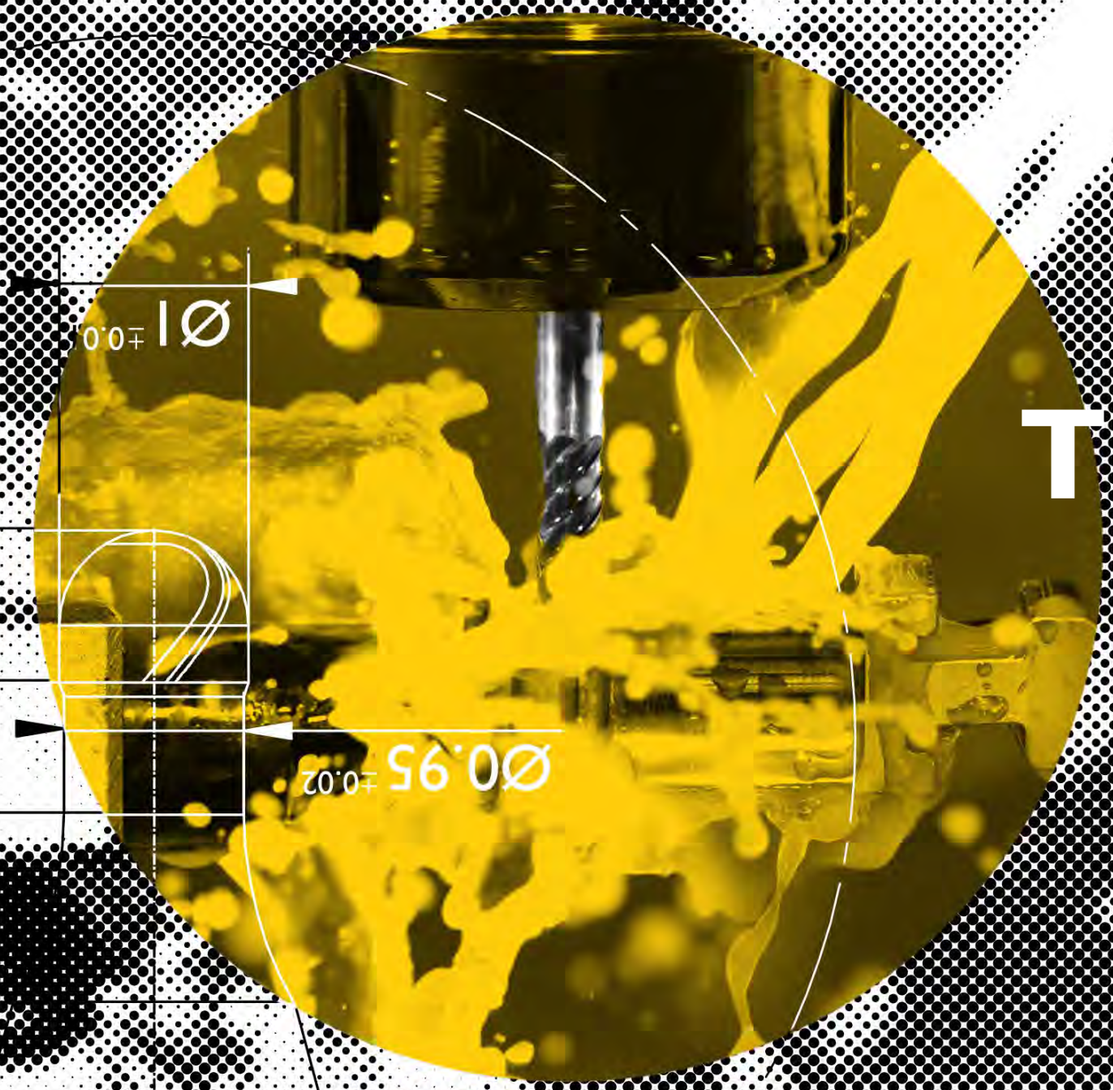
IGUANA MILLING CHALLENGE

30 DAYS
641+ HOURS
27+ KM
28 COINS
STILL SHARP...

ONE TOOL, NON-STOP, LIVESTREAM EVENT ON TWITCH.TV

ZECHA · ALIENTOOLS FUTURISTIC MICRO-MILLING TECHNOLOGY · KERN · oelheld innovative fluid technology · REGO-FIX · hyperMILL · LANG TECHNIK simple. gripping. future. · CIMTRODE THE ELECTRODE COMPANY



THE EVENT

ZECHA

ONE TOOL, NON-STOP, LIVE...

ZECHA & ALIENTOOLS LIVE

30 days, 641+ hours, 27 kilometers, 28 coins non-stop live milling with just a single double-edged 1-mm ball nose tool of the IGUANA family… and still sharp

We had a wild idea of how to demonstrate the advantages of ZECHA's new IGUANA tool technology: basically a live event where we show live how long the tool can run and we would call it the 'IGUANA MILLING CHALLENGE. We thought that after spending 10 years working on a crazy new coating technology, only an equally crazy challenge event would be fitting.

In the following booklet we go through the journey of us figuring out how to run a livestream from ZECHA's new Technology Center and their new Kern machine, more details about what we milled, our partners that helped along the way, and detailed results of what everything looked like at the end.

While hosting such an event came with its stresses and challenges, in the end we had a great time, and we hope you enjoy going through this booklet and discovering what the tool and the event was all about.

(On a side note, as tool manufacturers we are in the business of selling tools, and this event also marked the release of the new lines of these IGUANA tools (935.B2, 935.T2 and 935.T3 lines) which can now be ordered in the ZECHA and Alien-Tools Shop (called the Predator Series in the AlienTools lexicon).)

AND ACTION...

An absolute premiere for the ZECHA team: never before has anyone in the industry taken on such a challenge and broadcast a long-term milling test via live stream.

How did the IGUANA MILLING CHALLENGE come about?

We had a problem at ZECHA: after spending ten years developing this new coating technology it was finally released, but nobody believed how long it extended the tool's lifetimes. We then thought that the best way to show why the IGUANA technology won the 2021 Innovation Award of the German state of Baden-Württemberg was to simply let the tool run... and for as long as possible.

The goal was clear: one tool, one machine and the task of traversing milling paths.

We then spent the following weeks figuring out what we were going to mill, the technology and logistics of running a livestream event (settling on Twitch as the livestream platform), establishing a team that would run the event over the Christmas break, and developing back-up plans as there was simply too much unknown for a team that has never done this before.

On Thursday, December 16, 2021, ZECHA and AlienTools went live for the first time in the company's history...

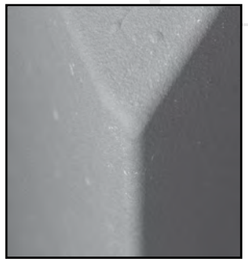
ABOUT THE TOOL

IGUANA - THE BRILLIANT

When machining highly abrasive materials, non-ferrous metals or copper in a wide variety of industries, many tools quickly reach their limits. With the IGUANA tool family, ZECHA is revolutionizing the market for diamond-coated tools in the micro range. The high-end tools are multi-cutters in the small diameter range with sharp cutting edges and highly wear-resistant, closed diamond coating - a world-premiere of such a technology..

This new coating is sharpened and strengthened due to laser processing of the edges (R= 1μm) combined with special cutting edge geometries, which reduces the cutting forces on the edges significantly. This perfectly uniform surface then greatly increases the lifetime of the tool due to the reduced cutting forces while at the same time increasing sustainable accuracy at the micro-level.

The new 935 series used was specially developed for producing the finest surfaces in non-ferrous materials. With their mold making dimensions, the two-flute ball nose end mills and two- and three-flute torus end mills are ideally suited for the production of copper electrodes.



Normal Coating

Normal Coating

IGUANA Coating

IGUANA Coating

ATION BW
INNOV 2021

Innovationspreis Baden-Württemberg
Dr.-Rudolf-Eberle-Preis
Preisträger 2021

AWARD-WINNING TECHNOLOGY

Winner of the Baden-Württemberg Innovation Prize 2021

The Ministry of Economics, Labor and Housing awards the annual Innovation Prize of the German state (Dr. Rudolf Eberle Prize) for special innovative achievements by small and medium-sized companies. The award recognizes exemplary achievements in the development of new products, processes and technological services as well as in the application of modern technologies in products, production or services.

In 2021, ZECHA applied for the first time and won the award with its innovative IGUANA technology, taking technical progress, outstanding entrepreneurial performance and sustainable economic success.

We are very proud of the entire ZECHA team as they guided this project over a ten-year-period from concept, through countless tests, countless adjustments, and finally to a completed technology that looks to change the milling world.

WHAT WAS MILLED

We loaded our KERN machine with high quality 50 x 50 mm copper (E-CU - CW004A) blanks and produced event coins in various designs. It was not about the number of coins, but the production of chips... and lots of them.

By using a 1-mm ball end mill, the details were minimal so that the consistency of the surface quality could be monitored over the entire event.

Each coin was milled with the same back design, which was the ZECHA IGUANA MILLING CHALLENGE design, with each coin engraved with the date that the milling started of that particular coin. On the front of each coin were various designs from ZECHA, AlienTools, and our multiple partners that helped make this event a reality.

Since this event went for so long, we were also able to mill a couple of special designs (Christmas design, New Year's design, Alien 2022 design) that we later auctioned off for charity.

THE RESULTS

AFTER 30 DAYS...STILL SHARP

With the opening on 16.12.2021, the milling test was livestreamed non-stop and ended after a whopping 30 days proactively to release our KERN milling machine for further projects. As verification from independent third-parties, the event ran under the strict observation of VDWF president Prof. Dr.-Eng. Thomas Seul and several thousand live live spectators.

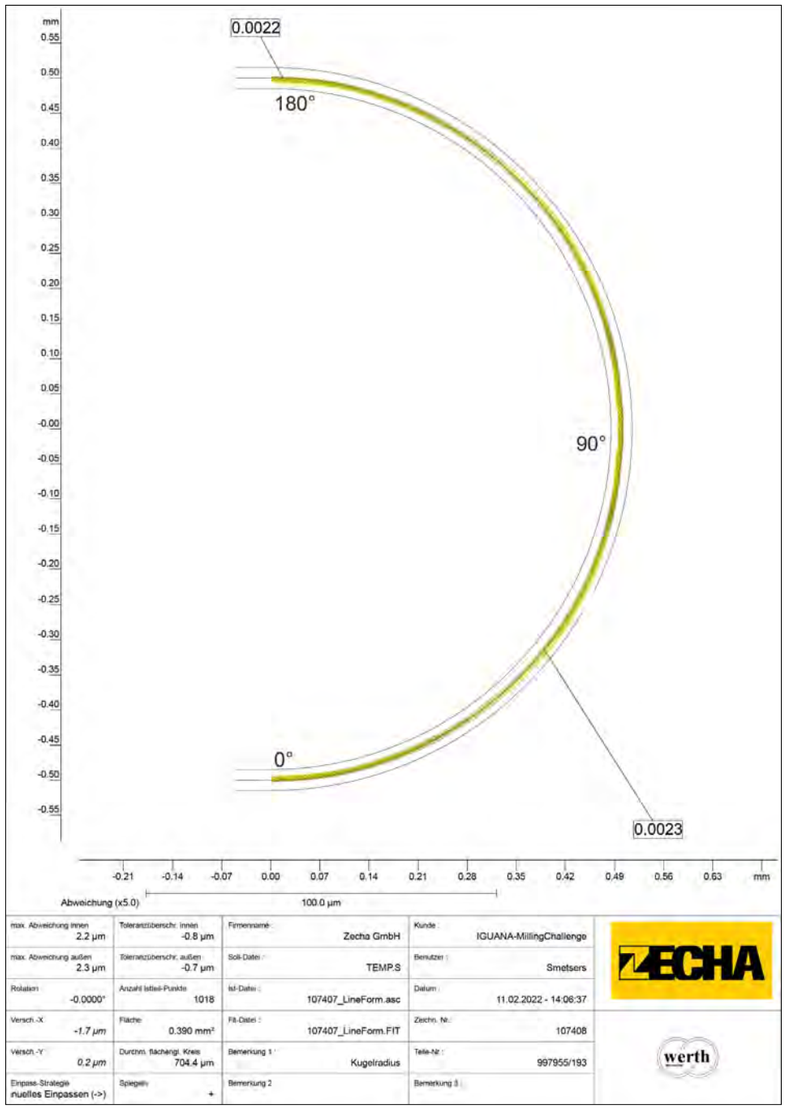
Extensive examination under our in-house measuring equipment have confirmed the first impressions: the tool is virtually undamaged even after an incredible 641+ milling hours and a milling distance of 27+ km.

The results under the C-view, SEM and nano-focus speak for themselves:

- **Tool shape deviation < 0.002 mm**
- **No damage or alteration to the layer structures**
- **Finely finished workpiece surfaces with RA of < 0,3 (N4-N5 quality)**

As a basis for comparison for the subsequent measurement results, the mold was already measured in detail in advance. Together with the machine parameters and the programming, these defined the requirements for the finished parts, such as the desired surface roughness, and thus formed the status quo.

After tool use, the tool shows neither wear nor a relevant change in shape. The surface measurements reflect the programmed roughness of Ra 0.25 within the measurement and manufacturing tolerance. Based on the surface optics, it can be seen that the traverse paths of the machine are very accurate. Despite the tool size (Ø 1 mm), the contour was machined very precisely and without burr formation at the contour transitions, which additionally speaks for the repeatability of the machine/tooling combination.



OPTICAL PROOFING
16.12.2021

OPTICAL PROOFING
14.01.2022

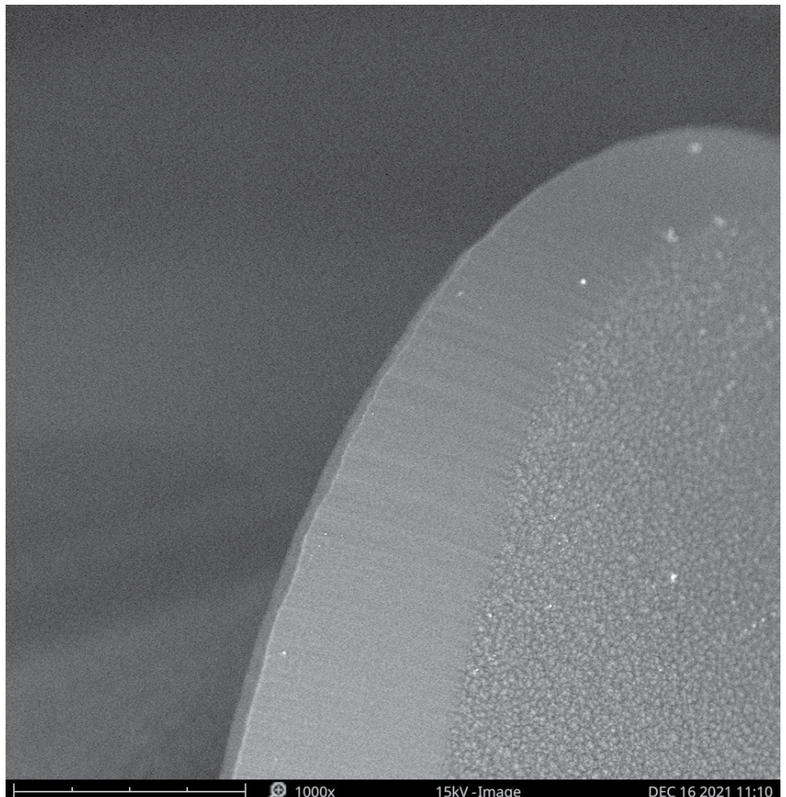
SHAPE DEVIATION OF THE TOOL < 0,002 MM

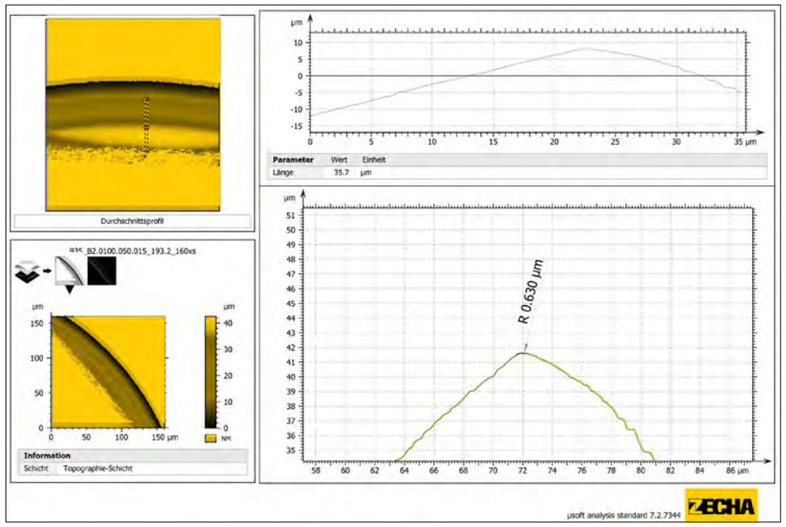
IGUANA milling cutters are manufactured to a tolerance of < 0.002 mm. Although the IGUANA milling cutter used has a minimal form deviation in the center due to the manufacturing process, it is within the tolerance range both before and after the event and therefore does not show any wear whatsoever.

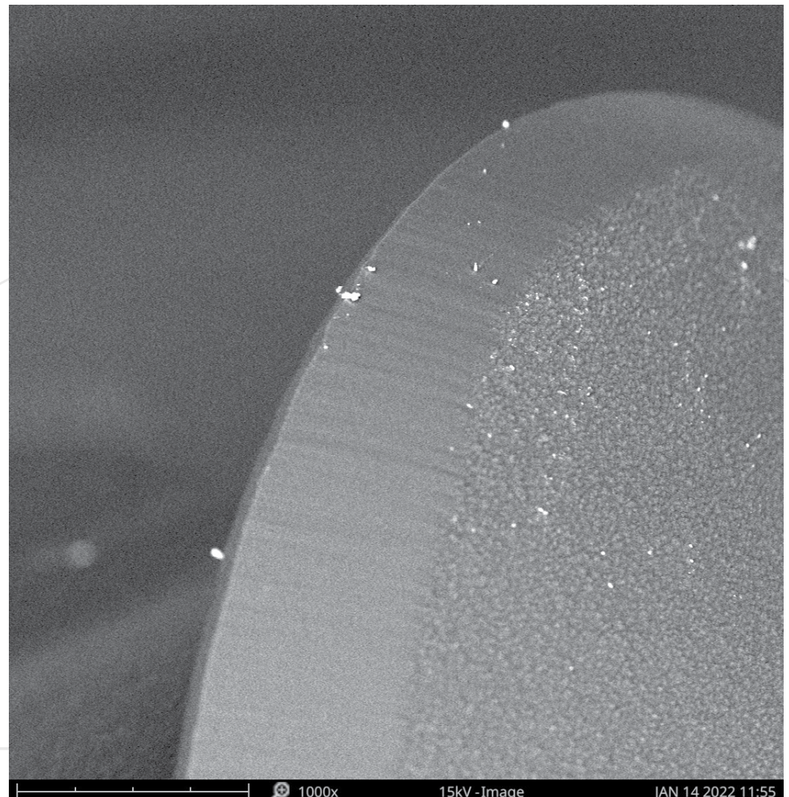
The tool was used in an arc segment with a maximum diameter of 0.65 mm, which corresponds to a maximum insert depth of 0.12 mm. This is equivalent to an arc of 84° (a ball nose cutter theoretically has 180°).

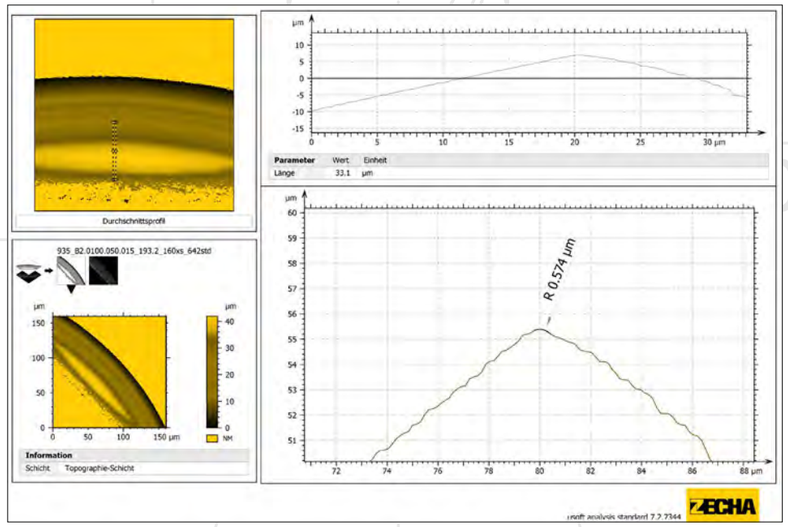
CONTOUR MEASUREMENT OF THE IGUANA TOOL

With the C-View optical inspection system from Cimtrode, the wear of the tool down to 0.01 mm can be accurately checked. The figure illustrates that the images as well as measurements at the beginning and at the end of the event show no change in the tool profile, thereby indicating less than 0.01 mm of wear.



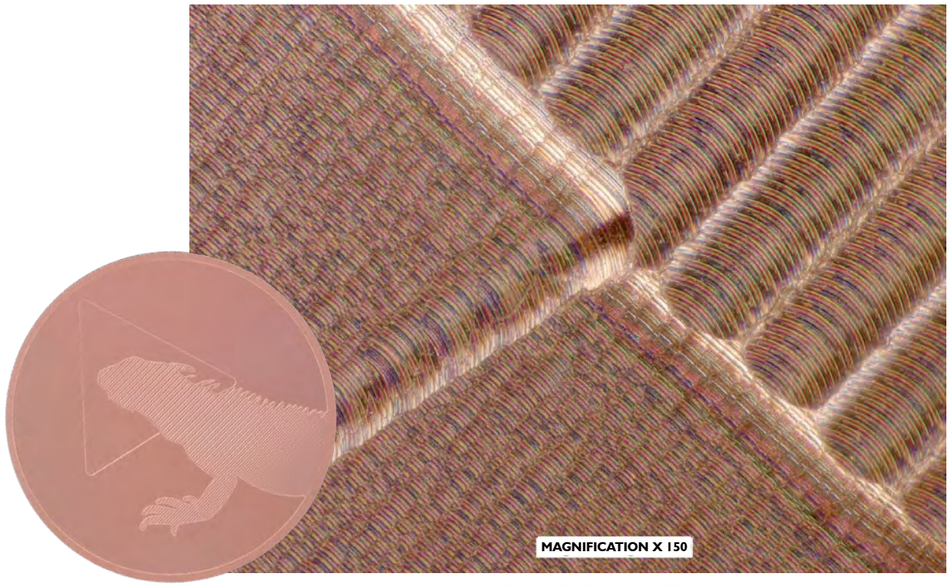




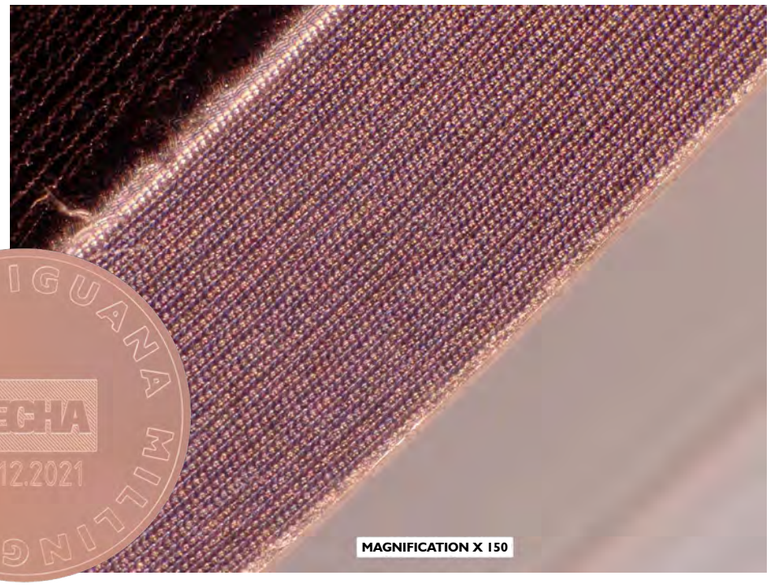


NO DAMAGE OR CHANGES TO THE LAYER STRUCTURES

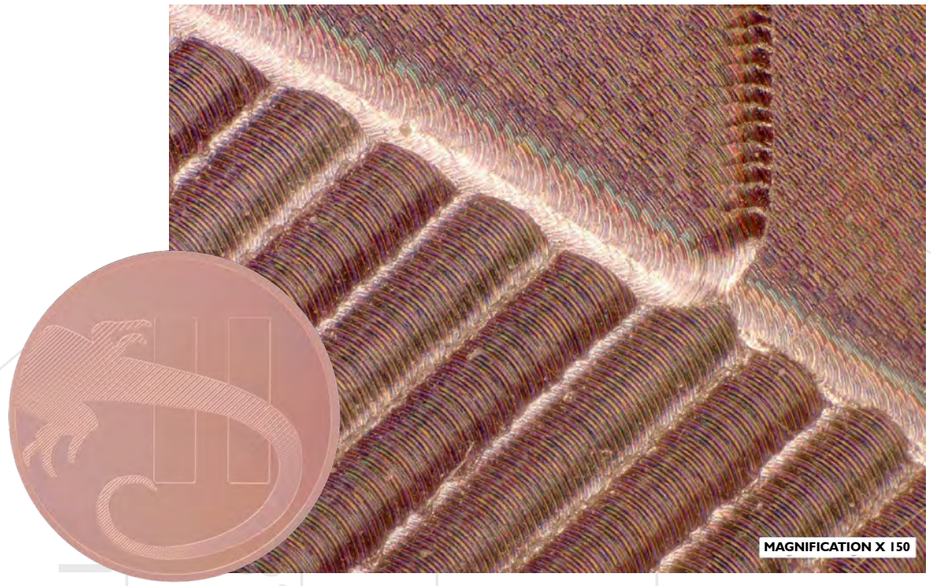
As can be seen from the shape measurement, there is no damage or change in the layer structure. This is due to the fact that the electrode copper is very tough, but also very soft compared to a diamond layer. Normally, one assumes a hardness < 120 HV.



CONTOUR TRANSITION
16.12.2021



EDGE
16.12.2021

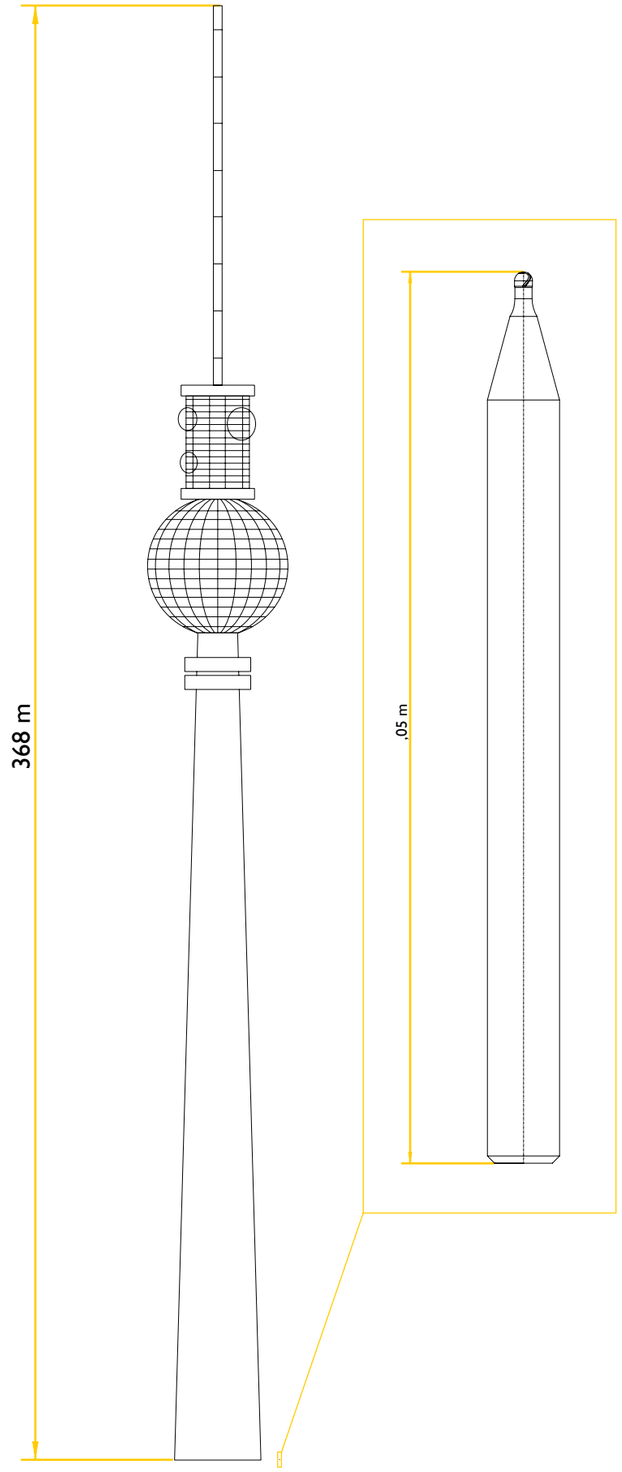


CONTOUR TRANSITION
14.01.2022

EDGE
14.01.2022

FINISHED WORKPIECE SURFACES WITH RA < 0,3

In electrode production, common surface qualities are N5-N7. The finely finished workpiece surfaces achieved during the live event with Ra < 0.3 (N4-N5) are better than the qualities required on the market. Even finer quality levels (N1-N3) with Ra < 0.1 count as a mirror surface and are only very rarely used in copper processing.



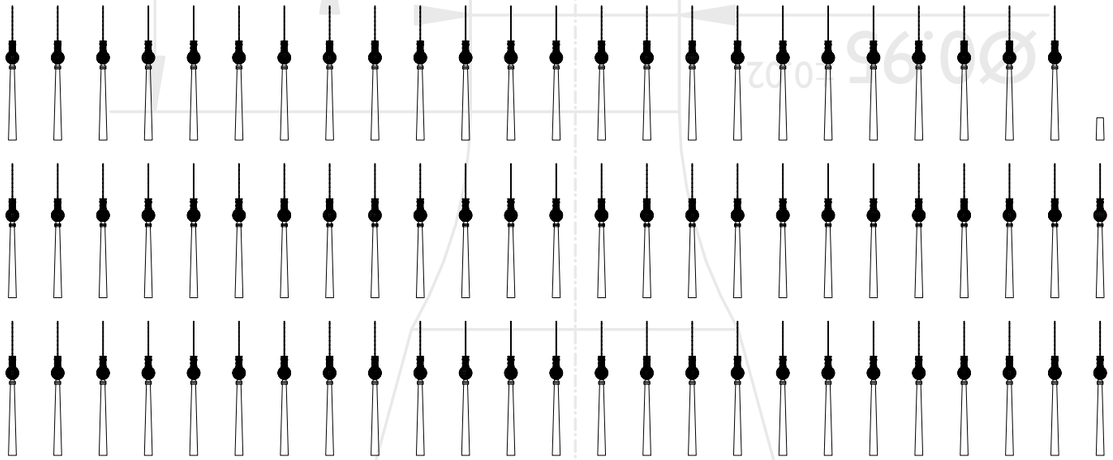
IGUANA DWARFS GERMANY'S TALLEST BUILDING

30 DAYS, 641+ HOURS, 27 KM, 28 COINS AND STILL SHARP..

… almost unimaginable when you consider the distance covered by the tool, which is only 5cm long. This is how our IGUANA microtool milled the distance of itself 546,288 times during the live milling event.

Taking the comparison a step further, the tool has managed to mill the length of Germany's tallest building, the Berlin TV tower, 74.2 times.

Still not dizzy? Then you should take your cue from the tallest building in the world. Here too our IGUANA has shown stamina and milled 32.9 times the length of the Burj Khalifa.



THE PARTNERS

ZECHA

ONE TOOL, PART OF ONE TEAM

The tool was, of course, only one part of the process and without our amazing team and the support of all of the partners that were highlighted in the event this event would have not been possible.

Throughout the event we met both the people and saw the products in action from AlienTools GmbH, Cimtrode GmbH, Kern Mikrotechnik GmbH, LANG Technik GmbH, oelheld GmbH, OPEN MIND Technologies AG and REGO-FIX AG.

Each partner played a crucial role in the success of the event, and as our thanks received their own unique coin, tailored to their company.

If you missed any of this during the live event, you can still see exclusive insights and interviews with the partners on the ZECHA website and our YouTube channel.

Website: www.zecha.de

Website: www.alien-tools.com

Website: www.de.rego-fix.com

Website: www.lang-technik.de

Website: www.kern-microtechnik.com

Website: www.oelheld.com

Website: www.openmind-tech.com

Website: www.cimtrode.com

VDWF

Die Werkzeugmacher

ONE EXPERT FOR ALL CASES

For the ultimate proof of results from our live milling event, an external, watchful eye on the Challenge was indispensable. Authenticity, credibility and transparency were paramount. The entire milling test was therefore to be observed and evaluated from outside independent sources.

It was an honor for us to be able to have VDWF President Prof. Dr.-Eng. to fill this role for this project. Together with the live viewers, this expert in the micro-tooling field was present for the opening of the milling event as well as the closing 30 days later. Not only were the coins and the tools closely inspected, but he also oversaw both the beginning and ending measurment-processes with our in-house measuring equipment.

A very big thank you to Professor Doctor Seul for your efforts.

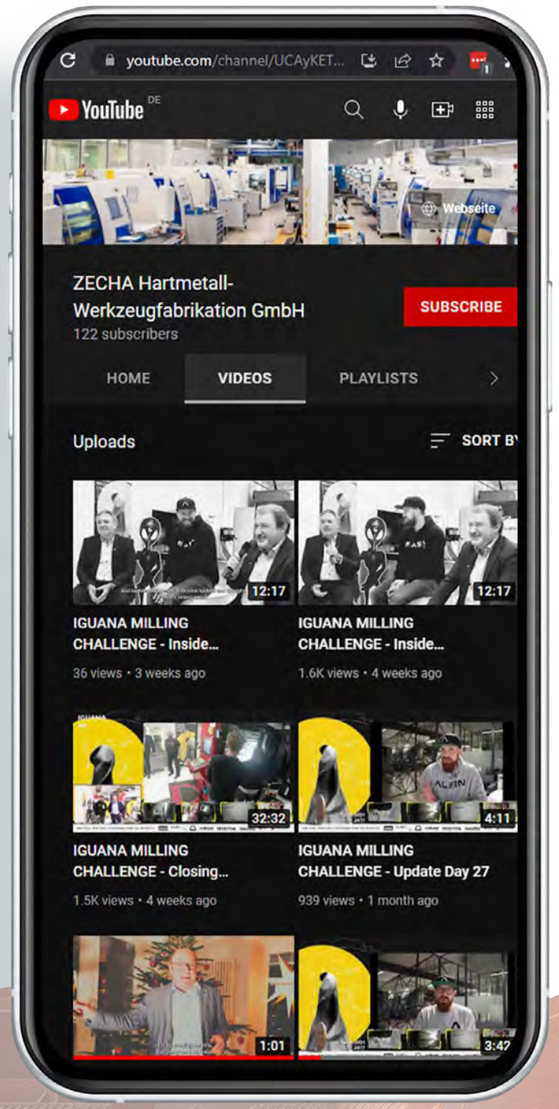
Sterneninsel
Kinder- und Jugendhospizdienst
Pforzheim und Enzkreis e.V.

SPECIAL COINS FOR A GOOD CAUSE

Within the one-week online auction after the closing of the event, viewers were offered the unique opportunity to purchase one of three of the live-milled coins through auction, where 100% of the proceeds would go to charity.

All proceeds went to the Pforzheim and Enzkreis Sterneninsel e.V. children's and young people's hospice service. Children and young people are the future of tomorrow and need our protection, which is why it is a matter close to our hearts to promote young talent and to pass on part of our success to this vulnerable part of our society.

Auctioned were the Christmas, the New Year's, and the AlienTools 2022 coins.



CHECK OUT THE HIGHLIGHTS

All information about the new coating technology of the IGUANA tool family as well as highlights of the IGUANA MILLING CHALLENGE can be found on the ZECHA website and on our YouTube channel.

There you will find, among other things, the daily updates from the event, the opening and closing of the event under the strict watch of Prof. Dr. Thomas Seul, exclusive interviews with all of the partners, and of course the management of ZECHA and AlienTools.

In the future we will continue to show you even further applications of what innovative tools across our family of tools are capable of. So stay tuned, this was certainly not the last live broadcast...

Thanks for watching, and see you all again soon!


Ø1 +0.0
Ø0.95 +0.02
3 +0.05
1.5

IGUANA MILLING CHALLENGE

TO BE CONTINUED...

16.12.2021

??.??.20??

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