5	3,917	3,700	
30	20	6	1,0	+1/-0.5	2,741	3,700	
25	25	6	1,0	+1/-0.5	2,414	3,700	
20	20	6	1,0	+1/-0.5	1,299	3,700	

The moment of resistance is calculated assuming a constant wall thickness of 6 mm.

Special shapes on request. Technical data, right of modification reserved.

# References



Intermittent kiln (SITI)



Tunnel kiln (Drayton)

The appropriate beam cross-sections are determined according to individual specific loading conditions.

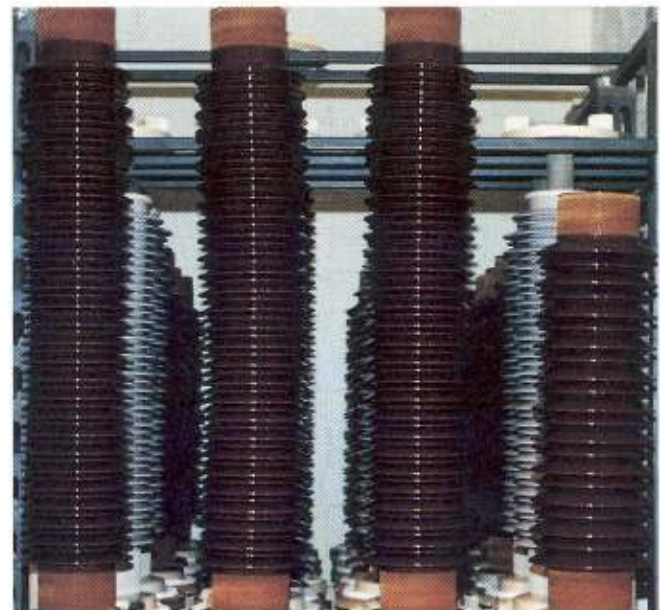
The excellent performance of **CarSIK** beams and their high degree of reliability in service, have placed them in an important market position worldwide for sanitaryware and other applications such as electrical porcelain which involve superstructures carrying heavy loads.

Silicon-infiltrated, reaction-bonded silicon carbide (RBSiC) has initiated significant technological progress over the last few years in quite diverse industry types (e. g. roofing tile industry). Through direct communication with constructors and end users, Schunk Ingenieurkeramik GmbH are able to develop solutions specific to each individual customer right up to the stage of final production. Various forming processes are available

depending on the different shape geometries required. Standard beam cross-sections up to 80 x 80 mm are produced by the process of extrusion, while slip-casting is used for the production of complex profiles. Both production methods are able to meet tight dimensional tolerances and slip-casting can be used for the production of prototypes right up to high-volume manufacture.



Intermittent kiln (Eisenmann)



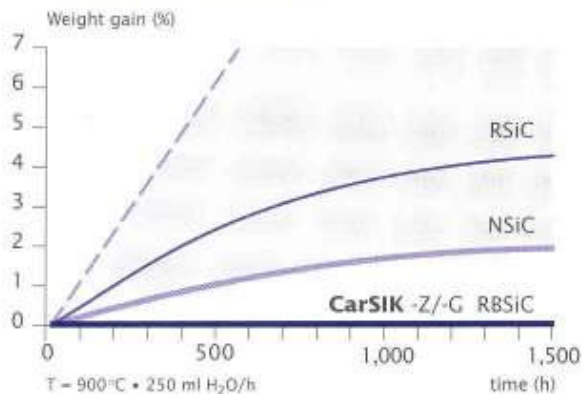
Doulton Insulators Ltd. (U.K.)

# Technical Data

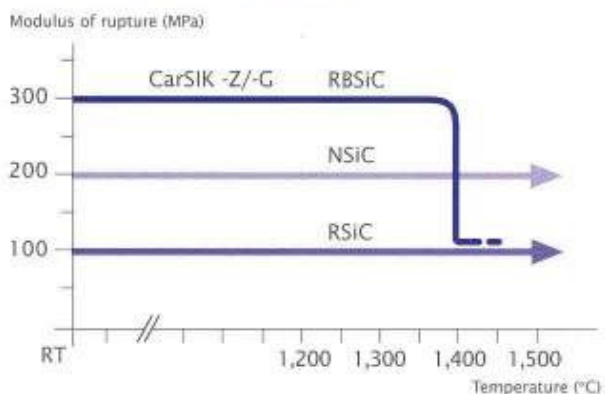
## Comparison of commercially available kiln-furniture materials based on SiC (schematic)

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### Oxidation resistance



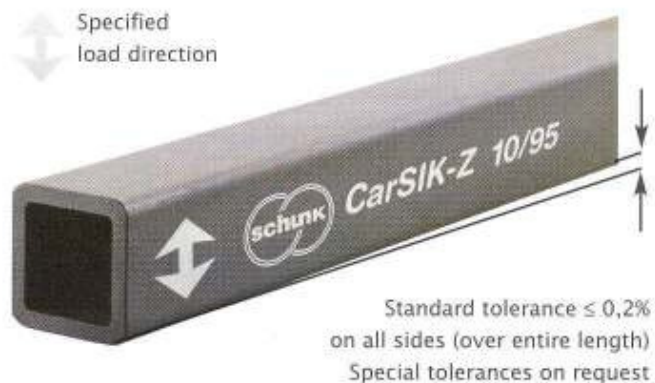
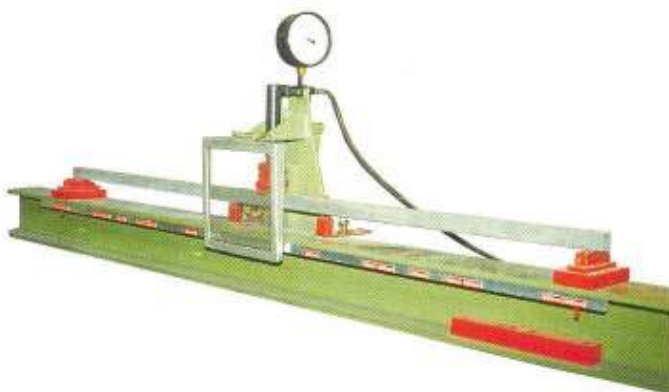
### Modulus of rupture



**RBSiC** Silicon-infiltrated, reaction-bonded SiC    **RSiC** Recrystallized SiC    **NSiC** Silicon nitride-bonded SiC

### In-process control

In addition to in-process control every shape is subjected to a final inspection. This includes an evaluation of warpage (according to DIN 40680 middle, part 2) and a 3-point modulus of rupture test. Each piece is tested with a defined load which exceeds the specified design load.



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