



Carbon Technology

Quality is our Driving Force

We set standards in current transmission
for household appliances, power and garden tools.



Schunk Carbon Technology

A worldwide success. Always at your side.



Schunk Carbon Technology is a worldwide leader in the development, production and application of carbon and ceramic solutions. Like no other company, Schunk Carbon Technology combines innovation and technological expertise with exceptional service orientation into a service portfolio that is unique on the market.

Schunk Carbon Technology is a partner who offers you all the technological possibilities of a globally operating company and pragmatically puts your ideas into practice. And always precisely tailored to meet your requirements – for industrial volume markets as well as for highly specialized niche markets. Our technology portfolio, including mechanical carbon, electrical carbon, high temperature applications and technical ceramics, offers you perfect solutions for a diversity of industrial applications.

After all, this is our commitment:
Ahead in Carbon Technology. Closer to your Business.

A division of the Schunk Group.

Pioneering, full of ideas, based on partnership – this is how the Schunk Group has made a name for itself as a global technology group since 1913. Pioneering, because we build bridges for our customers to enable them to use innovative technologies to develop better products and conquer new markets. Full of ideas, because innovations are an essential part of our corporate culture. And based on partnership, because customer orientation is practiced on a daily basis by each and every Schunk Group employee.

With approximately 8,100 employees in 29 countries, the Schunk Group develops customized high-tech products and systems in a wide variety of areas on this basis: We are active in carbon technology, ceramics, environmental simulation, air conditioning technology as well as sintered metal and ultrasonic welding. And this is the case for many key industries: from automotive, train, aircraft and ship technology to solar and wind energy through to medical and electrical engineering as well as in the semiconductor industry. Our customers benefit from this extensive expertise.

PAVE – Our Core Competencies for Your Success

Sometimes at the beginning it is only a vague idea about materials substitution. Or the need to push back the performance limits. Or finding new answers to complex challenges for current-transmitting, mechanical or thermal applications. The motives of our customers for joining forces with Schunk Carbon Technology as a development partners are diverse. What they all have in common is trust in us to discover potential, to focus on the customer with our work and to develop customized solutions all the way up to the serial-production stage.

Fulfilling times-to-market that are growing shorter and shorter while still providing a high degree of process and system reliability require rethinking development strategies and collaboration with the customer. So Schunk Carbon Technology has combined its four core competencies in an interdisciplinary manner:

1. Solid materials competence in carbon, ceramics and quartz;
2. Material property engineering for the precise design of material properties;
3. The most modern of shaping technologies;
4. A comprehensive spectrum of surface treatments.

Just like with a toolbox, we can quickly and precisely transform our experience in these four competence areas into new developments and customer-specific solutions and when doing so we can exactly tune each parameter to its specific engineering problem. On this basis we can often integrate existing technologies into the development process so as to accelerate it. In any case, you obtain technological and economical added value in this way, from the first idea all the way to the market launch. The result is Process Added Value Engineering (PAVE), which makes us a pioneering development partner for your requirements.



Welcome Home

Our carbon brushes, sliding contacts, carbon bearings and assemblies are the driving force in millions of electric motors worldwide. With this competitive advantage in experience and know-how, every current-transmitting application in household, power and garden tools and small appliances is a home game for us.

Schunk Carbon Technology is your high-performance technology partner for anything related to current transmission. Our uncompromising quality management and highly-efficient development and manufacturing processes combine performance capacity, profitability and reliability into a single common denominator.

In doing this, our components set standards for functionality, durability, and safety. And global production facilities as well as tailored services mean that we are there for you, wherever you need us. Worldwide.

No compromises when it comes to quality

For us, quality forms the foundation of a relationship of trust with our customers. That's why we do everything in our power to earn this trust anew, again and again. So, for example, we have established a firmly-institutionalized quality-management program and have certified our individual companies in accordance with the current ISO guidelines. Within a regulated and defined new-part project-management program, all well-known quality and approval processes are carried out. We even meet the demand for a defect rate of 0 ppm through self-inspection by each employee at their workplace.



Power and garden tools

Extensive material know-how and a wide-ranging portfolio as well as a powerful global sales network are the basis for competent technical support and worldwide collaborative customer relations.

Application examples:
Drilling machines, rechargeable drills, portable circular saws, angle grinders, lawn mowers

White goods

As the market leader, we set the benchmark with our L94/L93 material. Problem solving, raw-material production, material composition, testing and delivery – with us you have everything from a single source.

Application examples:
Washing machines, dryers, dishwashers

Small appliances and household appliances

In this segment, too, we offer decisive advantages through our materials competence and our global sales network. Our own professional test laboratory rounds out our comprehensive support.

Application examples:
Vacuum cleaners, mixers, coffee machines, food processors

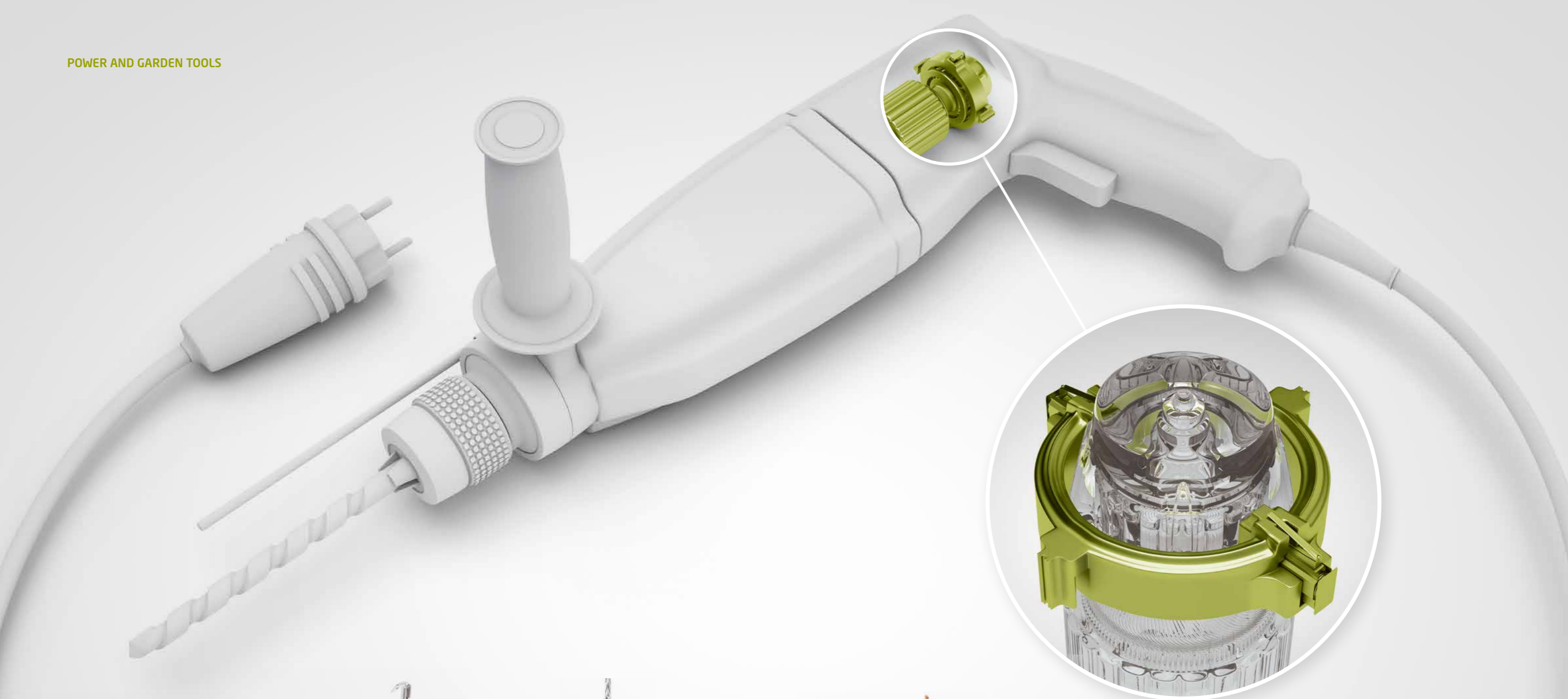


A New Force for Your Power Tools

Whether it's a percussion drill or a circular saw, hedge trimmers or a lawn mower – professional power and garden tools all place especially high demands on their electric motors. Our carbon brushes have proven themselves exceedingly well under the toughest of conditions – even when faced with high current density, vibrations, high speed or when subjected to the influences of adverse weather.

Through the selection of the optimal material and a specifically-matched impregnation, we are able to develop customized products for your individual requirements. Here, the impregnation permeates the entire carbon body and is effective for the entire lifespan of the carbon brush. It allows a permanent reduction of friction, increases efficiency and reduces noise and radio interference emissions.

With integrated signaling and cut-off devices, damping elements and dust ducts, the carbon brushes developed for your application can be further refined and perfected. In addition to product optimization, we always keep an eye on profitability for you: thanks ultramodern manufacturing technologies, we can produce many of our carbon brushes using the highly economical pressed-to-size-technique, which does not require mechanical processing.



Carbon brush

with cut-off devices, springs and terminals for corded tools

Exhibit high thermal and electrical resilience as well as outstanding commutation and radio-interference-suppression properties. The integrated cut-off device prevents damage to the motor while the spring and end piece provide optimal handling during assembly.



Carbon brush

with signaling devices for corded tools

The signaling device instructs the operator in a timely manner to change the carbon brushes prior to reaching the wear limit. The signal can be electronically evaluated, through which the motor is electrically switched off after a defined remaining service life.



Carbon brush

with cut-off devices and damping elements for corded tools

The damping element – a silicone mass in a slot of the carbon brush – reduces wear and brush sparking and prolongs the service life of the brush, especially replacement brushes being used on worn commutators which are no longer running so smoothly.



Carbon brush

with cut-off devices and dust ducts for cordless tools

The copper graphite material is characterized by low wear and suitability for high current densities. The dust ducts prevent the accumulation of deposits between the carbon brush and the brush holder, thus minimizing the risk of jamming brushes and damage.



Assembly

Carbon brush in a holder for corded and cordless tools

The assemblies are manufactured individually and customer specific. They consist of perfectly-matched carbon brushes, springs, brush guides and plastic carriers. Delivery of pre-assembled assemblies makes an optimized and more economical installation possible for you.



Reinforcement sleeves

These permit extremely high rotational speeds, minimize eddy-current loss and thus increase the degree of efficiency. With these high-tensile strength, fiberglass or carbon-fiber-reinforced carbon components, we can achieve extremely small wall thickness due to a high degree of manufacturing precision.

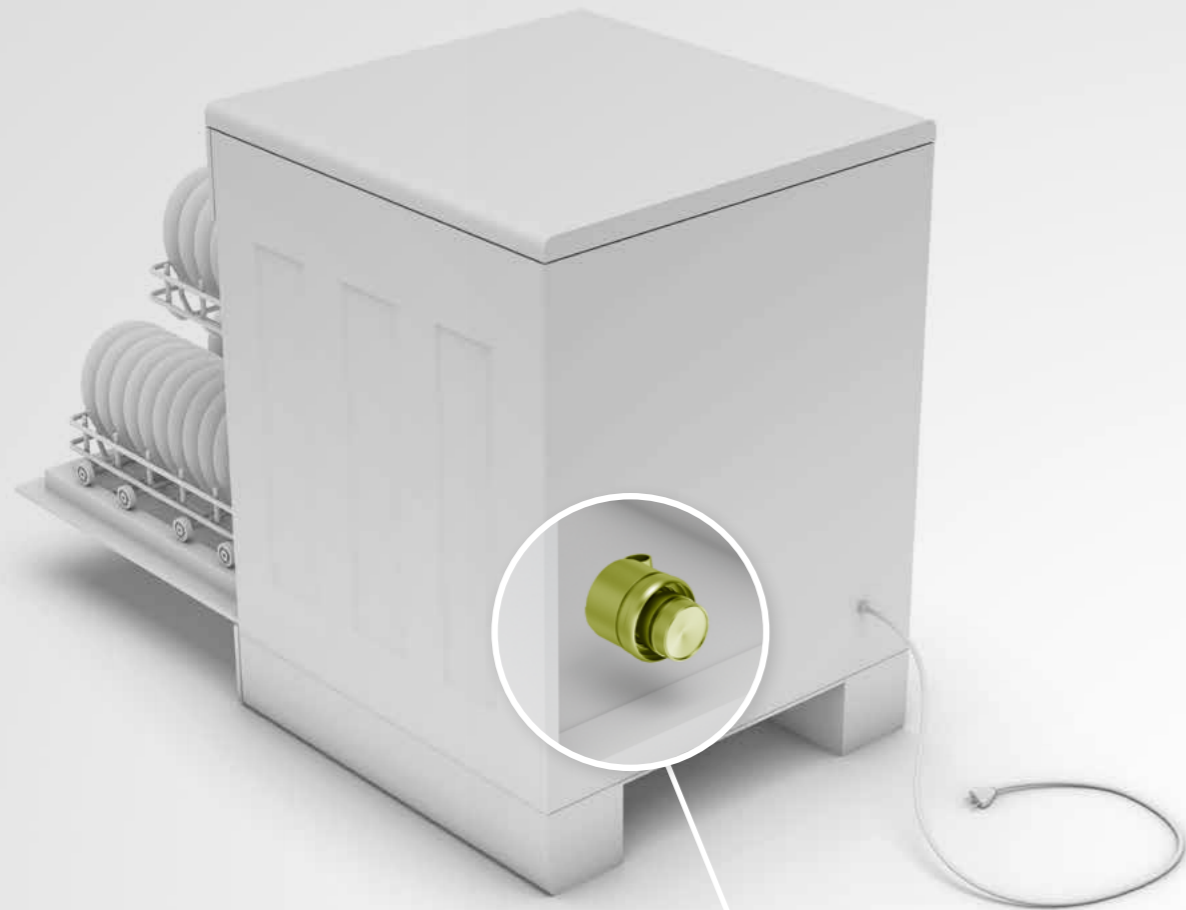


Washing, Drying and Dishwashing at the Highest Quality Level

In washing machines, dryers and dishwashers, Schunk Carbon Technology work absolutely reliably, durably and efficiently. The used materials are customized and precisely matched to their respective application.

Long, energy-saving wash cycles place high demands on the service life of carbon brushes in washing machine motors nowadays. In dryers the measurement residual moisture must take place continuously and be reliable – for this a very low and constant voltage drop is needed. For the carbon bearing in dishwashers, on the other hand, abrasive particles and the aggressive detergent are the biggest obstacles to proper functioning.

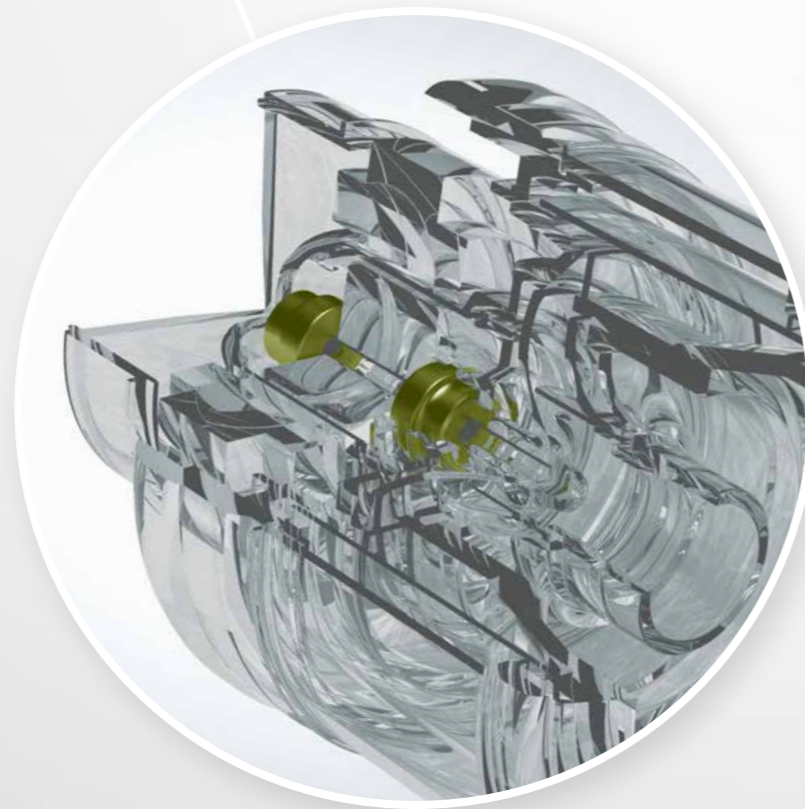
The carbon brushes, assemblies, grounding contacts and pump bearing that we develop meet all of these challenges. For instance, our carbon bearings for dishwashers stand out for their chemical resilience and their excellent dry-running and sliding characteristics. In washing machines, our sandwich carbon brushes made of pitch-bonded graphite are the first choice, while our sliding contacts made of phenolic-resin bonded and carbonized materials are a reliable component of the moisture-measurement system in dryers.



Carbon bearing

for circulation pumps in dishwashers

Pitch-bonded and resin-impregnated materials are chemically-resilient, safe for use with drinking water and food as well as resistant to high and low temperatures. Our bearings stand out for high precision, durability and economical pressed-to-size-production.



Sandwich carbon brush
for washing machine motors

Our materials with weak abrasive characteristics, wide resistance ranges, high thermal and electrical resilience as well as outstanding commutation and radio-interference-suppression properties are decisive. The separation in the middle by an insulating layer makes the brush particularly wear resistant.



Assembly
for washing machine motors

The assemblies consist of perfectly-matched carbon brushes, compression springs, brush guides and plastic carriers. Delivery of pre-assembled assemblies makes an optimized and more economical installation possible. Assemblies without metal guides offer even more savings potential.



Sliding contact
for dryers

The materials used are characterized by especially good material damping and outstanding anti-friction properties. Furthermore, they allow a very low and constant voltage drop on the sliding contact, which is very important for precisely measuring the residual moisture of the laundry.

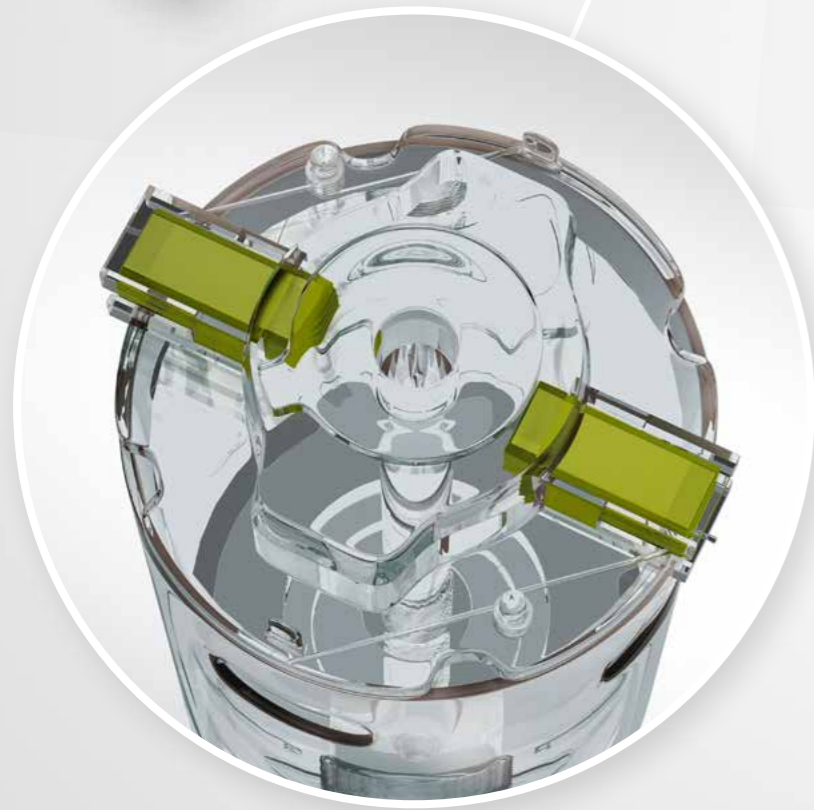
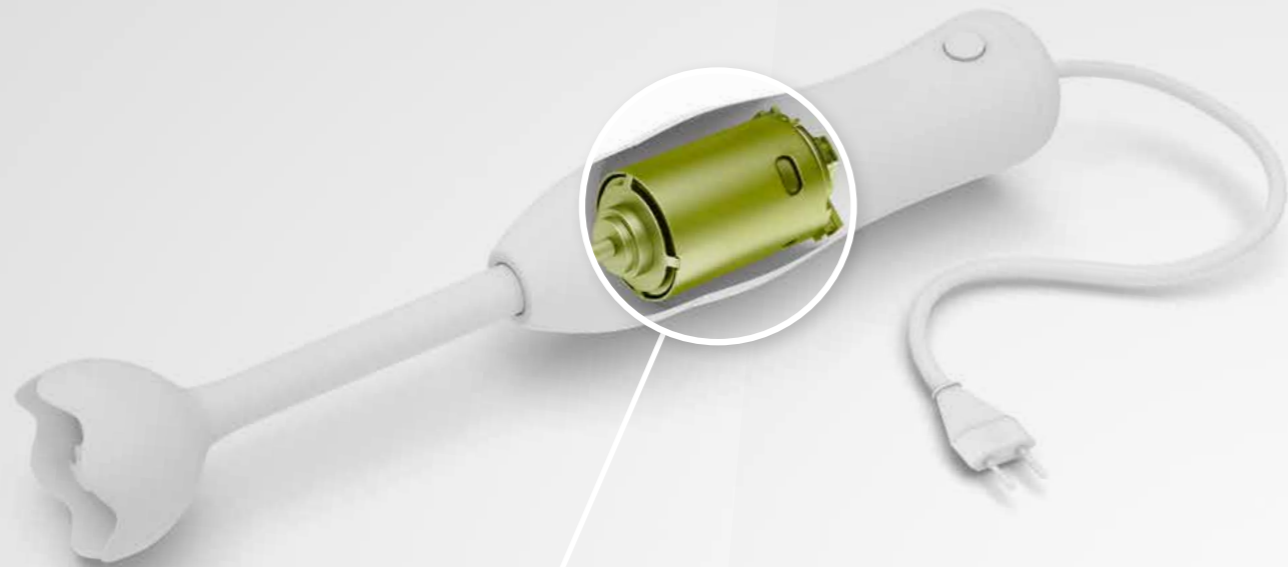


So that the Household Runs Smoothly

Whether it's a vacuum cleaner, hand-held mixer or an automatic coffee machine – the little electric helpers around the house should operate safely and reliably at all times. Our carbon brushes make a big contribution to stand-out functionality and durability. Whether corded or cordless tools – we have the right solution for many devices.

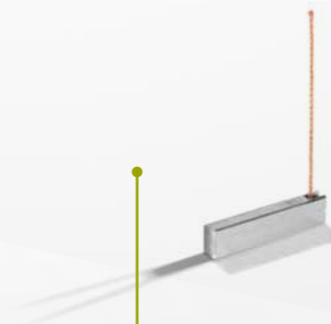
What this solution looks like depends decisively on your requirements. From the wide range of our highly-developed materials, we select the best composition for your system. Our solutions are economically interesting through the pressed-to-size production technique as well as through entire assemblies which make inexpensive installation possible.

Even our micro-carbon brushes with a volume of only a few cubic millimeters are packed with convincing properties: a perfect balance of transient voltage, coefficient of friction, Rockwell hardness, bending strength, raw density, metal content and other parameters. Due to the longstanding experience of our experts and our extensive testing facilities, Schunk Carbon Technology is the ideal partner for developing your formula for success.



Carbon brush
for small household appliances

Depending on motor power and the kind of device concerned, customer and application specific materials are possible, e.g. with high thermal and electrical resilience as well as excellent commutating and radio-interference-suppression properties. We can achieve a particularly economical production through the pressed-to-size-method.



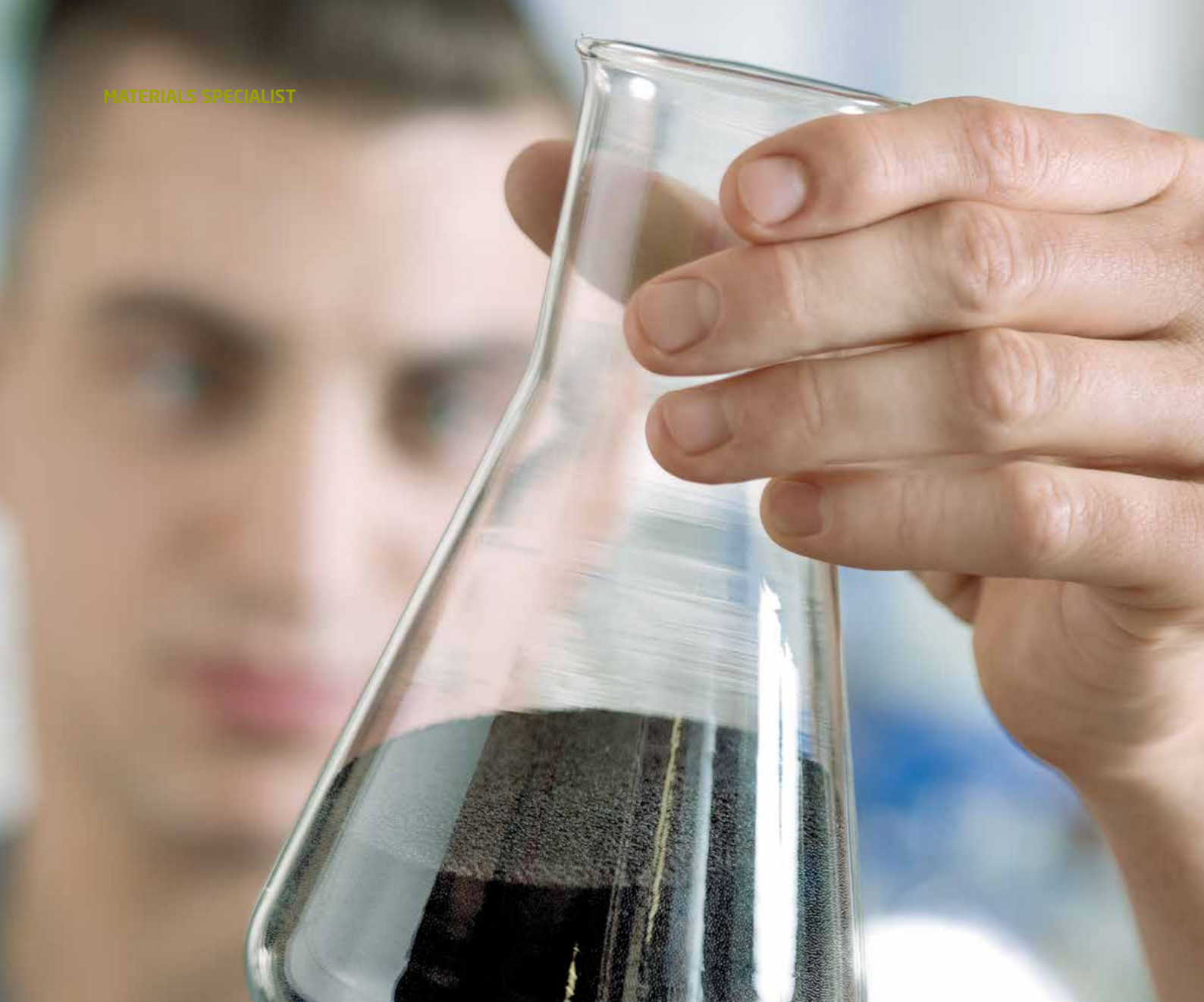
Carbon brush
for vacuum-cleaner fans

Epoxy-resin-bonded materials stand out for their excellent vibration damping. The sliding properties, which are already outstanding, can be even further improved through impregnation. These carbon brushes are available with a tamped or press-fit shunt wire in the economical pressed-to-size-design.



Assembly
for vacuum-cleaner fans

The assembly consists of perfectly-matched carbon brushes, compression springs, brush guides and plastic carriers where needed. Delivery of completely pre-assembled solutions makes an optimized and more economical installation possible for you.



Material Competence for Nearly Unlimited Possibilities

Why is carbon the first choice?

Graphite stands out for high electrical conductivity, a low coefficient of friction as well as for a high degree of chemical and thermal resistance. These properties result from the characteristic crystal structure, thanks to which graphite exhibits similar electrical properties to metals. The weak binding forces between the individual layers of the crystal structure lead to the layers being very lightly sheared when subjected to external force – hence, the low coefficient of friction.

Carbon brushes must withstand a high current density for one thing and transmit current to rotating components for another. For the sliding contact low frictional loss and low mechanical wear are important. Graphite meets all these demands especially well and is thus the preferred material for applications which require reliable current transmission in electrical motors.

Let the experts at Schunk Carbon Technology help you select the appropriate material and the optimum carbon brush design. The following page provides an overview of our material competences.

Carbon-graphite – Identification letter L

These materials consist of pitch-bonded graphites that are pressed into pellets or plates and undergo a heat treatment at temperatures ranging from 500 °C and 800 °C. They demonstrate weak abrasive behavior. The use of impregnation agents keeps the coefficient of low (see impregnation). The resistance range from 35 μΩm to 3,000 μΩm enables a wide spectrum of applications in motors in all input power classes for power tools, household appliances and washing machines. In addition to high thermal and electrical resilience, these materials have good commutation and radio interference suppression properties.

Epoxy resin-bonded graphite – Identification letter G

After pressing, these epoxy resin-bonded materials are hardened at temperatures between 180 °C and 230 °C. Characteristic for materials in this family are the particularly good vibration damping properties. The main applications include motors with high speeds and/or commutator peripheral speeds (≥250 m/s). The available sliding properties are already good and can be improved with impregnation. The resistance range from 100 μΩm to 1,500 μΩm (up to 10,000 μΩm as required) enables these materials to be used with motors in all input power classes.

Copper-graphite – Identification letter A

After pressing, copper-containing materials undergo heat treatment at temperatures between 300 °C and 1,000 °C. Synthetic resins, plastics or pitch are used as binding agents. Adding copper powder achieves particularly low resistivity between 0.1 μΩm and 20 μΩm. The main applications for these materials include motors with terminal voltages up to 36 V (DC) and very high current load.

Phenolic resin-bonded graphite – Identification letters F, HU

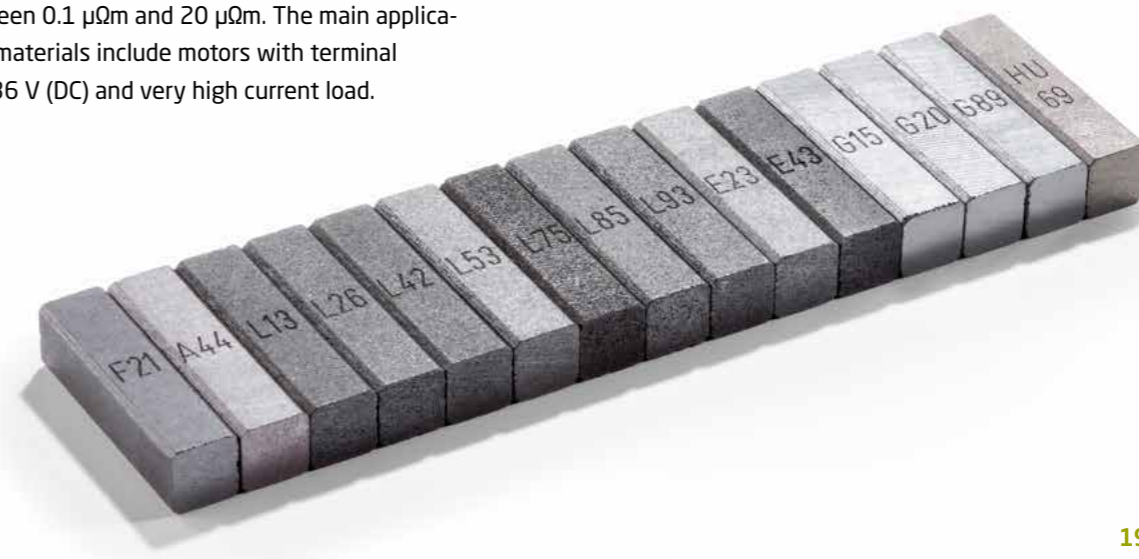
The binding agents used are phenolic resins that are treated in a subsequent thermal process at temperatures up to 800 °C. Depending on the composition, these materials demonstrate weak to medium abrasive behavior. Highlights here are the particularly good material damping and good sliding properties of these materials.

With a resistance range of 10 μΩm to 400 μΩm, F-materials (primarily natural graphite, some of which has low copper content) are more likely to be used for motors with lower input power in the area of household appliances.

With a resistance range of 50 μΩm to 500 μΩm, HU-materials (primarily synthetic graphite) are also used in power tools.

Electrographite – Identification letter E

Pitch is also used as a binding agent in electrographite materials. At temperatures up to 3,000 °C, the pressed plates are transformed into electrographite. High thermal and electrical resilience as well as very good sliding properties characterize these materials, which have a resistance range from 15 μΩm to 150 μΩm. Applications include motors for power tools and household appliances as well as small motors in all voltages.





Consulting, Developing, Testing – We Provide Comprehensive Support for You

Extensive experience as a development partner

We view ourselves as a creative and solution-oriented partner for the further development your products. Through simultaneous engineering, early integration into the development process, we can make a decisive contribution. Potential sources of faults and errors can be identified and eliminated during the formative design phase of your product. In doing this, our driving force is the goal of combining your requirements and technical feasibility.

High innovative capacity in many areas

Just as with the Schunk Group as a whole, so are our activities characterized by a high degree of creativity, deep expert know-how and the courage to pursue progress. Take advantage of our innovativeness in the areas of materials recommendations, optimal component design, prototype production, innovative production processes, component testing and application-oriented product trials as well as individual logistics solutions.

In-house test laboratory provides reliability

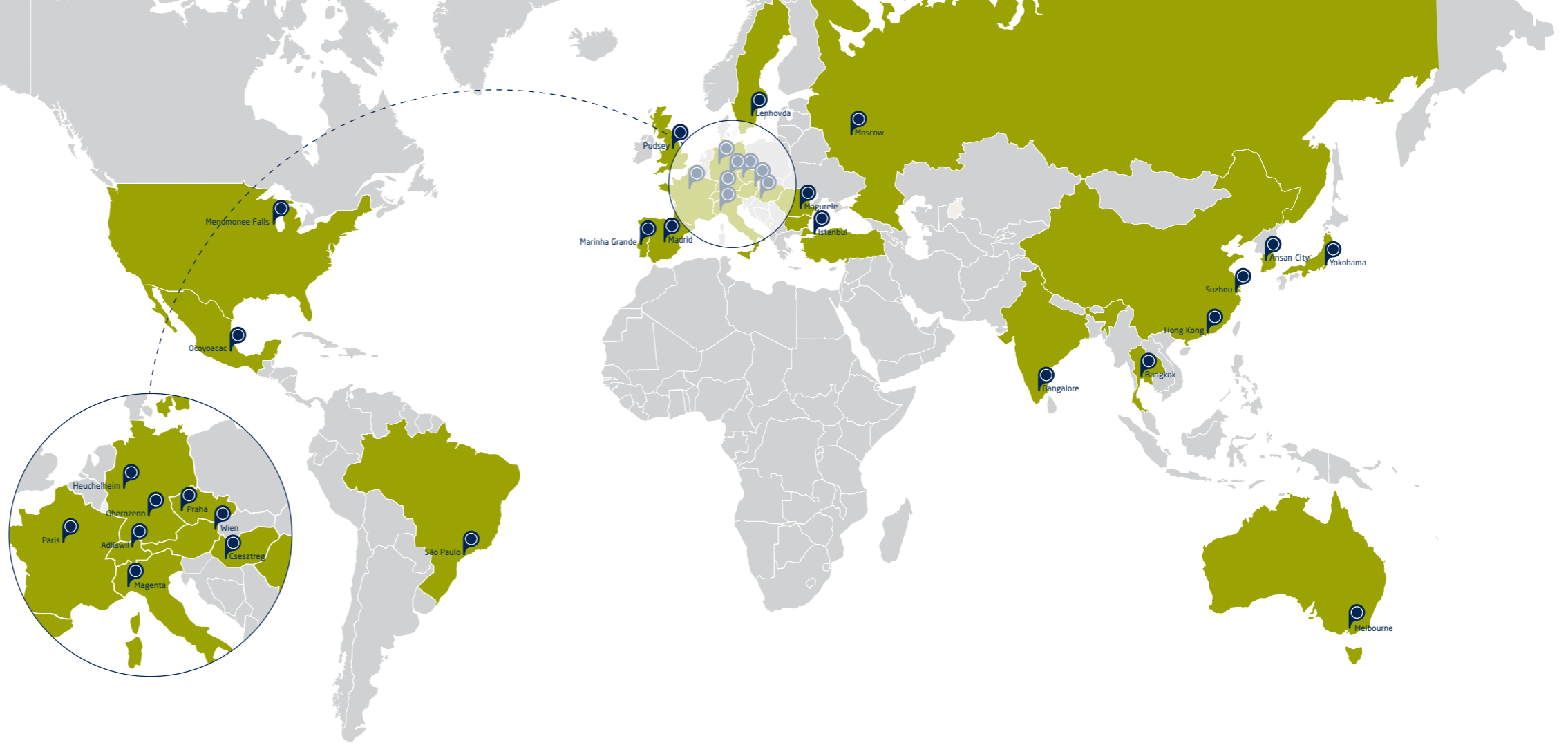
We have the aspiration of delivering to you the best possible product to meet your demands. That's why we don't outsource testing services out of our company, but rather conduct extensive test procedures ourselves with respect to functionality, durability, and EMC/radio interference suppression in our own professional laboratory. This way, you can be sure to fulfill all directives and regulations, thus sparing you the need to go through additional and costly certification processes.

Enjoy the advantages of Schunk Carbon Technology

- ▮ Consistently high quality of materials;
- ▮ Extensive know-how and materials portfolio for covering the wide-ranging demands in very diverse applications and customized specialties;
- ▮ High degree of innovativeness and intensive development consultation;
- ▮ This results in a large spectrum of materials and solution variations with respect to additional treatments, geometries, electrical contacting as well as being fitted with or without shunt wires, end pieces, plugs, springs, insulation, damping elements, cut-off or signaling devices etc.;
- ▮ In-house, professional test laboratory;
- ▮ Consistently high-level of production quality – from manually-machined small series to pressed-to-size high-volume production.

We are There Where You Need Us

We always face the increasing challenges and demands of globalization, and precisely align our decentralized corporate structure towards your market and application fields. Our specialists can support you with comprehensive know-how at 25 different locations. Due to our global sales network, we are always nearby and carry out production in many countries, deliver to your location and take care of logistics for you.



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