

Green Carbide – Making Innovation Sustainable

The new grade CT-GS20Y: high-performance premium carbide with reduced CO₂ footprint



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



**You want to quantify and
reduce the carbon footprint
of your products?**



**You are looking for a higher
price stability and lower
political and logistical risks?**



**You want to contribute to
the circular economy without
compromising on quality
and performance?**

**Then you can be excited with us
about the market launch of our
„Green Carbide“ carbide grade CT-GS20Y!**

Green Carbide from CERATIZIT

With over 100 years of experience in powder metallurgy and more than more than 1,000 patents and utility models, we are proud of our pioneering spirit in research, development, and production of carbides.

We are compelled to bring **CT-GS20Y** on to the market, a carbide which combines the **performance of a premium grade** with a focused, **sustainable production**.

Our new **CT-GS20Y** grade consists of more than 99% high-quality secondary raw materials. In addition, low-CO₂ production is ensured by low-emission production processes and energy sources as well as consistently short transport routes throughout the entire process chain.

With 2,6 kg of CO₂ per kg of carbide, this results in an exceptionally low footprint for a premium carbide grade with maximum performance.

The corresponding survey and calculation of the product carbon footprint (PCF) is based on the verified corporate carbon footprint (CCF) for the Reutte production site.

This new carbide grade is a realisation of our convictions at **CERATIZIT: We are responding to environmental and social changes and pointing the way to a greener and more sustainable future.**



Benefit from using CT-GS20Y for your tools:

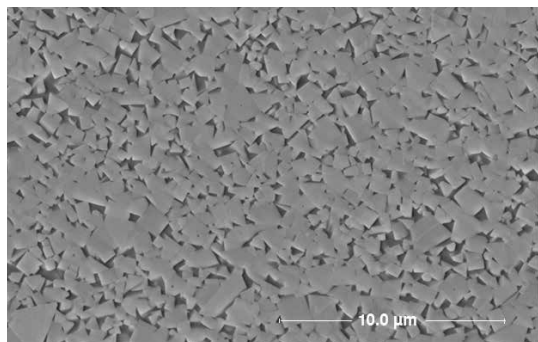
Due to the low CO₂-footprint of the carbide, you can significantly reduce the CO₂-footprint of your tools and get the basis from us to calculate the product carbon footprint of your products.

Due to the use of secondary raw materials for **CT-GS20Y**, we can guarantee a better price stability and counteract supply risks.

The performance and high consistency in production of a premium grade allows you to use it in the most demanding applications.

Grade Composition and properties

Grade	ISO code	U.S. code	Grain size	Binder m %	Density g/cm ³	Hardness		Transverse rupture strength TRS		K _{IC} ** Shetty MPa m ^{1/2}
						HV30	HRA	MPa	P.S.I.	
CT-GS20Y	K20 – K40	C-2	submicron	10.0	14.44	1580	91.8	3800	550.000	10.6



Grain size classification		CERATIZIT-Code
Average grain size [μm]	Classification	
< 0.2	nano	N
0.2 – 0.5	ultra-fine	U
0.5 – 0.8	submicron	S
0.8 – 2.5	fine/medium	F/M
2.5 – 6.0	coarse	C
> 6.0	extra-coarse	E

Comment:

The data in this table are typical material parameters. We reserve the right to modify the data due to technical progress or due to further development within our company.

*) The classification of carbides according to grain size corresponds to the recommendations of the Powder Metallurgy Association.

The standard ISO codes for carbides which were developed for fine to medium grain sizes no longer correspond current standards. In order to choose the correct grades, only the application data is relevant.

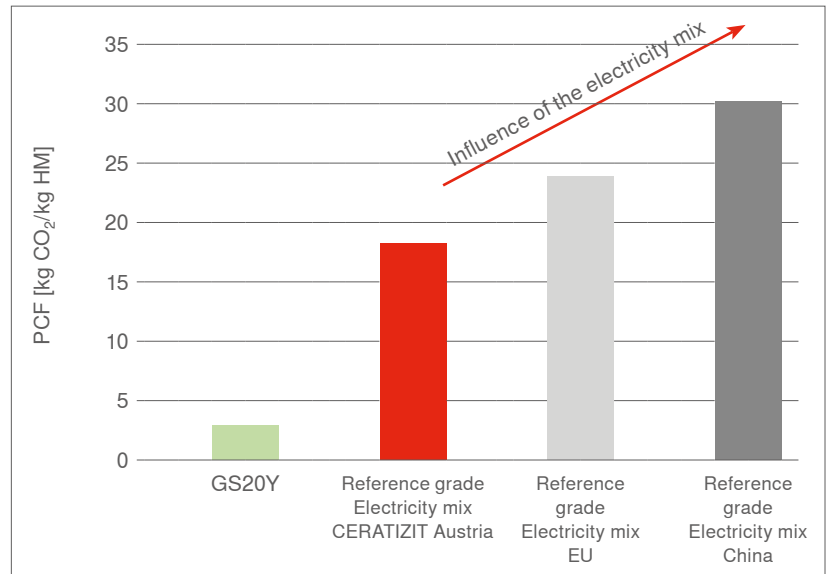
K_{IC}** : The measured critical tension intensity factors (K_{IC}) depend to a high degree on the sample geometry and sample preparation. A direct comparison with parameters which have been determined by means of a different method is therefore not admissible.

Product Carbon Footprint (PCF)

The PCF can be used to show the greenhouse gas (GHG) emissions caused by the production and transport of products or product groups. The PCF enables fact-based comparisons and the identification of potential for improvements.

Shown here for comparison is the PCF for the new carbide grade **CT-GS20Y** and the PCF for a conventional reference-grade produced at the CERATIZIT production in Reutte. Additionally shown are two hypothetical reference cases based on the data of the reference variety from the Reutte site. It illustrates how using a different electricity mix affects the PCF. The footprint of the average electricity mix of Germany and China was used in this comparison.

The PCF for **CT-GS20Y** and the reference variety were calculated based on the calculation principle for the CCF for Ceratizit Austria GmbH. Included are all direct GHG emissions (category 1), all indirect GHG emissions from imported energy (category 2), indirect emissions from transport (category 3) and indirect GHG emissions from products used (category 4). The corresponding greenhouse gas report was verified according to ISO 14064-1:2019.



Source: European Environment Agency (www.eea.europa.eu) – 2019
 Source: The International Energy Agency, (www.iea.org) – 2019



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Verification Statement

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was commissioned as an independent certification company by Ceratizit Austria GmbH, based in Reutte, to subject the underlying data and calculations for the greenhouse gas report for the 2020/21 financial year to an independent verification in accordance with ISO 14064-3.

In a process lasting several weeks, the entire greenhouse gas report was checked for plausibility, coherence and completeness. In several meetings, detailed data from the company was viewed and questioned. The quantity structures on which the calculation is based, the emission factors used and the calculation scheme used were checked. The greenhouse gas report is assessed on the basis of individual samples, with Ceratizit Austria GmbH ultimately being responsible for the entire content.

During the verification process, the verifiers had comprehensive insight into all the necessary documents, which were made available without restriction, and hereby confirm that the greenhouse gas report, which was presented by Ceratizit Austria GmbH for the 2020/21 financial year, complies with the international standard ISO 14064-1 and other practices of calculating greenhouse gas emissions. The verified calculation results are complete, valid, meaningful and comprehensible.

Wien, February 2022

DI Dr. Uwe Pölzl
Lead Verifier

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Performance test CT-GS20Y

The new CT-GS20Y grade made from high-quality secondary raw materials was also subjected to in-depth machining tests for milling. CT-GS20Y was able to prove its quality in comparison with our established premium grade CTS20D as well as our conventional downcycling grade TMG30.

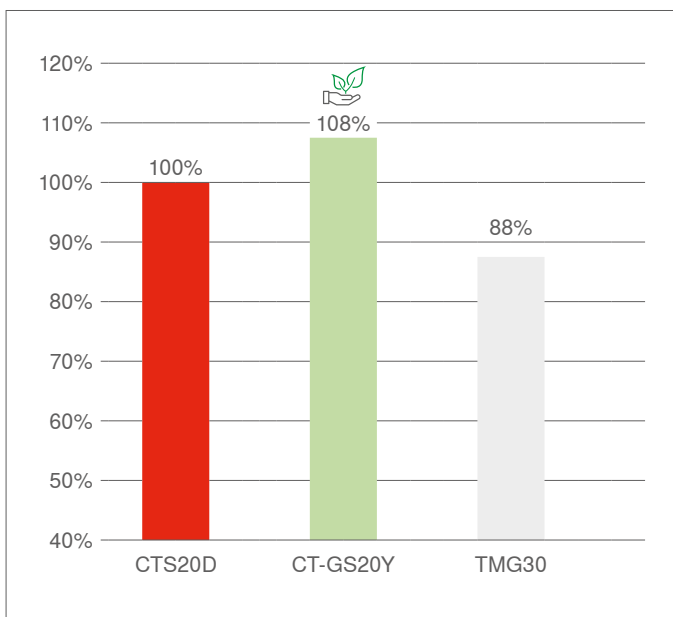
▲ End of tool life due to tool breakage

In the first series of tests, the toughness against tool breakage was analysed.

The tool tests started with the following test parameters. After each milled path the loads were increased by increasing the feed rate. The end of the test was reached with the occurrence of the tool breakage. Five tools were tested per data point.

In a comparison of our 10% submicron grades, the new Green Carbide grade CT-GS20Y is in first place, followed by CTS20D and by a long way by TMG30.

Tool life until tool breakage



Test parameters:

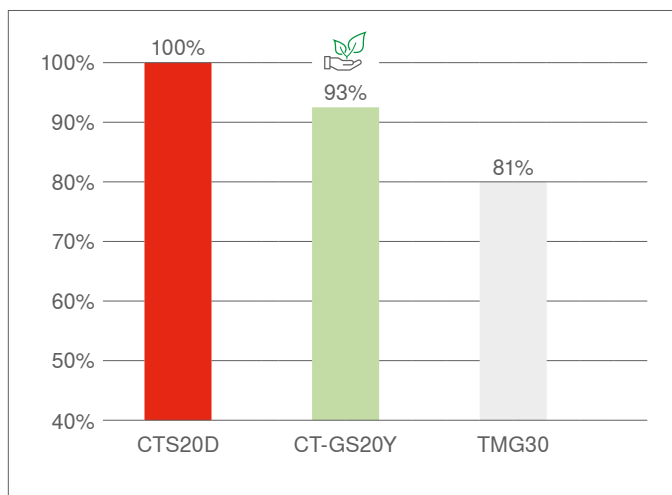
- ▲ Material: 1.4301 (X5CrNi18-10)
- ▲ Tool: End mill Ø 10 mm, 4 cutting edges, coated
- ▲ Wet processing
- ▲ $V_c = 100$ m/min
- ▲ $a_p = 10$ mm
- ▲ $a_e = 9$ mm
- ▲ $f_z = 0.05$ mm (+ 0,01 mm per path)

▲ End of tool life due to reaching the wear land width

The tool tests were carried out with the test parameters listed. The end of the test was defined when a wear land width of 0.15 mm was reached. The width of the wear land was measured after 60 and 120 milled paths. As like the first test, five tools were tested per data point.

Compared to CTS20D, CT-GS20Y achieved 93% of the tool life – TMG30 achieved a lower tool life of 81%.

Tool life due to reaching the wear land width



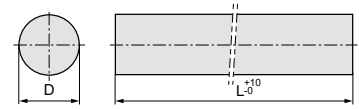
Test parameters:

- ▲ Material: 1.2379 (X153CrMoV12)
- ▲ Tool: End mill Ø 10 mm, 4 cutting edges, coated
- ▲ Wet processing
- ▲ $V_c = 200$ m/min
- ▲ $f_z = 0.07$ mm
- ▲ $a_p = 2$ mm
- ▲ $a_e = 1$ mm



Solid carbide rods, as sintered

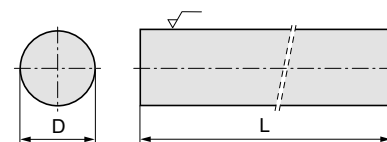
Ø D 6.20 – 25.20 mm



D mm	L	Type, description	Dia. tol. mm	CT-GS20Y
6.20	330	RR 0620-330	-0/+0.25	●
8.20	330	RR 0820-330	-0/+0.30	●
10.20	330	RR 1020-330	-0/+0.30	●
12.20	330	RR 1220-330	-0/+0.30	●
14.20	330	RR 1420-330	-0/+0.30	●
16.20	330	RR 1620-330	-0/+0.45	●
18.20	330	RR 1820-330	-0/+0.45	●
20.20	330	RR 2020-330	-0/+0.45	●
25.20	330	RR 2520-330	-0/+0.65	●

Solid carbide rods, ground, metric

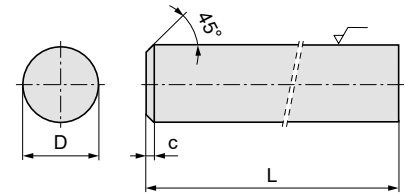
Ø D 6.00 – 25.00 mm



D mm	L mm	Type, description	Dia. tol. mm	ISO 286	CT-GS20Y
6.00	330	RGM 0600-330 h5	+0/-0.005	h5	●
8.00	330	RGM 0800-330 h5	+0/-0.006	h5	●
10.00	330	RGM 1000-330 h5	+0/-0.006	h5	●
12.00	330	RGM 1200-330 h5	+0/-0.008	h5	●
14.00	330	RGM 1400-330 h5	+0/-0.008	h5	●
16.00	330	RGM 1600-330 h5	+0/-0.008	h5	●
18.00	330	RGM 1800-330 h5	+0/-0.008	h5	●
20.00	330	RGM 2000-330 h5	+0/-0.009	h5	●
25.00	330	RGM 2500-330 h5	+0/-0.009	h5	●

End mill blanks

Ø D 6.00 – 25.00 mm



D mm	L mm	Type, description	Dia. tol. mm	ISO 286	c mm	DIN 6527	CT-GS20Y
6.00	51	RGMC 0600-051 h5	+0/-0.005	h5	0.40	X	●
6.00	55	RGMC 0600-055 h5	+0/-0.005	h5	0.40	X	●
6.00	58	RGMC 0600-058 h5	+0/-0.005	h5	0.40	X	●
6.00	60	RGMC 0600-060 h5	+0/-0.005	h5	0.40		●
6.00	100	RGMC 0600-100 h5	+0/-0.005	h5	0.40		●
8.00	59	RGMC 0800-059 h5	+0/-0.006	h5	0.60	X	●
8.00	64	RGMC 0800-064 h5	+0/-0.006	h5	0.60	X	●
8.00	70	RGMC 0800-070 h5	+0/-0.006	h5	0.60		●
8.00	100	RGMC 0800-100 h5	+0/-0.006	h5	0.60		●
10.00	67	RGMC 1000-067 h5	+0/-0.006	h5	0.80	X	●
10.00	73	RGMC 1000-073 h5	+0/-0.006	h5	0.80	X	●
10.00	100	RGMC 1000-100 h5	+0/-0.006	h5	0.80		●
12.00	74	RGMC 1200-074 h5	+0/-0.008	h5	0.80	X	●
12.00	84	RGMC 1200-084 h5	+0/-0.008	h5	0.80	X	●
12.00	100	RGMC 1200-100 h5	+0/-0.008	h5	0.80		●
14.00	76	RGMC 1400-076 h5	+0/-0.008	h5	0.80	X	●
14.00	84	RGMC 1400-084 h5	+0/-0.008	h5	0.80	X	●
16.00	83	RGMC 1600-083 h5	+0/-0.008	h5	0.80	X	●
16.00	93	RGMC 1600-093 h5	+0/-0.008	h5	0.80	X	●
18.00	93	RGMC 1800-093 h5	+0/-0.008	h5	1.00	X	●
20.00	93	RGMC 2000-093 h5	+0/-0.009	h5	1.00	X	●
20.00	105	RGMC 2000-105 h5	+0/-0.009	h5	1.00	X	●
20.00	125	RGMC 2000-125 h5	+0/-0.009	h5	1.00		●
25.00	125	RGMC 2500-125 h5	+0/-0.009	h5	1.00		●

Responsible packaging

Responsible handling of resources and environment is part of our corporate culture. There are many approaches to increase the sustainability of products, and product packaging plays its part in this. In 2018, we decided to completely replace the previously used plastic packaging for our rods with environmentally friendly CO₂-neutral cardboard boxes. An innovative packaging system for tungsten carbide rods was developed in cooperation with a regional cardboard box manufacturer, which is optimally suited for heavy tungsten carbide rods in terms of product safety and handling. With the help of internal and external bands, the carbide rods are excellently protected against slipping. Thanks to special tear threads, the packaging can be opened comfortably and tamper-proof. In addition, when an opened package is stored at the customer's stock, it is immediately recognisable whether it is a break-off quantity or a full packaging quantity.

The use of environmentally friendly cardboard packaging is not only the optimal solution for product safety: our customers can also benefit from it. Cardboard packaging is easy to recycle, in many countries you even get a refund when handing in paper and cardboard waste at recycling centres.



Why we are the right partner when it comes to sustainability and responsible behaviour in the supply chain:

At CERATIZIT Group, we strongly emphasize sustainability and the responsible treatment of our planet. This means transforming our industrial behaviour by responding to social, environmental, and economic challenges while we continue to meet and exceed the expectations and requirements of our customers and stakeholders.

We aim to include sustainable thinking and actions in every area of our business. Here are some examples of our activities:



Reducing our carbon footprint:

We are deeply committed to contributing to a reduced-carbon future, that's why we are constantly working on reducing our greenhouse gas (GHG) emissions. This includes measures to optimise technologies, processes and energy sources in the production and transportation but also covers raw material sourcing and helps our customers achieve their climate-related objectives to build a more sustainable world together.



Recycling of cemented carbide:

For us, recycling means the responsible handling of resources. We pursue a deliberate policy of conserving limited primary resources through metal recycling, by notably increasing the ratio of reused materials. Recycling secondary material also limits the consequences of intensive mining, such as air, water and soil pollution, and helps check the excessive use of energy.

At CERATIZIT, therefore, we have our own recycling facilities where we recycle coated and uncoated carbide tools, inserts and grinding sludges. The recycled materials are re-used following careful examination for carbide grades specifically designed for this purpose.

We will help you optimise your product cycle from purchase to scrap return, production and repurchasing.

We are proud of our current recycling rate of over 83%.

Efficient use of energy:

Our production in Reutte, the heart of our rods and preforms production, has been certified according to the requirements of the energy management standard ISO 14001 and ISO 50001 for many years. This is a confirmation of our systematic energy management, which allows us to consistently improve our energy efficiency.

Already, almost 100% of the site's electricity needs are covered by renewable energy sources. Even when expanding our site, we focus on the efficient use of resources and use wood as a building material wherever technically possible.



Responsible purchase:

We are committed to the highest standards of ethical business conduct and expect the same from our suppliers. That is why we have established a Code of Conduct for all our suppliers and their suppliers and subcontractors.

In this context, we also implemented a strict supply chain policy that commits us to responsible sourcing of minerals.



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