

System Solutions

for high-temperature applications



CFC fixtures

From the idea to the finished component.



Lightweight. Stable. Temperature resistant.

Graphite Materials recognizes the tremendous potential of the element carbon. And enthusiastically gets it into shape.

It's up to you to decide what shape this will be. We are driven by your individual needs. These give us direction and point the way to the best solution for you with maximum benefit for your application.

Each of our employees is totally committed to this. From the initial idea to the finished component. From the dimensionally-stable CFC fixtures to the customized heating system. From piece production to large-scale manufacture. Quality in every fiber.

This begins with the use of materials that have undergone exhaustive testing, includes a precise design and culminates in effective manufacture according to the highest quality standards. Everything under one roof – everything from one stop. Always listening to you and taking your requirements into account. True to our guiding principle: we are only satisfied when you are.

This is the standard by which we are measured.

Kind regards, Dr.-Ing. Rolf Terjung

Graphite Materials.

Your partner for the best that carbon has to offer.

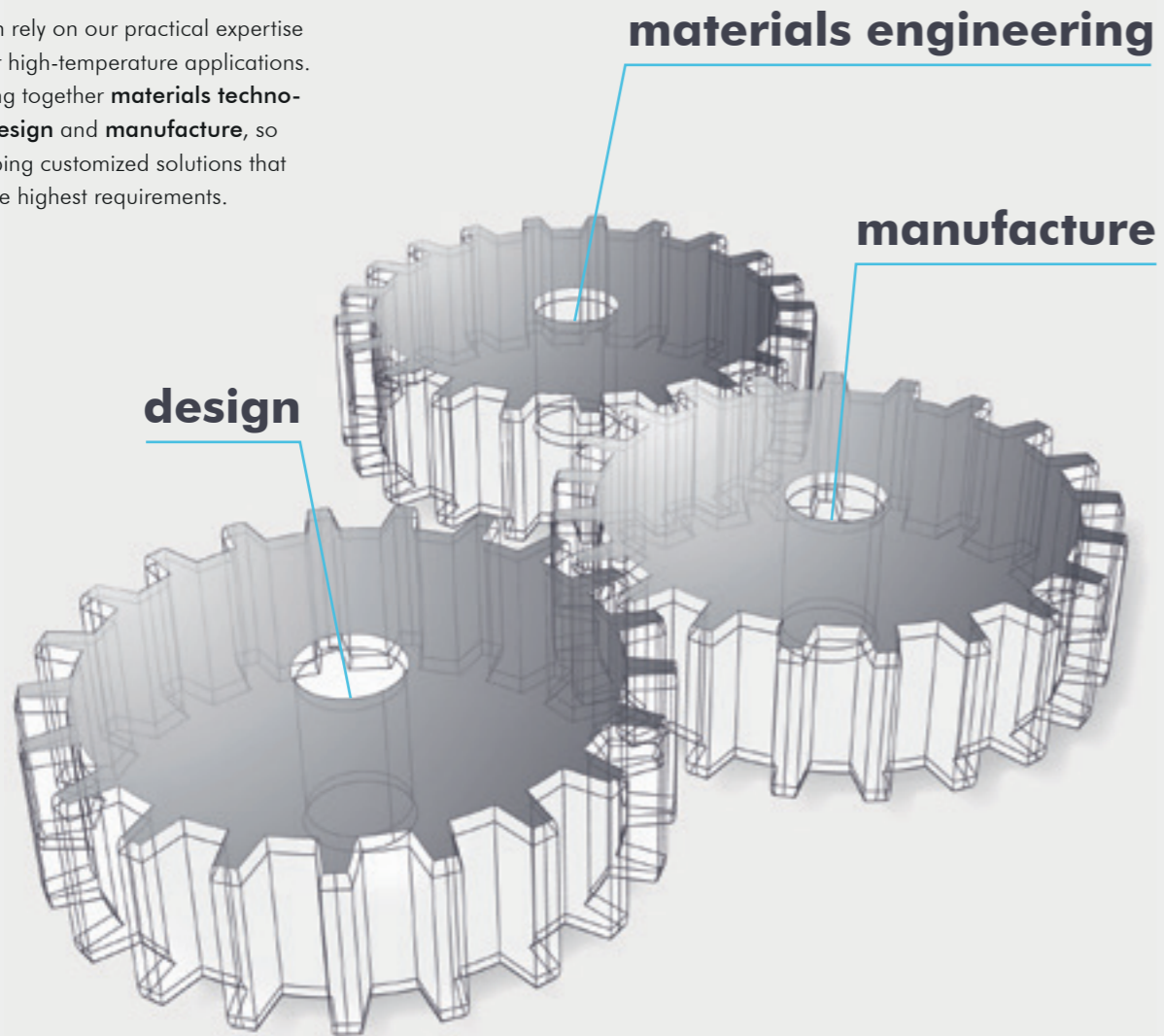


In the heart of the metropolitan region of Nuremberg:

- 3000 m² production area
- 30 employees
- Founded in 2000
- Owner-managed, independent company
- LEAN production management
- Sustainable environmental management ISO 14001:2015
- QM system 9001:2015
- Training is the future

Lots of questions, one solution: Graphite Materials.

You can rely on our practical expertise for your high-temperature applications. We bring together **materials technology, design** and **manufacture**, so developing customized solutions that meet the highest requirements.



Creative partner for high-temperature applications

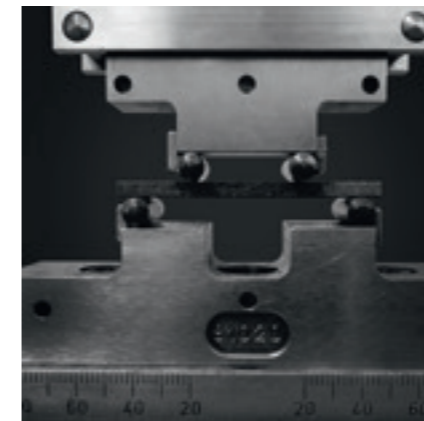
Graphite Materials is your equal partner for high-temperature applications in the range from 1000 degrees Celsius. We manufacture high-quality components from graphite and CFC, which are used in systems in a wide variety of different industries. From the robust special screw in series production to the complex CFC cylinder in piece production.

Our work is always centered on your individual requirements. Our employees include you in the planning and manufacturing process from the start and translate your wishes into tangible solutions. Creativity meets quality. In materials engineering, design and manufacture.



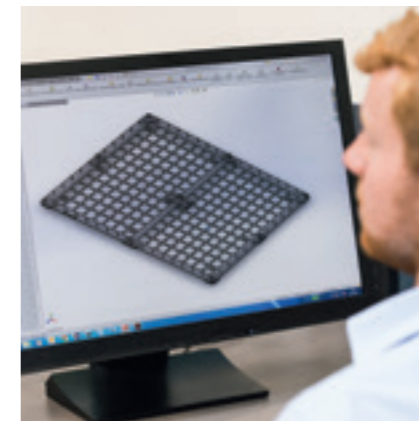
↑ Multi-layer CFC fixture in use

Materials engineering



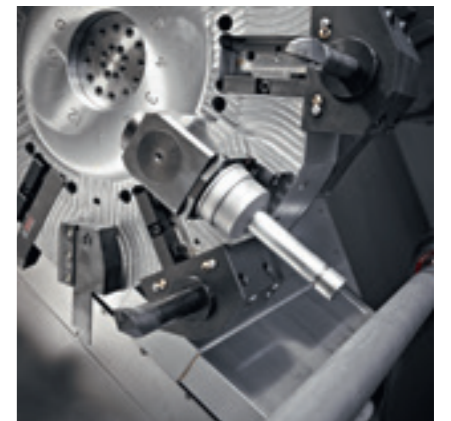
No compromises: We only use the best materials in our products. Our materials engineering specialists measure and analyze, simulate and experiment.

Manufacture



Spot-on solutions: Each of your wishes encourages our creative lateral thinkers to new heights. We offer you modern and effective solutions. Transparent and practical.

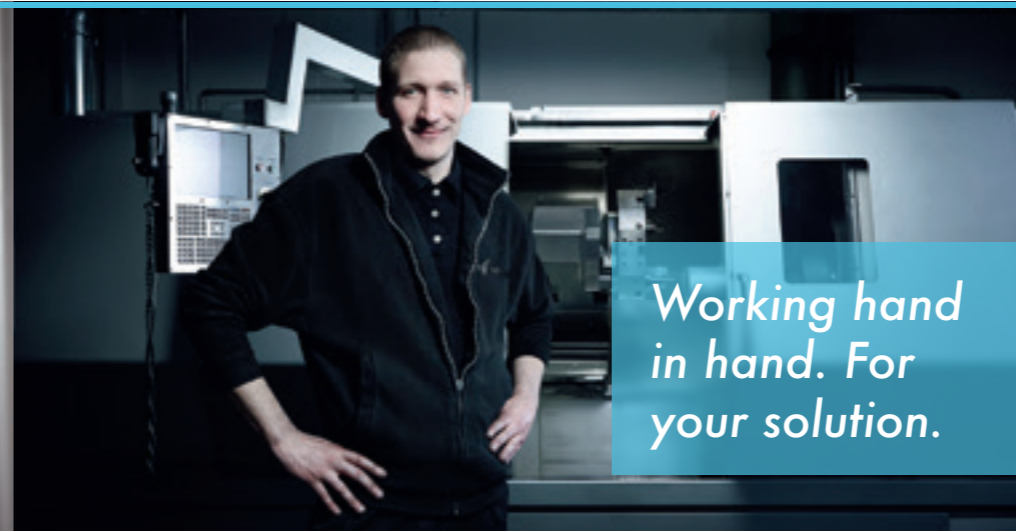
Design



Putting designs through their paces: Our manufacture is not just an extended workbench mindlessly producing one piece after another. It is the heart of Graphite Materials, kept in sync by skilled workers who use their initiative, always with a focus on customer benefit.



*Good ideas.
Optimum components.*



*Working hand
in hand. For
your solution.*





**YOUR ORDER –
OUR SOLUTION**

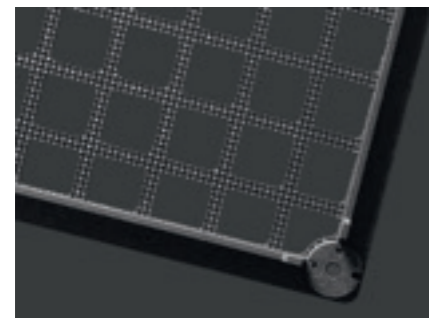
CFC fixtures

Lightweight. Stable. Durable.
Fixtures also for extreme conditions.

CFC fixtures by Graphite Materials withstand heat of up to 1300 °C, tremendous temperature fluctuations and a high weight load – and still stay in shape. This makes them the ideal workpiece fixture for use in heat treatment, for example, when hardening metallic components, such as rings, gearwheels and shafts.



↑ Our charging plates are designed to match your component geometry

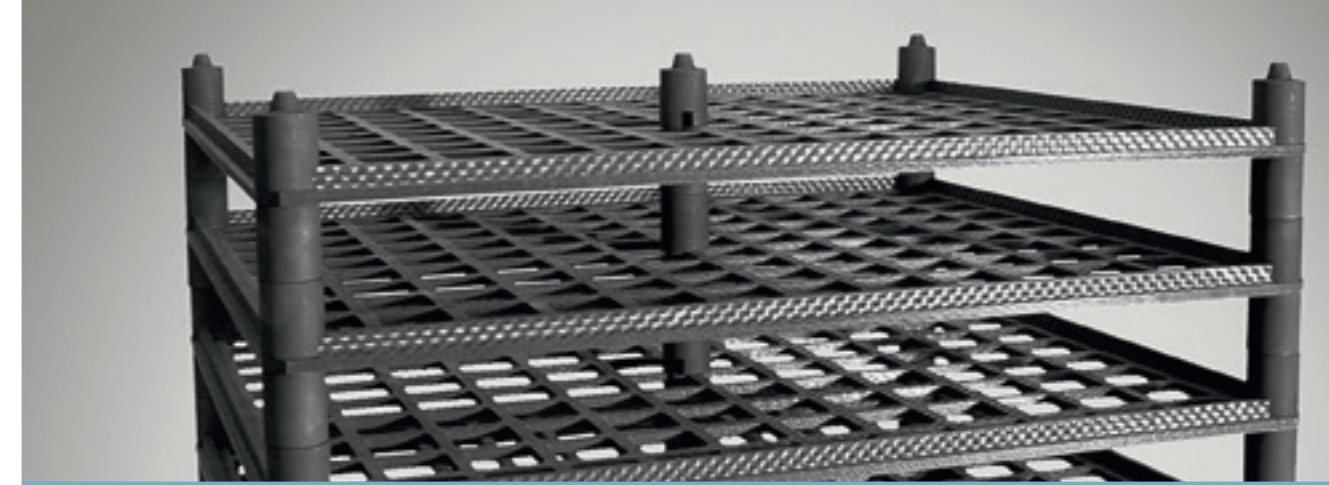


↑ Workpiece fixture with optimized surface structure

As tough as it comes: CFC

As hard as steel? That's not hard enough for us. So we make our carrier frames of **CFC (carbon-fiber-reinforced carbon)**. CFC has a multi-layer structure and was first developed for aviation and space flight. It is also an outstanding construction material in manufacture.

CFC fixtures by Graphite Materials are used in case hardening via **surface carburizing, case hardening with oil quenching** and in **structure adjustments** and **soldering processes**. They boast an impressive array of positive material properties. CFC fixtures are at least five times lighter than those made of steel – and yet much stronger. Carbon fiber materials even increase in strength with a rise in temperature. Whilst steel distorts or deforms at high temperatures, **CFC fixtures retain their shape**. This makes them **predictable** and **the components placed on them are protected against unwanted changes**. In addition, CFC carrier systems are **resistant to the effects of chemicals** and **extremely durable**: When used correctly, CFC fixtures by Graphite Materials last for **ten years** or more.



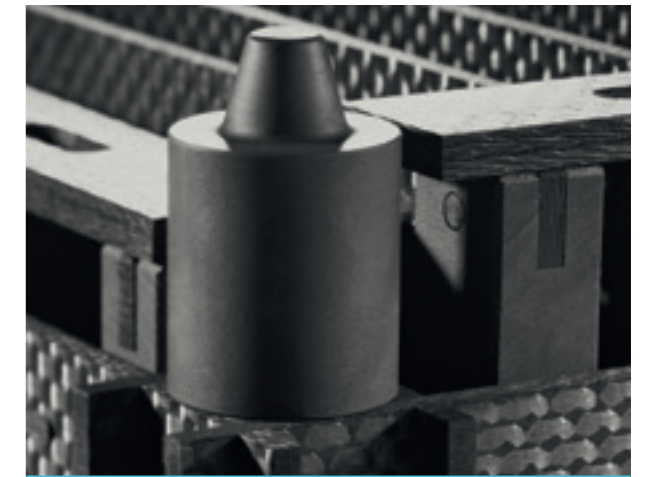
↑ Uniform heating and cooling thanks to customized design

Customized to your needs

The workpiece supports of the CFC fixtures by Graphite Materials are ideally adjusted to the geometry of your components. The customized design ensures an optimum air flow around your products during heat treatment and, at the same time, uniform heating and cooling. The result: Components with only minimum reproducible shape and dimensional deviations after hardening. With our specialist knowledge and experience, we manufacture CFC fixtures that you can put to practical use on an everyday basis. We also take account of whether the fixture is loaded manually or automatically (lifting truck or conveying system).

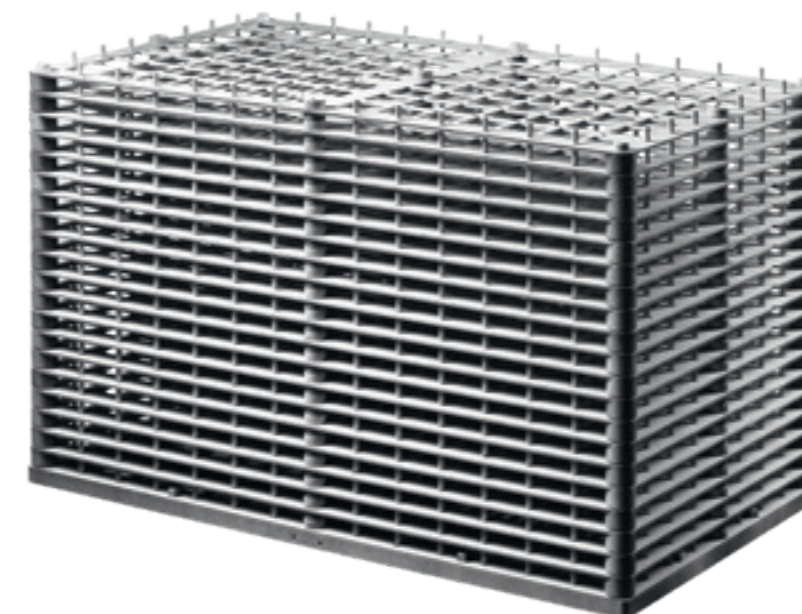
Coding and individualization

Smart fixtures for smart users: Individual coding of our CFC fixtures for process control and maintenance ensures maximum process safety, plannable downtimes and clear identification.



↑ Thanks to the specially adapted conical posts, the individual fixture levels can be angled. This simplifies the process cycle and prevents accidental damage.

Five times lighter than steel fixtures – and yet much stronger.



Maximum resistance to high weight loading

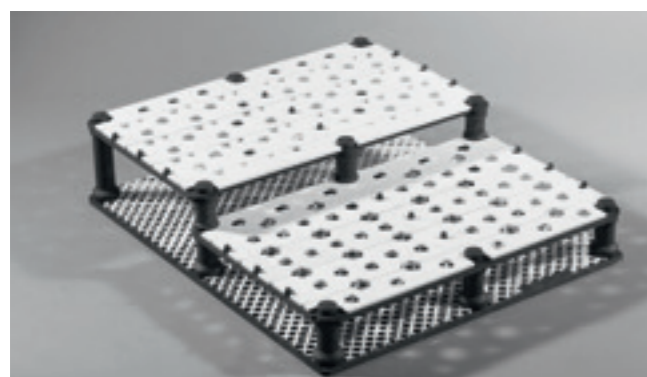
Robust and dimensionally stable – this also applies to CFC fixtures loaded with heavy components. Graphite Materials manufactures carrier systems for forming tools with a weight of up to five tons.



↑ CFC workpiece fixtures for gas carburizing with oil quenching, stackable.

Advantages of CFC fixtures for your manufacture:

- + Lightweight:** 60 to 90 percent weight reduction compared with metallic fixtures
- + Easy:** Customized for manual or automatic loading
- + Durable:** Service life of ten years or more
- + Resistant:** Withstand chemical influences
- + Effective:** Clear energy savings compared with metallic fixtures
- + Plannable:** Reliable processes thanks to reproducible, minimal distortions
- + Cost-saving:** Higher added value thanks to reduced process times and higher packing density



↑ DuComGrid®: CFC with ceramic modules

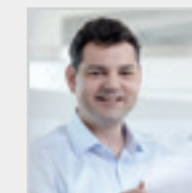
DuComGrid®: Two are better than one

Temperatures up to 1325 degrees Celsius? For particularly hot applications, Graphite Materials relies on its innovative **DuComGrid®** combining two or more different materials for your carrier system. For example, CFC is either coated or supplemented with ceramic or refractory metal. There is no risk of contact reactions between metallic workpieces and CFC fixtures.

Applications of CFC fixtures:

- Case hardening via surface carburizing up to 1050 °C (low-pressure carburizing with high-pressure gas quenching)
- Case hardening with oil quenching
- Structure adjustments and soldering processes up to 1300 °C
- Heat treatment under vacuum or in oxygen-free inert atmospheres

Your contact person:



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For different designs, spacings and stacking heights:



↑ HS steel billets



↑ Turbine blades



↑ Gearwheels

QUALITY MEANS MORE



💡 →
**from the
idea**
to the finished
component
→ ⚙️

Graphite Materials thinks ahead. As a system supplier, we not only offer you inspiring ideas but also clear added value – at every stage of our collaboration:

1.

Consultation

Always at your service: Your personal contact at Graphite Materials will be pleased to hear from you. We take the time to give you comprehensive, individual and transparent advice. With our modern ERP system, we control all business processes to ensure they are perfectly aligned. In this way, we ensure that your orders are processed quickly and economically.

2.

Materials engineering

Experienced and inquiring: Which material is suitable for your application? What are the strengths and weaknesses of the different materials? We help you to choose the best material for your application. This results in tested material combinations, such as our DuComGrid® for high-temperature applications.

3.

Design

Resourceful: We have pragmatic ideas for designing products that function perfectly in everyday use. Visual models at the design stage give you an idea of how your finished product will actually look. We are passionate about finding the best solution and creating customized products for your application area. Cost-aware, with state-of-the-art technology and optimum benefit.

4.

Manufacture

Modern and motivated: Manufacture at Graphite Materials is characterized by state-of-the-art CNC machines, high-quality tools and a committed team. Thanks to flat hierarchies and little red tape, we respond quickly and flexibly to your requirements. Our employees continue to expand their knowledge. Graphite Materials brings together vertical integration and an extensive range of services with professional and effective lean production management.

5.

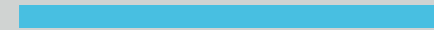
Logistics

Intelligent packaging: Our Logistics department no longer dispatches our products in cardboard boxes with polystyrene fillers but in robust wooden crates. These are easier to stack and store and protect against light, dirt and moisture. The lids of the crates are screwed down rather than nailed. This makes them easy to open and, if necessary, re-close. Damage caused by crowbars and similar implements is a thing of the past.

6.

After-sales service

Service-oriented: As part of our after-sales service, we continue to talk to you about a product's performance. Are you satisfied with it? Do you need support? Is there now an effective enhancement for your product? We'll also be happy to support you by visiting you on site, for example, for training, inspections and servicing. Thanks to online documentation, we respond quickly when you need a specific replacement part.



Sustainability is apparent in the materials used, efficient processes and manufactured or traded products. We set high standards and have developed our own environmental management system based on LEAN principles. In September 2017, we were certified in accordance with the requirements of the international standard ISO 14001:2015.

ENVIRONMENTAL PROTECTION MEANS MORE

Save energy,
reduce waste,
preserve reusable materials.

Sustainability is more than just a catchword.



There's no question about it: Like all industrial companies, Graphite Materials consumes resources such as electricity, water and packaging materials. To minimize their use as much as possible, we have implemented a comprehensive environmental management system. In this way, we achieve optimum results – in this case, for the benefit of our environment.

As part of our environmental management system, we continue to document the impact of our actions on the environment and take immediate action when problems occur. Our employees make it a personal concern to use resources consciously and economically, to reduce waste and to preserve reusable materials.

For example, Graphite Materials uses recyclable packaging materials to transport its products. These include corn packing chips, paper buffering material and filling made from recycled card. Polystyrene has been reduced to a minimum. Fragile parts are delivered to you in wooden crates. This not only spares the environment, but it also saves time and nerves when unpacking. It also provides optimum protection for the components transported.

Further measures currently include:

- Light sensors for our lighting system
- Energy-saving, ceiling-mounted radiant heaters as hall heating system
- Use of process heat and thus reduction in consumption of natural gas
- 100 percent use of green energy
- Advising customers on energy-saving measures with vacuum and inert-gas furnaces

Our current environmental policy is available to download in PDF format from www.graphite-materials.com/gm-umwelt-leitlinien.pdf.

Graphite products in a wooden box secured by paper and cardboards →





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