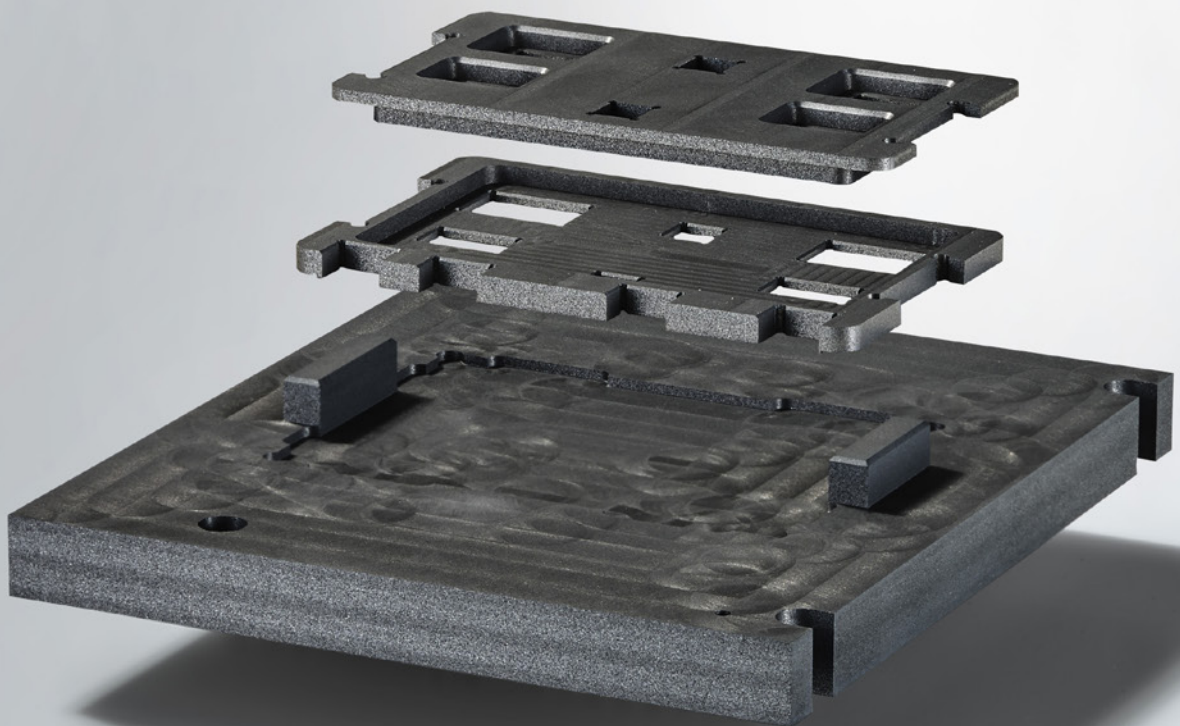


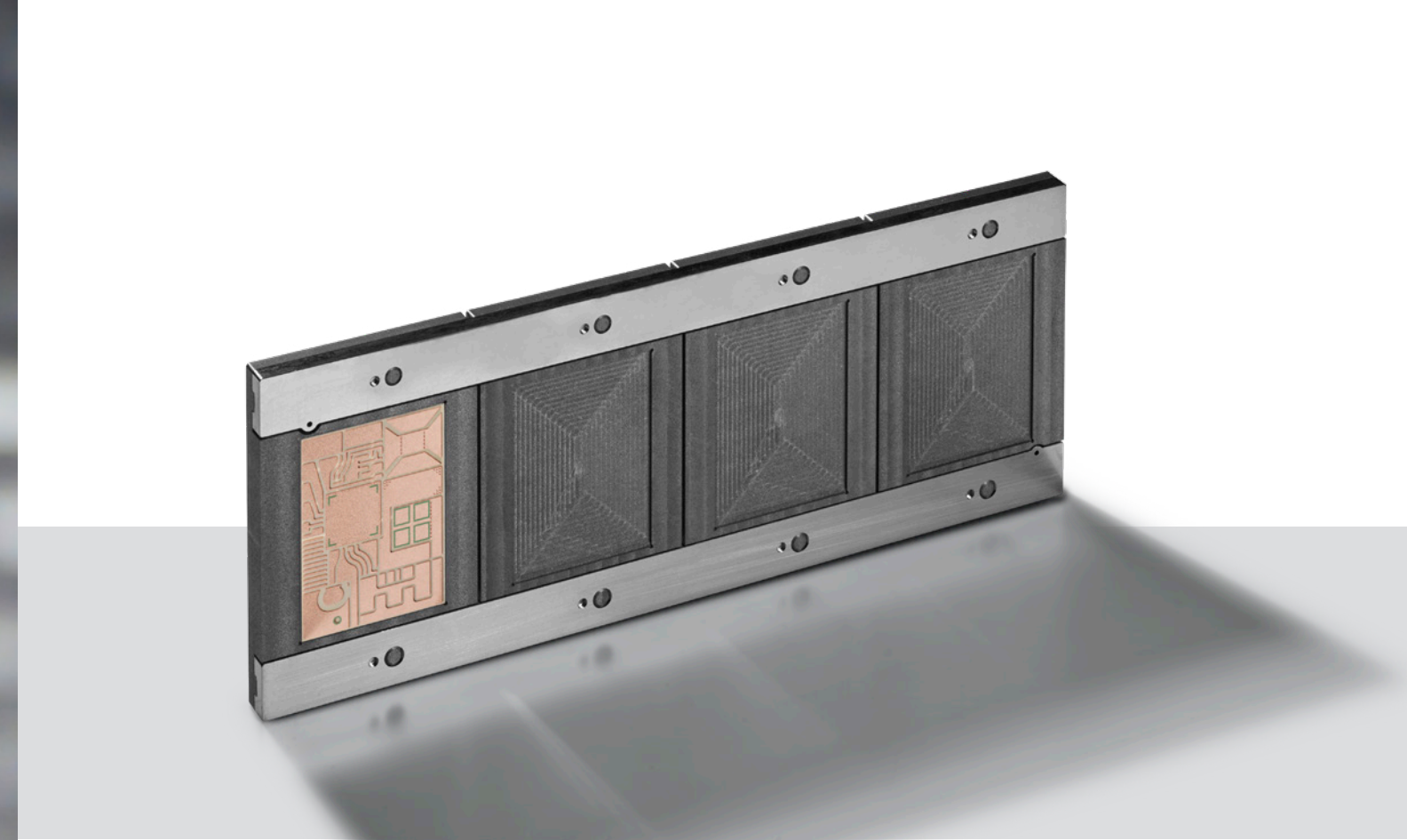
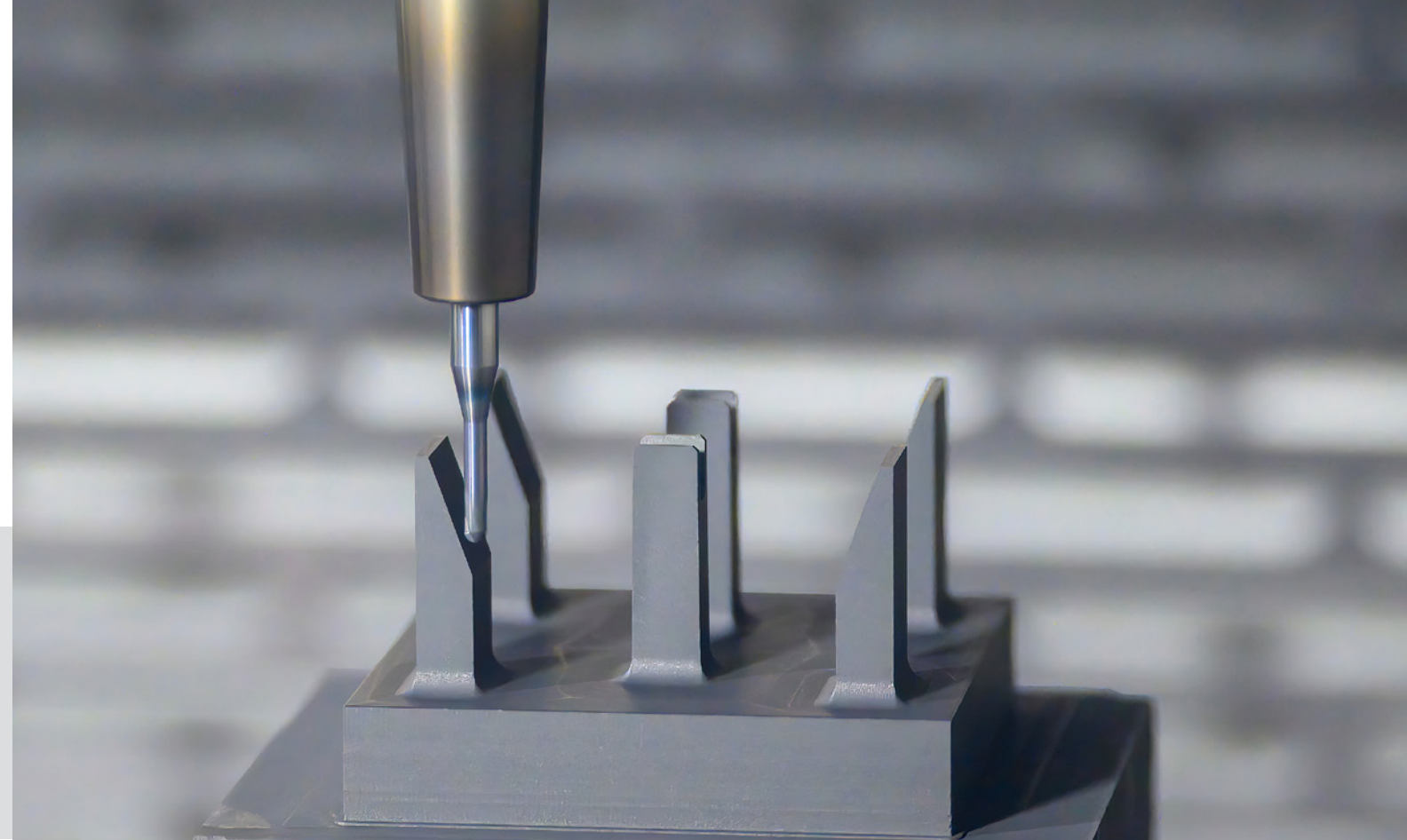
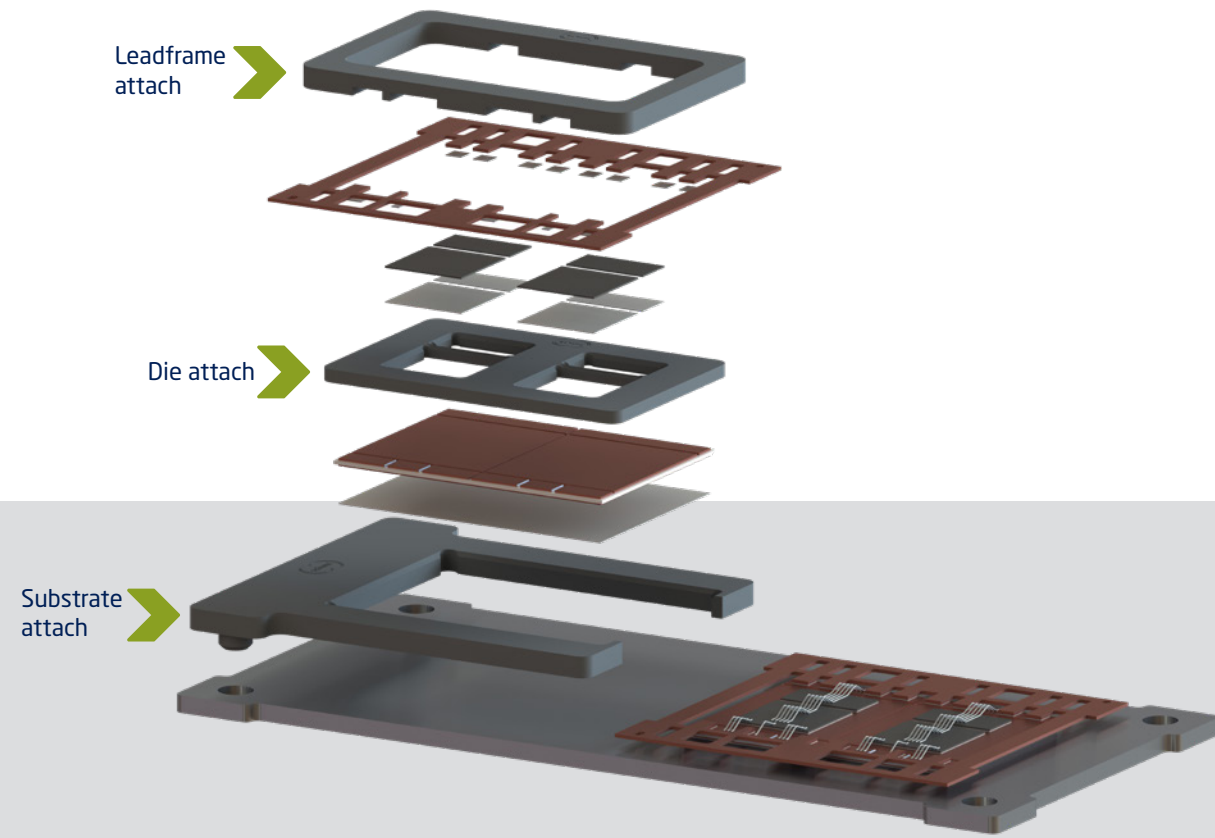


Mobility Carbon

ALUMINIUM GRAPHITE SOLDERING JIGS & FIXTURES

The material of choice to achieve a higher production yield
and throughput





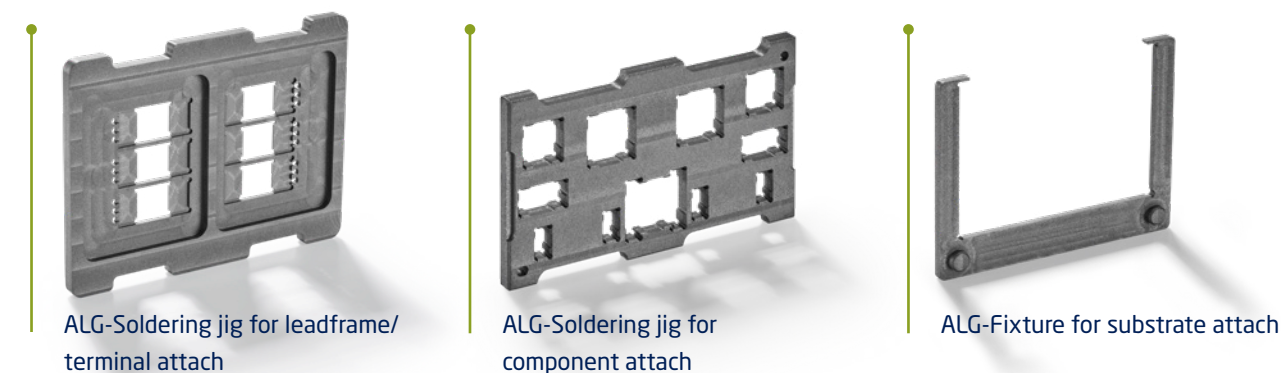
DIFFERENT MATERIAL GRADES FOR MULTIPLE USE CASES

Schunk has developed different material grades to perfectly match the requirements for soldering jigs in multiple use cases.

ALG2208 is the preferred material grade when used as a carrier plate for one or multiple base plates or substrates. Irrespective of the heating and cooling method - either conduction, convection, or radiation - **ALG2208** provides the fastest transfer of heat from the heat source or cooling medium to the devices to be soldered that it carries. Additionally, **ALG2208** maintains its flatness over time even after many soldering cycles.

ALG1808 and **ALG2007** are typically used for jigs to insert and align solder preforms, substrates, semiconductor devices, and other components such as copper lead frames, shunts or NTCs. They exhibit a better mechanical strength and are resistant to mechanical abrasion so that the required tight tolerances for an exact positioning are maintained even after many pick and place and soldering cycles. In addition, small features such as bridges, noses or spacers are feasible. These guarantee the minimum separation distance between substrates to reduce the risk of cracks or breakages.

In some cases, jigs are required on the top side of the power electronics assembly to either provide an additional heat source or apply pressure e.g., to hold copper terminals in their upright position or provide some weight for a better warpage control. Either **ALG2208** or **ALG1808** / **AL2007** can do the job depending on the required thermo-mechanical performance.



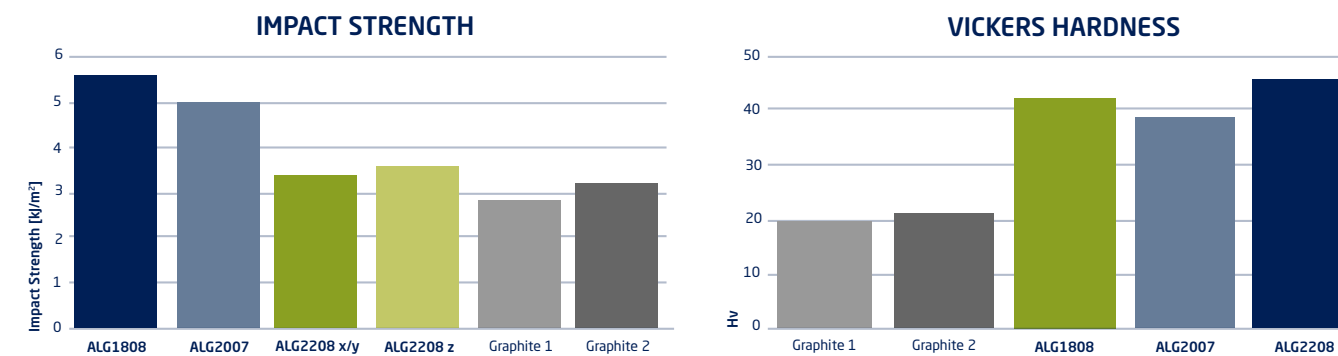
LONG LASTING FIXTURES, EVEN WITH COMPLEX GEOMETRIES

Aluminium Graphite exhibits an excellent machineability which facilitates the production of customized parts.

Aluminium Graphite can easily be machined without expensive tooling costs. Geometries with thin features and shapes such as rounded edges, fillets, chamfers, holes, pedestals, and cavities can be produced with tight dimensional tolerances according to each customers' individual needs. New designs are readily available on quick turn around from small to large lot sizes.

Unlike graphite soldering jigs which have a porous structure and must be coated to avoid wear residues and oxygen contamination, Aluminium Graphite soldering fixtures do not require any additional surface treatment. This not only saves costs but also improves the lifetime because coatings may fatigue or fail after many soldering cycles.

Overall Aluminium Graphite jigs and fixtures last longer than their graphite counterparts because they are less fragile thanks to their superior mechanical properties. Additionally, they do not experience any significant deformation nor wear out during the soldering process and can be used for multiple cycles without the need to replace them.



ONE MATERIAL. ACCURATE DESIGNS. COUNTLESS SOLUTIONS.

Schunk combines its design expertise, production capabilities and application knowledge to consistently deliver support and assistance from the early development phase through to production scale up.

One material for you means:

- The commitment from Schunk as a financially stable company to support your business in the long term
- Security of supply because we control the full supply chain from raw materials to finished products
- High quality as we check the critical properties and dimensions of our products during every process step

Soldering jigs require high dimensional accuracy, so we offer:

- Early design support to do it right the first time, every-time and avoid expensive corrective actions
- Sets of multiple jigs nesting amongst each other with features for accurate positioning and thickness control
- Assemblies of Aluminium Graphite jigs with screws, springs and brackets to deliver a system ready to use and easy to automate

Schunk can adapt to your needs and offer:

- Hybrid solutions that combine the best of Aluminium Graphite and metals to deliver the required performance
- Markings such as Data Matrix Codes for full traceability
- Pins for camera recognition systems

ALUMINIUM GRAPHITE

LIGHTER THAN METAL, STRONGER THAN GRAPHITE

Aluminium Graphite is a metal matrix composite (MMC) that is the material of choice for jigs or fixtures for flux-free soldering processes.

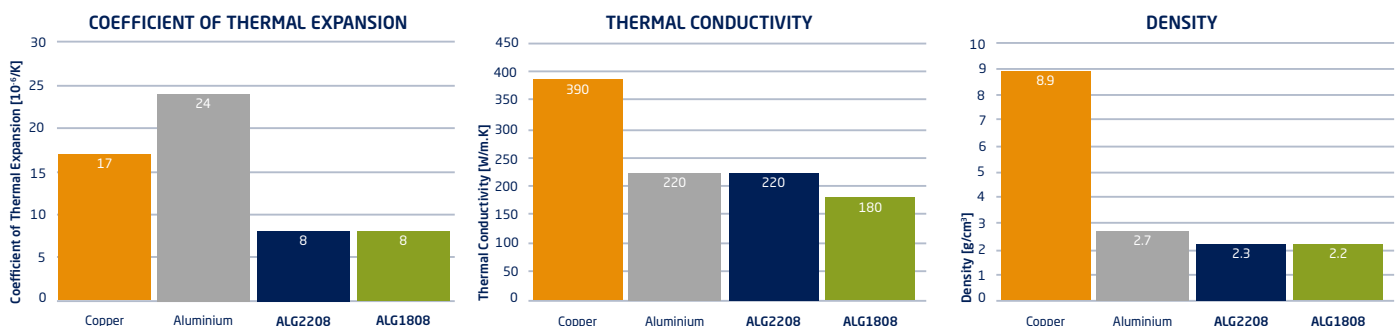
Schunk's Aluminium Graphite (ALG) is available in a range of different material grades. They all exhibit a well-adapted coefficient of thermal expansion, high thermal conductivity, and low density.

ALUMINIUM GRAPHITE MATERIAL GRADES				
Properties	ALG1808	ALG2007	ALG2208	ALG5502
Orientation	isotropic	isotropic	anisotropic	anisotropic
Density in g/cm ³	2.2	2.15	2.3	2.2
Coefficient of Thermal Expansion (25°C) in 10 ⁻⁶ /K	8	7	x/y: 8 z: 12	x/y: 2 z: 20
Thermal Conductivity (25°C) in W/m.K	180	200	x/y: 220 z: 140	x/y: 550 z: 40
Flexural Strength in MPa	110	100	x/y: 90 z: 50	x/y: 25 z: 4
Compression Strength in MPa	210	180	x/y: 110 z: 90	x/y: 15 z: 20

Aluminium Graphite soldering jigs and fixtures allow for a better thermal performance compared to steel and titanium, and an improved mechanical durability and stiffness compared to graphite.

What's in it for you?

- Faster processing times and higher throughput thanks to Aluminium Graphite's high thermal conductivity
- Higher production yield due to the homogeneous heat distribution and good planarity over time
- Lower Total Cost of Ownership as you benefit from the longer lifetime of Aluminium Graphite jigs



SCHUNK GROUP

ENGINEERING COMPETENCE IN MATERIALS TECHNOLOGY AND MECHANICAL ENGINEERING

The Schunk Group is a global technology company. 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 to air conditioning technology and ultrasonic welding to optics machines. The Schunk Group has around 9,600 employees in 26 countries and generated a turnover of 1.6 billion euros in 2023. The company is divided into ten different Business Units.

In the fast lane with innovative strength - as a component and development partner to the automotive industry, we provide mobility with components for power transmission and with tribologically highly resilient slide bearing and sealing elements made of carbon graphite, graphite and silicon carbide. With several hundred million carbon brushes per year in electric motors for starters, fans, petrol pumps and window regulators, we are the global leader.

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