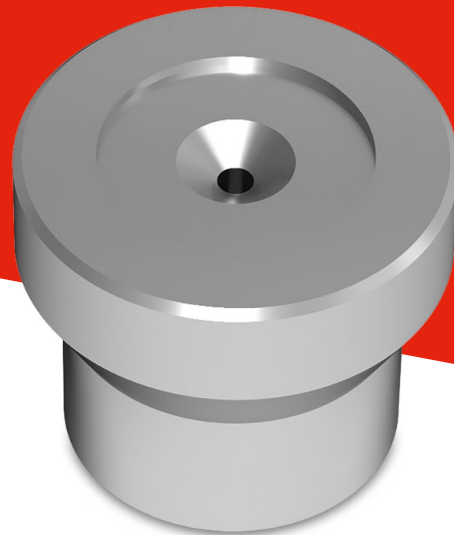
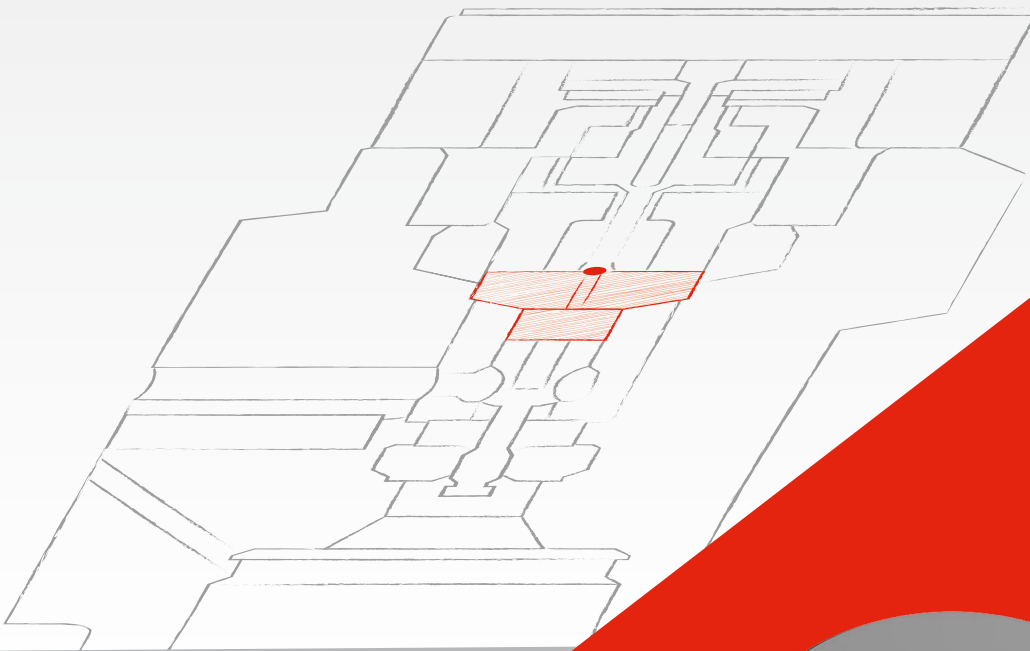


Premium products for injection technology



CERATIZIT is a high-technology engineering group specialised in cutting tools and hard material solutions.

Tooling a Sustainable Future

ceratizit.com



CERATIZIT
GROUP

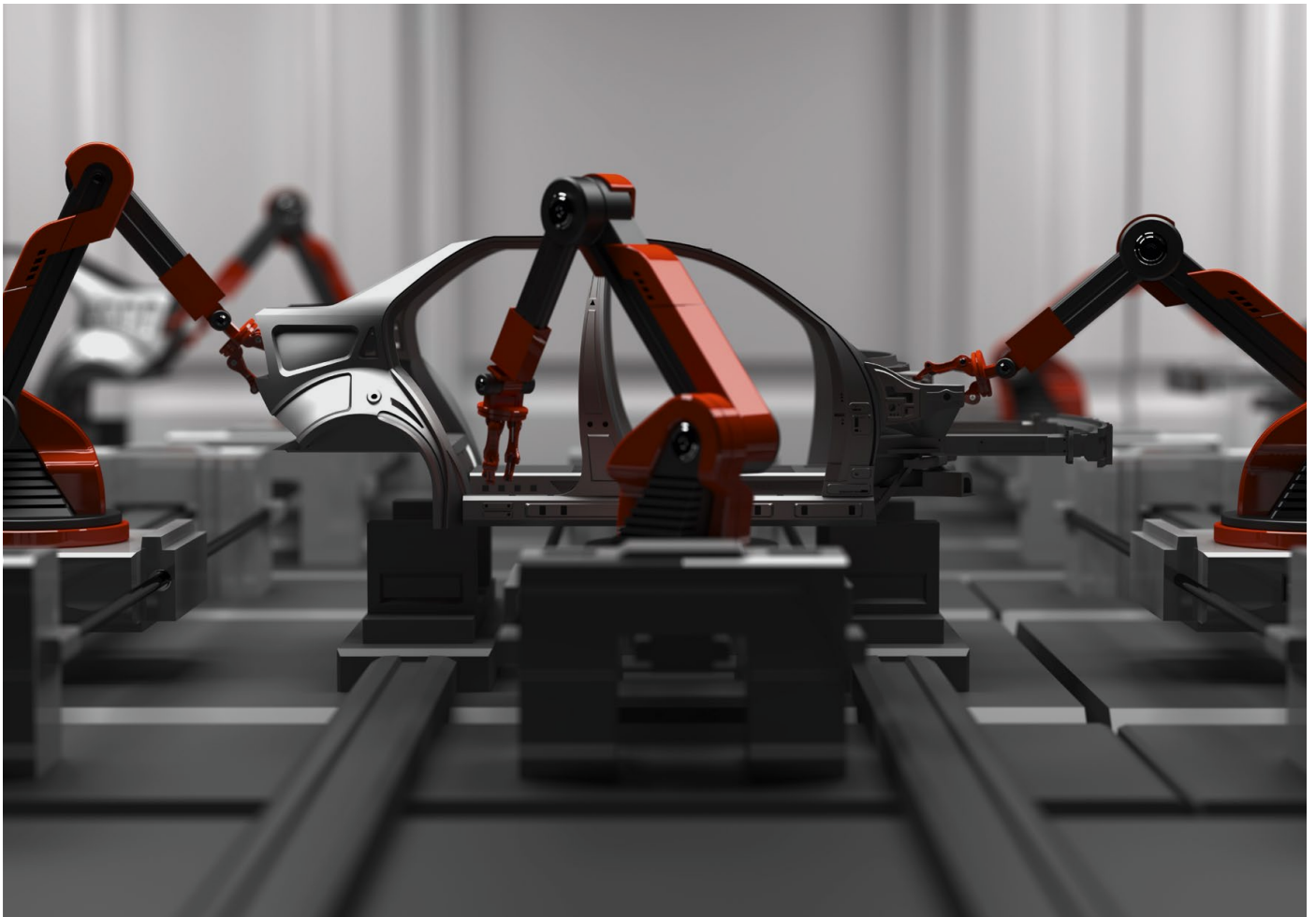


**As we manage the entire process chain,
we can always guarantee top quality and
smooth collaboration.**

Your solution for maximum requirements

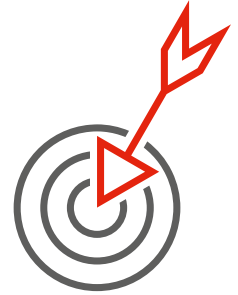
Cemented carbide is becoming increasingly important in the automotive industry and for large diesel engines. Not only because they **are naturally superior as compared to conventional materials in wear resistance and component performance**. Where mechanical components have a sealing function, make opening or closing movements or create pressure, hard materials are applied: these are ever more frequently mounted **in diesel injectors, diesel pumps, valve groups and injection nozzles** and used as valve pistons, piston seats, valve needles, coupling components, ball seats and gear elements in high-tech engines.

No matter whether you produce diesel cars and utility vehicles or large diesel motor systems used in trains, marine vessels, construction machines or for power generation: with products from CERATIZIT featuring excellent dimensional accuracy, you can count on premium components that stand out with **maximum precision, best compressive strength and maximum durability** – all of which are decisive quality parameters for your applications.



Advantages & benefits

Strong arguments for tailor-made carbide solutions from CERATIZIT.



Advantages

Quality certified to ISO 9001 and TS 16949 for maximum requirements.

Maximum precision, perfect dimensional accuracy, process capability, stability, wear resistance.

Optimal compressive strength at the highest system pressures.

Higher rigidity in high-pressure components provides advantages in terms of expansion and deformation behaviour as well as high surface quality.

Corrosion-resistant grades.

Up-to-date machine park with the possibility of direct pressing; all grinding and testing machines are state-of-the-art.

Benefits

> Stable processes and highest standards in production and administration.

> Shape and dimensions are guaranteed throughout the entire work cycle; higher productivity, increased efficiency.

> The most demanding requirements are fulfilled in mechanical assemblies of state-of-the-art CRD injectors.

> Optimal leakage properties.

> The most suitable solution for every application.

> Economic high-volume production of prismatic or nozzle-like components; measuring possibilities as with the customer.



CERATIZIT is your expert partner,
creating the best possible hard material
solution for your product development.

Dually certified

As a specialist in hard material technology, CERATIZIT is the development partner of experts in the field of components and synonymous with product and service quality for high-tech components that stand out when compared internationally. As one of the leading carbide producers worldwide, we fulfil the demanding quality standards of the automotive sector. Certifications to ISO/TS 16949 and ISO 9001 confirm that we comply with the strict technical specifications you require from your suppliers.



Innovations²

Innovations are hardly such a focal point in other sectors as they are in yours: **continuous optimisation of engine-related standards** are the order of the day for you just like the high competitive pressure in a strictly scheduled process chain. CERATIZIT is your expert development partner who understands your individual production parameters both commercially and technically, **creating the best possible hard material solution for your product development: from prototype to serial production** – all to ensure that your innovations come out on top!



Cemented carbide: better than steel

CERATIZIT supplies you with cemented carbide, which, when compared to hardened steel, offers **considerably higher compressive strength**: this is first and foremost a big advantage for the automotive sector, as system pressure in practice is on a continuous rise, as seen today for example with diesel injectors that operate at 2,200 to 3,000 bar. Even under the highest pressure, both shape and dimensions are guaranteed over the entire period of the required work cycles. Furthermore, carbide solutions are characterised by a **significantly higher rigidity** which is particularly relevant for high-pressure components where the expansion and deformation behaviour, and thus also the leakage properties, are improved.

No chance for corrosion

In addition to classic carbide solutions, you can also choose from **corrosion-resistant grades** that have been specifically designed for applications where components are in contact with corrosive materials: this includes all fuels, additives and acid solutions. For example, you will receive **valve needles for injection nozzles of SCR systems** where specific solutions are fed into catalytic converters, triggering a chemical process for the reduction of nitrogen oxides into exhaust gas.



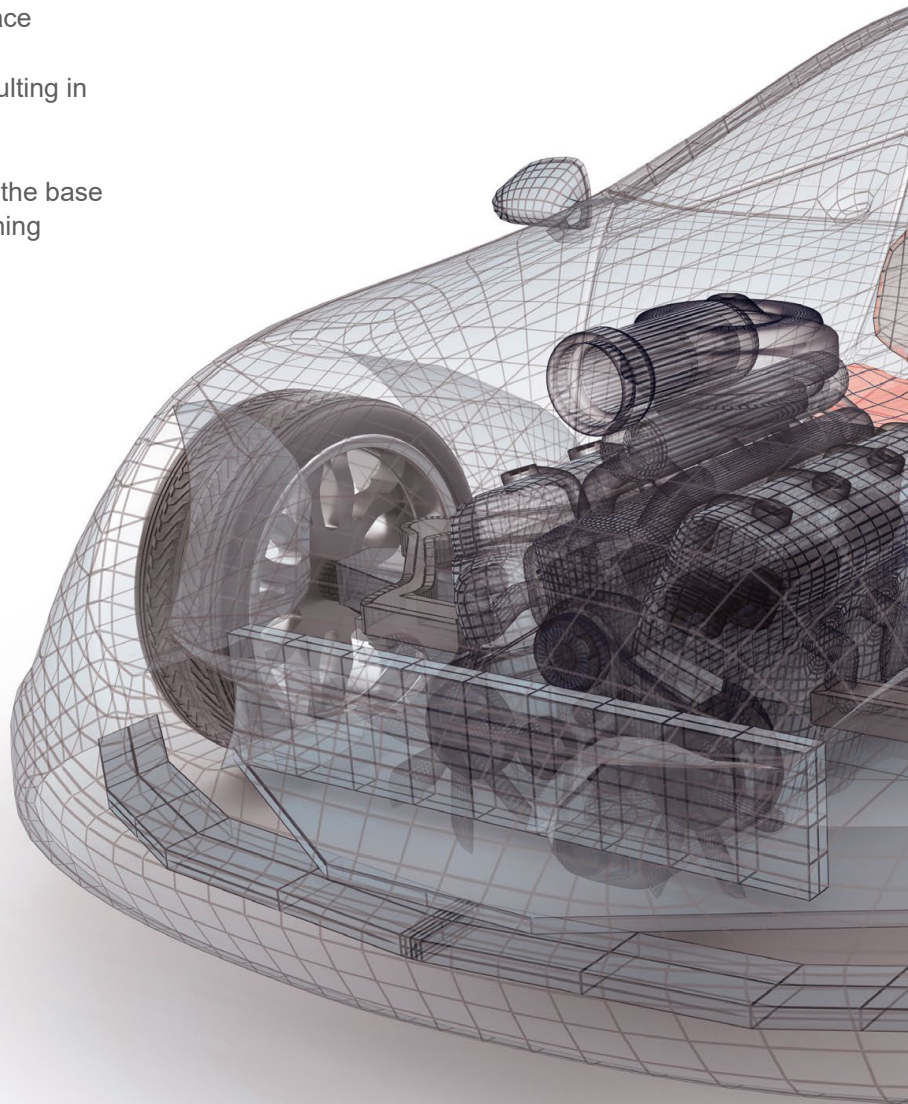
Customer-specific premium products

If you are in search for the best individual solution for you – benefit from products customised to your specific component requirements in high-performance engine components to develop maximum effectiveness. Where necessary, **carbide products** can be provided **with specific coatings** (PVD, CVD, DLC). This surface treatment guarantees maximum wear resistance in friction combinations, resulting in longer service life.

Even after the coating has worn away, the base material continues to promise far-reaching emergency running properties.

What we offer:

- ▲ **Small parts** – down to the millimetre range,
- ▲ **Ground parts** with very close tolerances of only a few μm
- ▲ **Cylindrical components**, which showcase minimum shape and position tolerances.



Pistons

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Control plates

Page 11

Pins

Page 11

Valve plates

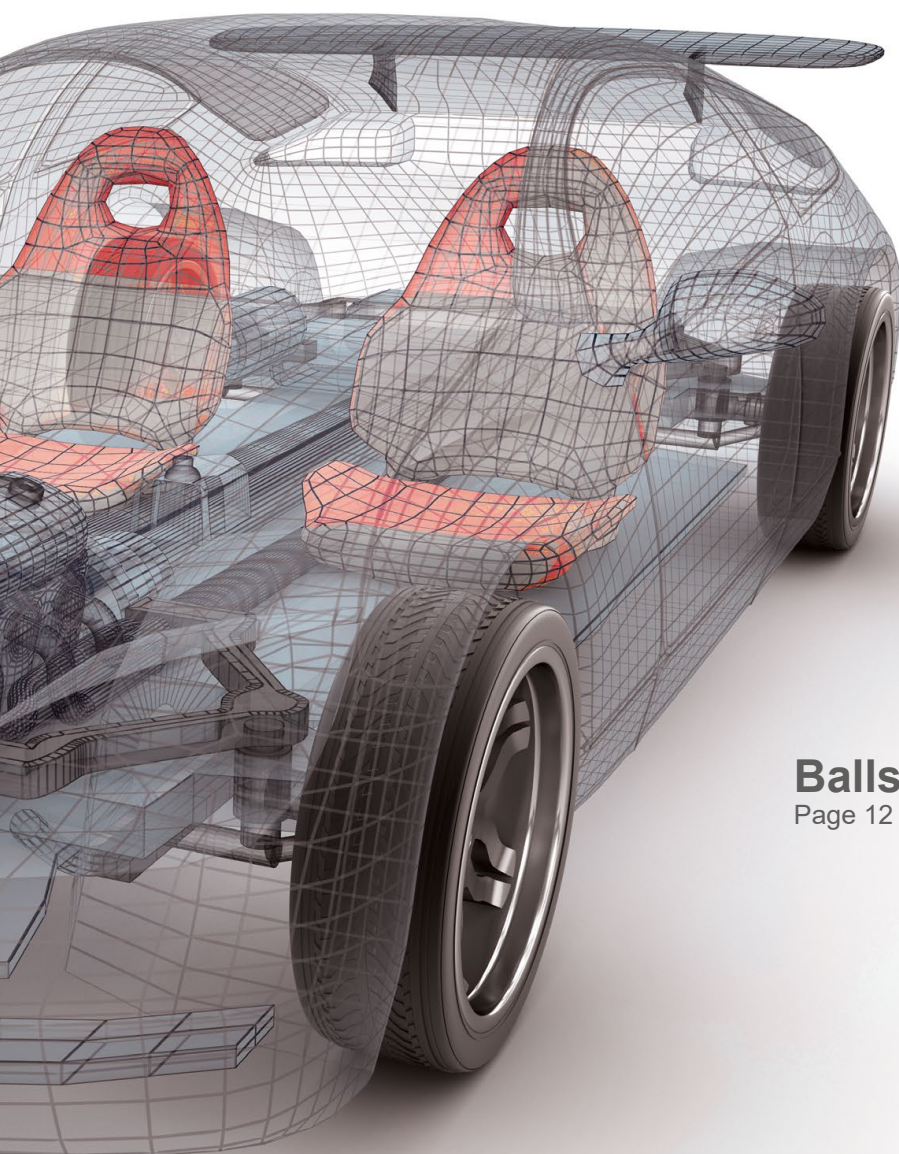
Page 11

Valve needles

Page 12

Balls

Page 12



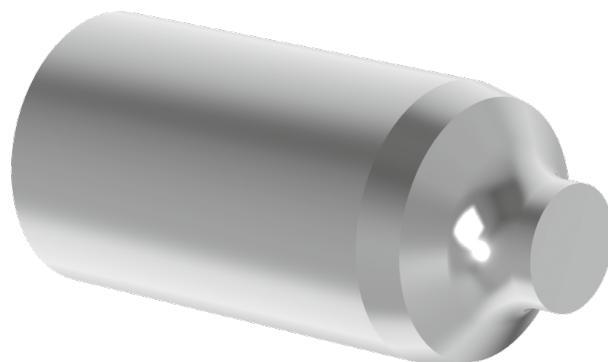
Top products for injection technology

All products are designed based on your individual specifications – **with strict confidentiality always upheld!** And all this by hard material experts who develop every component to become a high-tech product for application in injection technology. CERATIZIT products perform optimally, also because they are produced in a **sophisticated and highly developed manufacturing process** – by the only supplier who manages the entire process chain of carbide production from the raw material all the way to the final product.

Pistons

CERATIZIT pistons in CRD injectors are used as mechanic components; they are supplied as entirely ground pressing parts and feature:

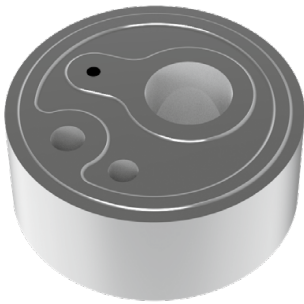
- ▲ **Maximum compressive strength**
- ▲ **Minimum length tolerances as well as maximum requirements regarding flatness and parallelism of the front faces**



Control plates and pins

Control plates and pins in CRD injectors are used as mechanical and sometimes as high-pressure components: they are delivered as pressed parts with double disk ground front faces. Highlights include:

- ▲ **Flat sealing surfaces**
- ▲ **Close positioning tolerances of the holes on the blank**



The pins are also delivered as centreless ground rods and are characterised by:

- ▲ **Maximum precision in terms of roundness and straightness**



Valve plates

In large diesel engines, CERATIZIT valve plates are used as mechanical components in valve groups. In practice, the quality of the ball seat is decisive as it determines the actual cavitation behaviour and service life of the entire component. Valve plates are delivered as pressed parts with a ground ball seat and feature:

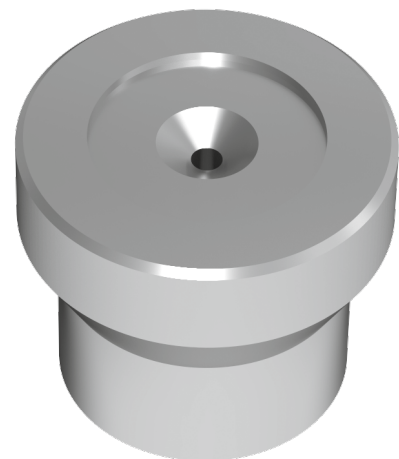
- ▲ **Maximum precision in terms of roundness and straightness**

The front faces are double disk ground, which results in:

- ▲ **Flat sealing surfaces**

Optionally the following coating types are available:

- ▲ **PVD and CVD or diamond coating**

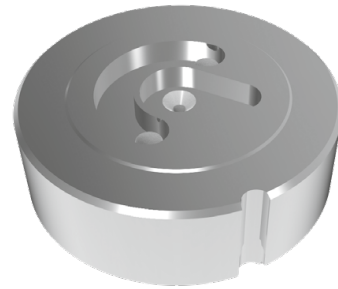


High-pressure components control and apportion the flow of fuel. They are delivered either as pressed blanks or as finish-ground parts:

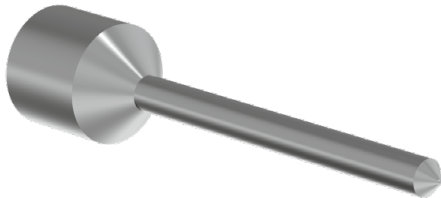
▲ **High requirements regarding flatness of the blank and the finished part**

Fine holes that dispense the fuel can be finish-machined quickly and effectively:

▲ **Minimal hole diameters possible**



Valve needles



In SCR injection systems, corrosion-resistant valve needles by CERATIZIT are used as classical locking components: they are delivered with a centreless ground diameter:

▲ **Maximum precision in terms of roundness and straightness**

Balls

We offer carbide balls with a unique variety of dimensions, e.g. for valve seats or bearings:

▲ **Maximum precision**

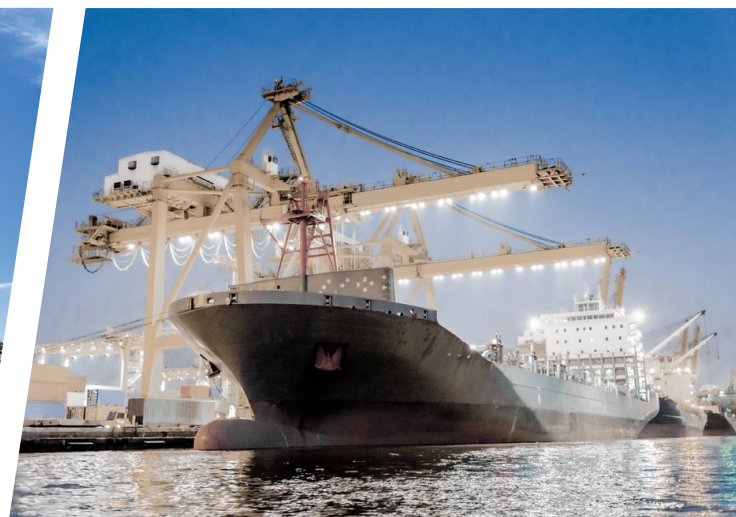


Top products for your engine technology

Whether in cars, utility vehicles or large diesel motor systems: CERATIZIT is appreciated and recognised by **numerous industry leaders as a regular supplier**. Companies from the automotive supplier pyramid make use of the **know-how, solution-finding expertise and performance** of a 'tier 2' expert, one which naturally cares for all matters with the strictest confidentiality, and one which makes batch productions with individually-calculated hard material products even more efficient.

Specifically for large diesel engines

Large diesel engines power **construction and transport machines** (excavators, cranes, tipper and mining lorries) and are utilised in **locomotives** as well as in a variety of marine application fields: the construction aggregate either provides the power that directly drives the gears and screws, or it supplies a power generator that puts the vehicle's electric systems and other engines into motion. This is the case, for example, with large-scale **merchant and passenger vessels or even ferries, ice boats and drilling vessels**.



Hard Material Solutions

Hard cases are our speciality

We are your ideal partner when it comes to **high-quality hard materials for production processes, tool manufacturing and wear protection.**

From standard products to tailor-made solutions, from massive components to minute parts, from the blank to the fully finished product – a product that meets the highest standards of precision, surface treatment, and user-friendly assembly – our carbide solutions ensure improved efficiency and outstanding total cost of ownership.

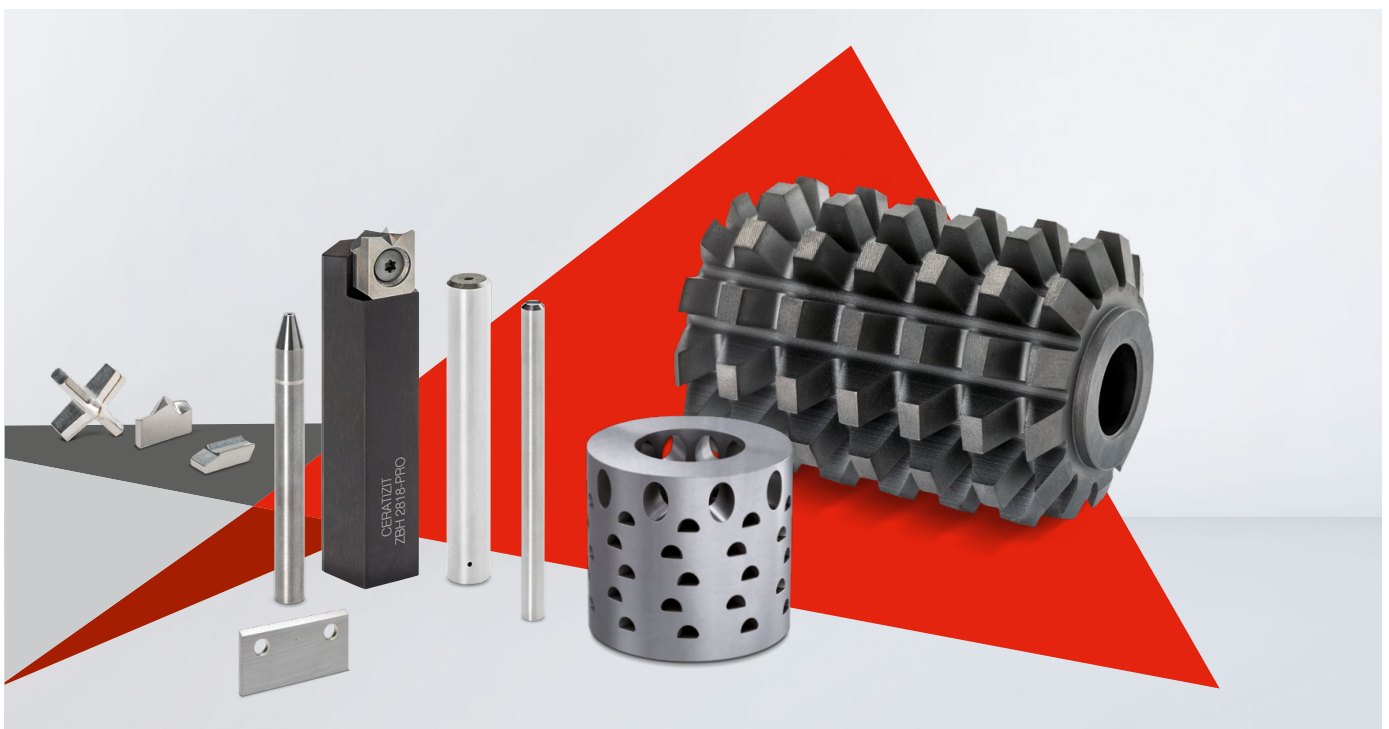
This is the case in a variety of application fields and industrial sectors. Even when subjected to extreme stress, our cemented carbides are notable for the high flexibility they offer in numerous industries. Our products are specially designed for extreme working conditions, making our Hard Material Solutions impressive tools for optimising your processes and increasing wear resistance.

Product portfolio

- ▲ Blanks and semi-finished products
- ▲ Waterjet cutting
- ▲ Blanks for hobs
- ▲ Drawing tools and drawing nibs

Solutions for:

- ▲ Tool and die industry
- ▲ Fastening industry
- ▲ Injection technology
- ▲ Health industry
- ▲ Plastics industry



CERATIZIT Group

For over 100 years, CERATIZIT has been a pioneer in developing exceptional hard material solutions for machining and wear protection. The private company, with registered offices in Mamer, Luxembourg, develops and produces highly specialised cutting tools, indexable inserts, rods made from hard materials and wear parts.

The CERATIZIT Group is the global market leader in various application segments and successfully develops new carbide and cermet grades, such as for wood and stone working.

Facts & figures*

 **Headquarters**
Mamer, Luxembourg



30 production sites



30 % of products developed in the last 5 years



2⁰⁰ R&D employees



80 countries in which we are active



7⁰⁰⁰ employees



25 innovation awards



1⁰⁰⁰ patents & utility models



1^{00 000} products



€ **1.5** bn turnover

* approximate values

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