

The future is hot – innovative materials and components from Schunk



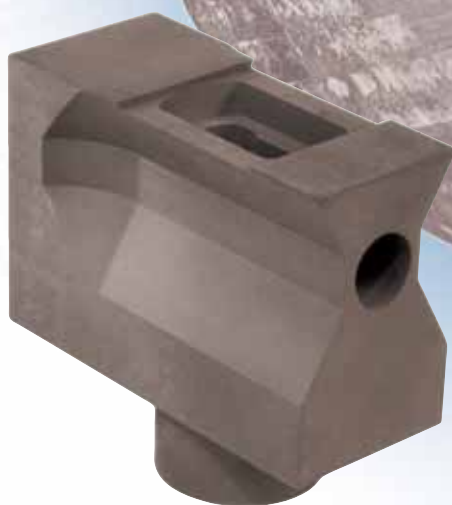
High-Temperature Applications Division



Specialists in carbon materials



Ultra-pure electrographite component for analytical applications



High-temperature resistant fine-grained graphite (e.g. for use in the semiconductor industry)



Carbon fibre-reinforced carbon with high strength against breakage (e.g. for furnace applications)

A Schunk Group company

The High-Temperature Applications Division is part of the Schunk Group, a GLOBAL engineering group offering a broad range of services in materials engineering and system technology. Schunk is represented by more than 80 subsidiaries in 25 countries and employs over 7,300 personnel worldwide.

We are the innovative partner who can provide you with the entire process chain when it comes to materials and products, from the manufacture of basic materials, the planning and development of components and their production through quality control and testing.

The High-Temperature Applications Division is closely related to Schunk Ingenieurkeramik, XYCARB.

International consulting and service

Schunk High-Temperature Applications specialises in consultation and worldwide service. Our consulting service includes the following:

- Recommendation of mechanical and physical properties of materials
- Optimum exploitation of the advantages of fibrous composite materials

- Optimum utilisation of materials in component design
- Component development
- Component design
- Prototyping
- Testing recommendations

Tailored materials for specific applications

The High-Temperature Applications Division specialises in "tailored" materials and components. Schunk's know-how is particularly strong with regard to the following materials and processes:

Graphite:
Utilisation of extreme electrical and thermal properties and excellent chemical resistance

Carbon fibre-reinforced carbon (carbon fibre composite – CFC):
Tailored from a specially-developed carbon matrix with integrated carbon fibres

Carbon fibre-reinforced ceramics:
Development of excellent properties for tribological applications through utilisation of specific raw materials, material structure and selection of process parameters

Carbon and graphite felt:
Utilisation of positive insulation properties under extreme thermal and chemical stress.



Your competent partner



Carbon fibre-reinforced CMC material (e.g. for manufacturing high-performance brake discs in series-production vehicles)



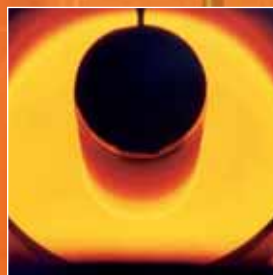
Graphite/Hard and soft felts. Ultra-pure for thermal insulation (e.g. crystal growing)

An extensive range of high-temperature applications



2.800 °C

Using a graphite tube in the atomic absorption spectroscopy under extreme thermal conditions

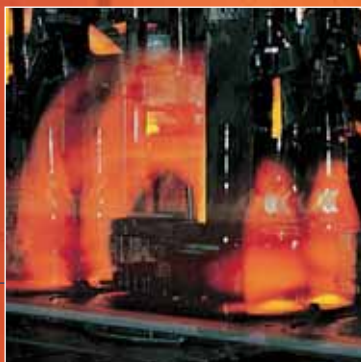


CFC fixtures for inert gas and vacuum furnace units

1.500 °C

CFC and graphite components for crystal growing units in the semiconductor industry

Carbon components for use in the glass industry



1.000 °C

600 °C

Industrial applications

Schunk is one of the few international companies which offer both a broad spectrum and wide range of high-temperature applications, with capability ranging up to 2,800 °C in a vacuum or inert gas atmosphere.

We develop and manufacture special materials and components for use in the following applications:

- Semiconductor industry
- Continuous casting
- Analytical applications
- Furnace construction
- Hardening technology
- Optical fibres
- Pressure sintering
- Reactor technology
- Solar technology
- Medical technology
- Aerospace
- Heat treatment
- Glass industry
- Hard metal production and many more.

Minimum and maximum dimensions

Schunk manufactures components varying in size from microscopic dimensions to several metres long and guarantees the absolute purity of these products. Our furnace systems and machining centres are suitable for all dimensions, from individual part manufacturing to industrial serial production.

From blanks to finished parts – all from a single manufacturer

We support you in the realisation of your projects, from initial concept to the finished component. This includes:

- Material consulting
- Design and dimensioning of components.

We manufacture the basic materials, and thus directly influence their quality right from the start.

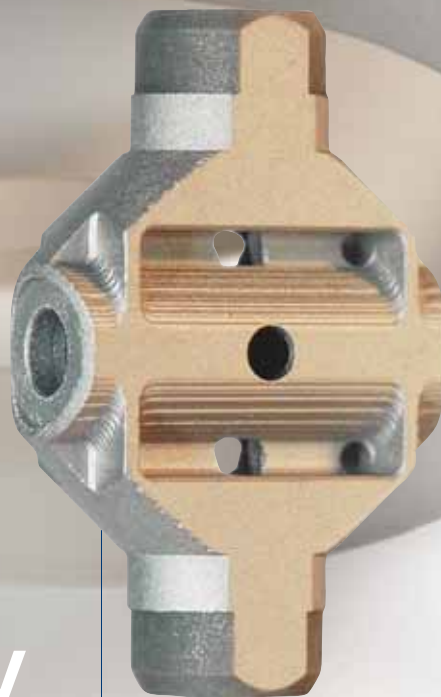
Highest demands

High-temperature CFC heating element. Used in systems for producing ultra-pure silicon



Perfection in cleaning and coating

Excellent
quality



*The world's no. 1:
graphite tube
cuvette from
Schunk. Important
components in
atomic absorption
spectroscopy (AAS),
one of the most
important methods
for determining
trace elements*

Highest purity standards for analytical and semiconductor engineering

We achieve purity levels down to the detection limits of conventional analysis methods, due to our high-temperature cleaning of graphite and CFC components at over 2,000 °C in a vacuum with purification gases.

Schunk, as a supplier of graphite components, is the international market leader in the area of atomic absorption spectroscopy (AAS), one of the most accurate analytical procedures in trace element analysis.

Coatings to meet extremely high demands

Schunk uses the principle of chemical vapour deposition (CVD) when it comes to coating and using chemical vapour infiltration (CVI) to deposit or infiltrate thin layers onto a substrate through thermal decomposition of the vapours. Layer thickness ranges from a few nanometres to several hundred micrometres.

The slow growth of these coatings creates highly oriented structures with a high resistance against chemical and physical attack.

Schunk specialises in coating with CVD/CVI processes such as:

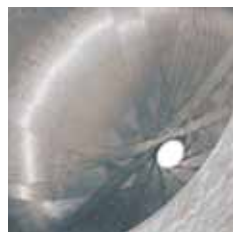
- SiC
- Pyrolytic Carbon (PyC) and
- BoraSiC® (B4C/SiC)

In addition to our leading role in the production of components for the semiconductor industry, Schunk materials with silicon carbide coatings are also increasingly important as material for mirror support structures for applications in satellite and aerospace engineering.

CVI coatings permit the production of graphite and CFC components which can attain extremely long service life under very aggressive conditions.

Quality assurance in our own laboratory

Schunk conducts on-site testing in its own test laboratory. We are certified in compliance with DIN EN ISO 9001: 2000 (quality) and DIN EN ISO 14004 (environment). We also meet the criteria of the international aerospace industry in special areas.



CFC crucible. Used for producing silicon monocrystals. Highly-complex winding structure. Up to 32 inches



One of the products Schunk supplies the aerospace industry and solar engineering with is highly-oriented SiC coatings



Quality assurance in Schunk's own test laboratory



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