2018.V1 **EN**

# Round Tool Materials
# Product Highlights 2018

CERATIZIT is a high-tech engineering group specialised in tooling and hard material technologies.

TOOLMAKER SOLUTIONS BY CERATIZIT

**Tooling the Future**

www.ceratizit.com

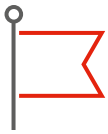
# The CERATIZIT Group

For over **95 years**, CERATIZIT has been a **pioneer** developing exceptional hard material products for cutting tools and wear protection.

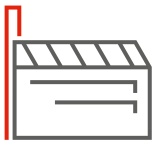
The privately owned company, based in Mamer, Luxembourg, develops and manufactures highly specialised carbide cutting tools, inserts and rods made of hard materials as well as wear parts.

The CERATIZIT Group is the **global market leader** in several wear part application areas, and successfully develops new types of cemented carbide, cermet and ceramic grades which are used for instance in the wood, metal and stone working industries.

# Facts and figures



**1 headquarters**
Mamer (Luxembourg)



**34**
production sites

**> 70**
sales subsidiaries

**> 9,000**
employees

**> 100,000**
different products

**> 1,000**
patents and
utility models

**> 200**
employees in R&D

**> 10**
innovation awards

**30 %**
of products developed
in the last 5 years

# Dear customers,

Thanks a lot for taking an interest in our product highlights for 2018.

This year, above all, we have extended our stock range for you:

**p-line products**

- **Rods with helical coolant holes in grade CTS24Z**
- **Rods with helical coolant holes in grade CTS12D**
- **End mill blanks in the most popular inch dimensions**
- **Brazing tips to DIN 8011**

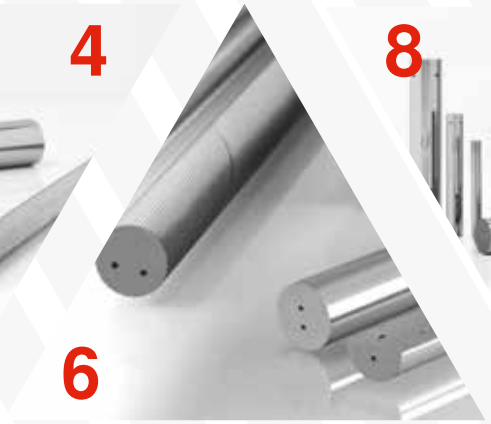
**e-line products**

- **Rods with helical coolant holes in grade TMG30**

You can order the product you need at any time rapidly and easily, for example at our online shop, the E-Techstore.
Our wide and innovative product range satisfies the highest demands of the modern precision tooling industry. For all materials and machining tasks, you can find grades specially developed for the given application.

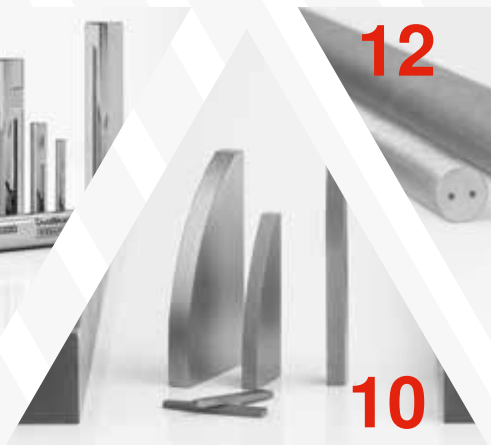
**Yours,**
**The Toolmaker Solutions by CERATIZIT team**

CTS24Z: high-performance grade for the roughing of titanium and heat-resistant alloys


Rods with helical coolant holes in grade CTS12D

End mill blanks in the most popular inch dimensions in our proven CTS20D grade


Brazing tips to DIN 8011 included in the standard range

Rods with helical coolant holes in grade TMG30

# New carbide grade for the high-performance machining of difficult materials

# CTS24Z: high-performance grade for the roughing of titanium and heat-resistant alloys

On the occasion of EMO 2017, we launched CTS24Z on the market as a **new high-performance grade for the rough machining of difficult materials** like titanium and heat-resistant alloys. In response to high demand, we now also offer end mill blanks, as sintered, in grade CTS24Z from stock.

Applications in the **aerospace industry**, in particular, ask a lot of the tooling systems. Having virtually the same hardness, CTS24Z is even more resistant to rupture than our proven CTS18D and CTS20D grades.

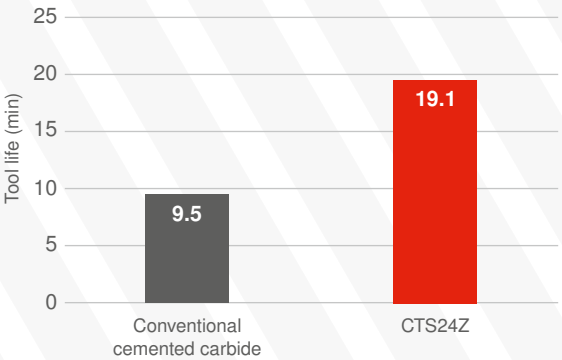
This extreme toughness offers **maximum protection against breakage and ensures consistent performance** of your tools.

## CTS24Z stock range

- Solid rods, as sintered or ground
- End mill blanks
- Rods with two helical coolant holes, as sintered

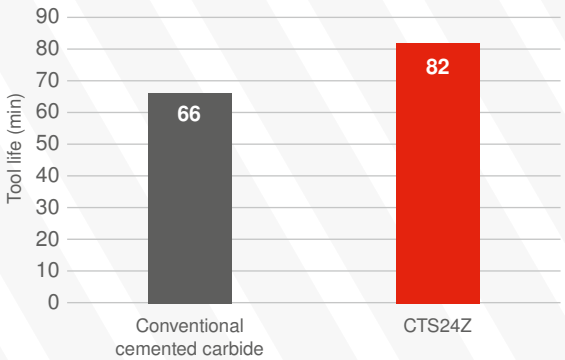
| CERATIZIT code | ISO code | US code | Grain size | Binder % | Density [g/cm³] | Hard-ness [HV30] | Hard-ness [HRA] | Transverse rupture strength [MPa] | KIC [MPa*m] |
|---|---|---|---|---|---|---|---|---|---|
| CTS24Z | K20 - K40 | C-2 | submicron | 12.0 | 14.1 | 1570 | 91.7 | 4000 | 11.3 |

## Tool life comparison CTS24Z




**Test parameters:**
Peripheral milling of Ti-6Al-4V (climb milling operation)
Solid carbide end mill D = 25 mm z = 4
uncoated

$V_c$ = 63 m/min $f_z$ = 0.1 mm
$a_p$ = 10 mm $a_e$ = 8 mm




**Test parameters:**
Peripheral milling of Ti-6Al-4V (climb milling operation)
Solid carbide end mill D = 10 mm z = 4
uncoated

$V_c$ = 80 m/min $f_z$ = 0.08 mm
$a_p$ = 10 mm $a_e$ = 3 mm

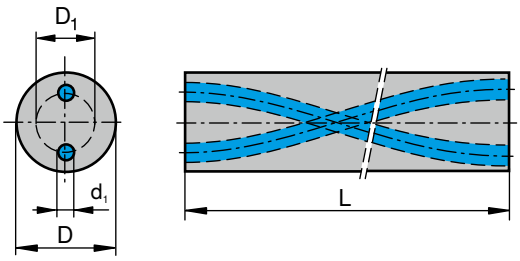
# Rods for aluminium machining and diamond-coated drilling tools

# Now available from stock: rods with helical coolant holes in grade CTS12D

Particularly in the aerospace industry the demand for diamond-coated drilling tools continues to rise.

In order to satisfy this demand, as of now our rods with helical coolant holes are also available from stock in submicron grade CTS12D.

CTS12D is **ideal for diamond coating, and is explicitly recommended by all leading companies providing such coatings**. Without coating, CTS12D is also used for machining aluminium materials where the 6% grade, thanks to its high wear resistance, results in longer tool life as compared with conventional 10% grades.




## Rods with helical coolant holes, as sintered (15°)

| D [mm] | L [mm] | Type, description | $D_1$ [mm] | $d_1$ [mm] | Nominal pitch [mm] | Nominal pitch [°] |
|---|---|---|---|---|---|---|
| 6.3 | 330 | 15R2 0630/2.6/0.7/70.35-330 CTS12D | 2.60 | 0.70 | 70.35 | 15 |
| 8.3 | 330 | 15R2 0830/3.6/1.25/93.8-330 CTS12D | 3.60 | 1.25 | 93.80 | 15 |
| 10.3 | 330 | 15R2 1030/4.80/1.40/117.25-330 CTS12D | 4.80 | 1.40 | 117.25 | 15 |
| 12.3 | 330 | 15R2 1230/6.25/1.55/140.70-330 CTS12D | 6.25 | 1.55 | 140.70 | 15 |
| 14.3 | 330 | 15R2 1430/6.70/1.90/164.14-330 CTS12D | 6.70 | 1.90 | 164.14 | 15 |
| 16.3 | 330 | 15R2 1630/8.0/2.10/187.59-330 CTS12D | 8.00 | 2.10 | 187.59 | 15 |
| 18.3 | 330 | 15R2 1830/9.0/2.3/211.0-330 CTS12D | 9.00 | 2.30 | 211.00 | 15 |
| 20.3 | 330 | 15R2 2030/10.0/2.50/234.49-330 CTS12D | 10.00 | 2.50 | 234.49 | 15 |

## Rods with helical coolant holes, as sintered (30-40°)

| D [mm] | L [mm] | Type, description | $D_1$ [mm] | $d_1$ [mm] | Nominal pitch [mm] | Nominal pitch [°] |
|---|---|---|---|---|---|---|
| 6.3 | 330 | 46R2 0630/1.6/0.5/18.0-330 CTS12D | 1.60 | 0.50 | 18.00 | 46 |
| 6.3 | 330 | 40R2 0630/1.9/0.7/22.5-330 CTS12D | 1.90 | 0.70 | 22.50 | 40 |
| 6.3 | 330 | 30R2 0630/2.7/0.8/32.7-330 CTS12D | 2.70 | 0.80 | 32.70 | 30 |
| 6.8 | 330 | 30R2 0680/2.7/0.8/35.4-330 CTS12D | 2.70 | 0.80 | 35.40 | 30 |
| 8.3 | 330 | 30R2 0830/3.4/1.0/43.5-330 CTS12D | 3.40 | 1.00 | 43.50 | 30 |
| 8.3 | 330 | 40R2 0830/2.9/0.7/30.0-330 CTS12D | 2.90 | 0.70 | 30.00 | 40 |
| 10.3 | 330 | 30R2 1030/4.8/1.3/54.4-330 CTS12D | 4.80 | 1.30 | 54.50 | 30 |
| 10.3 | 330 | 40R2 1030/2.7/0.8/37.0-330 CTS12D | 2.70 | 0.80 | 37.00 | 40 |
| 12.3 | 330 | 30R2 1230/6.3/1.7/65.3-330 CTS12D | 6.30 | 1.70 | 65.30 | 30 |
| 12.3 | 330 | 40R2 1230/4.0/0.9/44.9-330 CTS12D | 4.00 | 0.90 | 44.90 | 40 |
| 14.3 | 330 | 30R2 1430/6.7/1.8/76.2-330 CTS12D | 6.70 | 1.80 | 76.20 | 30 |
| 14.3 | 330 | 40R2 1430/4.6/1.3/52.4-330 CTS12D | 4.60 | 1.30 | 52.40 | 40 |
| 16.3 | 330 | 30R2 1630/8.0/2.0/87.1-330 CTS12D | 8.00 | 2.00 | 87.10 | 30 |
| 16.3 | 330 | 40R2 1630/5.5/1.2/59.9-330 CTS12D | 5.50 | 1.20 | 59.90 | 40 |
| 18.3 | 330 | 30R2 1830/9.3/2.7/98.0-330 CTS12D | 9.30 | 2.70 | 98.00 | 30 |
| 18.3 | 330 | 40R2 1830/5.6/1.6/68.0-330 CTS12D | 5.60 | 1.60 | 68.00 | 40 |
| 20.3 | 330 | 30R2 2030/10.0/2.5/108.8-330 CTS12D | 10.00 | 2.50 | 108.80 | 30 |
| 20.3 | 330 | 40R2 2030/7.1/1.5/74.9-330 CTS12D | 7.10 | 1.50 | 74.90 | 40 |

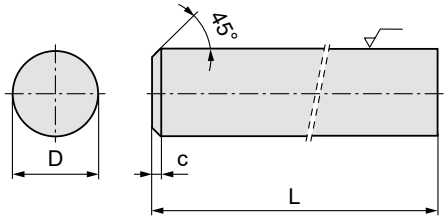
# Extended stock range for inch dimensions

# Now available from stock: end mill blanks in the most popular inch dimensions in our proven CTS20D grade

Our stock range now also includes end mill blanks in the most popular inch dimensions (see table).
The blanks are available in our submicron grade CTS20D for the universal machining of alloyed and non-alloyed steels. Thanks to its balanced properties this grade is suitable for a variety of cutting operations on different materials.

Improved toughness ensures a low risk of cutting edge breakage.

The following dimensions are already available from stock:




| D [inch] | L [inch] | Type, description | Dia. tol. [inch] | Dia. tol. ISO 286 | c [inch] |
|---|---|---|---|---|---|
| 1/8 | 1.500 | RGIC 1/8 - 1.50 | +0 / -0.0003 | h6 | 0.010 |
| 3/16 | 2.000 | RGIC 3/16 - 2.00 | +0 / -0.0003 | h6 | 0.016 |
| 1/4 | 2.000 | RGIC 1/4 - 2.00 | +0 / -0.0004 | h6 | 0.016 |
| 1/4 | 3.000 | RGIC 1/4 - 3.00 | +0 / -0.0004 | h6 | 0.016 |
| 5/16 | 2.500 | RGIC 5/16 - 2.50 | +0 / -0.0004 | h6 | 0.016 |
| 3/8 | 2.500 | RGIC 3/8 - 2.50 | +0 / -0.0004 | h6 | 0.016 |
| 3/8 | 3.000 | RGIC 3/8 - 3.00 | +0 / -0.0004 | h6 | 0.016 |
| 1/2 | 3.000 | RGIC 1/2 - 3.00 | +0 / -0.0004 | h6 | 0.016 |
| 1/2 | 4.000 | RGIC 1/2 - 4.00 | +0 / -0.0004 | h6 | 0.031 |
| 5/8 | 3.500 | RGIC 5/8 - 3.50 | +0 / -0.0004 | h6 | 0.031 |
| 3/4 | 4.000 | RGIC 3/4 - 4.00 | +0 / -0.0005 | h6 | 0.031 |
| 1 | 4.000 | RGIC 1 - 4.00 | +0 / -0.0005 | h6 | 0.031 |
| 1 | 6.000 | RGIC 1 - 6.00 | +0 / -0.0005 | h6 | 0.031 |

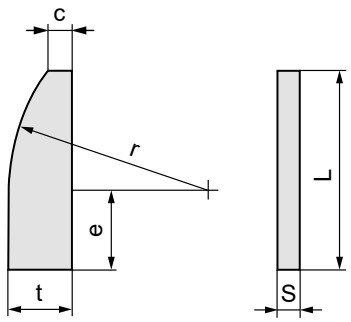
# Extended standard range of brazing tips

# Now available from stock: brazing tips to DIN 8011 in the standard range

The brazing tips stock range has also been extended with the addition of the most popular DIN 8011 articles. Our brazing tips are characterised by very good brazability and can be supplied upon request in all common DIN dimensions.

**Our new stock range includes products in the following two grades:**
**CTS12D:** submicron grade with 6 % cobalt and a hardness of 1820 HV30, ideal as cutting material for reamers when machining aluminium alloys, graphite, fibre-reinforced plastics (CFRP, GFRP) and other abrasive materials.

**CTF28T:** cermet grade especially for the finishing of steel materials. Thanks to its high oxidation resistance and low tendency to adhesion, this grade is particularly suited for the production of uncoated reamers for ferrous materials.




## Form R

| Type, description | L [mm] | e [mm] | S [mm] | r [mm] | c [mm] | t [mm] | CTF28T | CTS12D |
|---|---|---|---|---|---|---|---|---|
| DIN 8011 R 12 | 12 | 5.00 | 0.80 | 25.00 | 0.80 | 2.00 | ▲ | ○ |
| DIN 8011 R 16 | 16 | 7.10 | 1.20 | 25.00 | 1.00 | 2.50 | ▲ | ▲ |
| DIN 8011 R 19 | 19 | 9.00 | 1.40 | 25.00 | 1.00 | 3.00 | ▲ | ▲ |
| DIN 8011 R 22 | 22 | 11.20 | 1.80 | 25.00 | 1.40 | 3.50 | ▲ | ▲ |
| DIN 8011 R 25 | 25 | 15.00 | 2.20 | 25.00 | 1.40 | 4.00 | ▲ | ● |
| DIN 8011 R 30 | 30 | 18.00 | 2.80 | 25.00 | 1.40 | 5.00 | ▲ | ▲ |

## Form T

| Type, description | L [mm] | e [mm] | S [mm] | r [mm] | c [mm] | t [mm] | CTS12D |
|---|---|---|---|---|---|---|---|
| DIN 8011 T 12 | 12 | 4.50 | 1.20 | 15.00 | 1.00 | 3.00 | ○ |
| DIN 8011 T 16 | 16 | 7.50 | 1.60 | 15.00 | 1.00 | 3.50 | ○ |
| DIN 8011 T 19 | 19 | 7.50 | 2.00 | 25.00 | 1.80 | 4.50 | ▲ |
| DIN 8011 T 22 | 22 | 9.50 | 2.50 | 25.00 | 2.50 | 5.60 | ▲ |
| DIN 8011 T 25 | 25 | 10.00 | 2.80 | 25.00 | 3.00 | 8.00 | ▲ |

## Form U

| Type, description | L [mm] | e [mm] | S [mm] | r [mm] | c [mm] | t [mm] | CTS12D |
|---|---|---|---|---|---|---|---|
| DIN 8011 U 12 | 12 | 1.40 | 1.20 | 15.00 | 1.00 | 5.60 | ○ |
| DIN 8011 U 16 | 16 | 4.00 | 1.60 | 15.00 | 1.00 | 6.70 | ○ |
| DIN 8011 U 19 | 19 | 2.50 | 2.00 | 25.00 | 1.80 | 8.00 | ▲ |
| DIN 8011 U 22 | 22 | 2.80 | 2.50 | 25.00 | 2.50 | 11.20 | ▲ |
| DIN 8011 U 25 | 25 | 4.00 | 2.80 | 25.00 | 3.00 | 14.00 | ▲ |

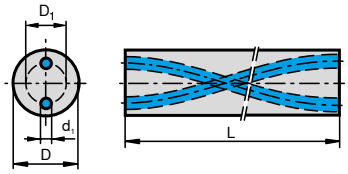
○ limited stock ▲ new stock itemr Other grades and dimensions upon request

# Rods with helical coolant holes in grade TMG30

# Rods with two helical coolant holes in grade TMG30

TMG30 is a submicron grade from our s-line. The s-line (solid line) is designed for the economical production of standard tools. The use of high-quality secondary raw materials from in-house CERATIZIT recycling facilities makes the s-line not only attractive in price terms but also contributes to the sustainable management of valuable resources. The s-line product range includes rods, both as sintered and ground, as well as ground cut-to-length products with chamfer. Also rods with helical coolant holes (as sintered) have been added.

| Grade | Mixed carbide | Binder m % | ISO code | US code | Grain size | Density [g/cm³] | Hardness HV10 | Hardness HV30 | Hardness HRA | Transverse rupture strength MPa | Transverse rupture strength P.S.I. | KIC Shetty MPa*m$^{1/2}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TMG30 | < 2 % | 10 | K30 – K40 | C-2 | **submicron** | 14.40 | 1590 | 1570 | 91.7 | 3600 | 522.000 | 9.3 |




| D [mm] | L [mm] | Type, description | $D_1$ | $d_1$ [mm] | Nominal pitch [mm] | Nominal pitch [°] |
|---|---|---|---|---|---|---|
| 6.30 | 330 | 40R2 0630/1.9/0.7/22.5-330 | 1.90 | 0.70 | 22.50 | 40.0 |
| 6.30 | 330 | 30R2 0630/2.7/0.8/32.7-330 | 2.70 | 0.80 | 32.70 | 30.0 |
| 8.30 | 330 | 40R2 0830/2.4/0.65/30.0-330 | 2.40 | 0.65 | 30.00 | 40.0 |
| 8.30 | 330 | 30R2 0830/3.3/1.0/43.5-330 | 3.30 | 1.00 | 43.50 | 30.0 |
| 10.30 | 330 | 40R2 1030/3.2/1.0/37.4-330 | 3.20 | 1.00 | 37.40 | 40.0 |
| 10.30 | 330 | 30R2 1030/4.8/1.3/54.0-330 | 4.80 | 1.30 | 54.00 | 30.2 |
| 12.30 | 330 | 40R2 1230/4.0/0.9/44.9-330 | 4.00 | 0.90 | 44.90 | 40.0 |
| 12.30 | 330 | 30R2 1230/6.3/1.7/65.3-330 | 6.30 | 1.70 | 65.30 | 30.0 |
| 14.30 | 330 | 40R2 1430/4.3/1.0/52.4-330 | 4.30 | 1.00 | 52.40 | 40.0 |
| 14.30 | 330 | 30R2 1430/6.7/1.75/76.2-330 | 6.70 | 1.75 | 76.20 | 30.0 |
| 16.30 | 330 | 40R2 1630/5.1/1.2/59.9-330 | 5.10 | 1.20 | 59.90 | 40.0 |
| 16.30 | 330 | 30R2 1630/7.9/1.75/87.1-330 | 7.90 | 1.75 | 87.10 | 30.0 |
| 18.30 | 330 | 40R2 1830/5.9/1.4/68.0-330 | 5.90 | 1.40 | 68.00 | 39.7 |
| 18.30 | 330 | 30R2 1830/9.15/2.0/98.0-330 | 9.15 | 2.00 | 98.00 | 30.0 |
| 20.30 | 330 | 40R2 2030/6.6/1.5/74.9-330 | 6.60 | 1.50 | 74.90 | 40.0 |
| 20.30 | 330 | 30R2 2030/10.0/2.5/108.8-330 | 10.00 | 2.50 | 108.80 | 30.0 |
| 25.30 | 330 | 40R2 2530/7.7/1.75/93.6-330 | 7.70 | 1.75 | 93.60 | 40.0 |
| 25.30 | 330 | 33R2 2530/12.0/3.2/119.0-330 | 12.00 | 3.20 | 119.00 | 33.4 |

# Supreme availability

A majority of our standard products are available from stock. A well-organised warehouse means that we can respond quickly and reliably to your order, even for bulk quantities. Thanks to our advanced supply chain management, our production capacity is flexible and able to produce very large quantities, even in a short time frame. We are therefore able to produce very large quantities, even in a short time frame.

You can order stock products online around the clock at our E-Techstore.

**e-techstore.com**
**Available 24/7 for you**

## Your benefits

- Live product availability check
- Detailed up-to-date technical information and graphic illustrations
- Fast delivery: orders up to 6.30 pm will leave our warehouse in Kempten, Germany, on the same day
- Reliable delivery: we work only with the best and most reliable service providers in the sector

# We are Toolmaker Solutions by CERATIZIT

### Unique product variety

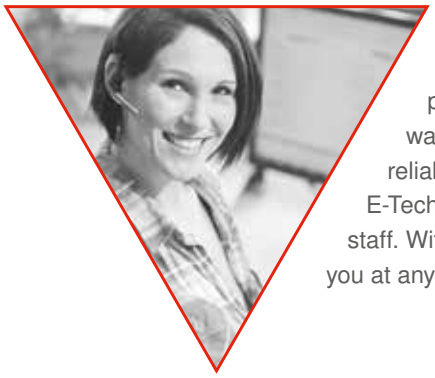
Based on your requirements and the desired price category, when it comes to tool production you can choose from three different product lines for carbide rods: s-line (Solid), e-line (Economy), p-line (Premium). Benefit from one of the largest standard carbide rod ranges from ultrafine grades for the machining of super-hard materials, by way of micrograin grades for universal application to cermet grades for the finish machining of ferrous materials. Of course you can also order rods with or without coolant holes, in a variety of tolerances and dimensions for the entire range.

### Individual expertise in solutions

Our highly qualified technical experts are happy to advise you from the first enquiry to order processing and any application issues you may have – any time and directly on site! Moreover our research centres can optimise your tools using everything from FEM simulation to damage analysis – look forward to benefiting from the services of the technological leader in this field! You can also count on receiving customised blanks and semi-finished tools for the production of rotating cutting tools. Of course production will be based on your drawings. Even complex geometries will be produced near net shape, and our intelligent lean management system ensures that they can be delivered in next to no time.

### Steady development

We are continually developing our carbide grades for you. Not only do we focus on fundamental research and modelling, we also optimise production procedures in order to reduce process costs and guarantee you maximum quality as well as environmental friendliness. You can have confidence in our interdisciplinary team of material scientists, chemists, machine engineers, designers, manufacturing specialists, environmental experts and process engineers. Our versatile team will cooperate closely with you as our project partner, as well as working hand in hand with universities and research institutes.



### Worldwide service

You can count on our high and flexible production capacity for stock products, special products or high production volumes: an optimally stocked warehouse ensures that your order will always be dealt with swiftly and reliably. You can order stock products without any problem 24/7 online from our E-Techstore, and take advantage of the technical expertise of our sales and office staff. With over 50 company sites in Europe, America and Asia, we are available for you at any time throughout the world.

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