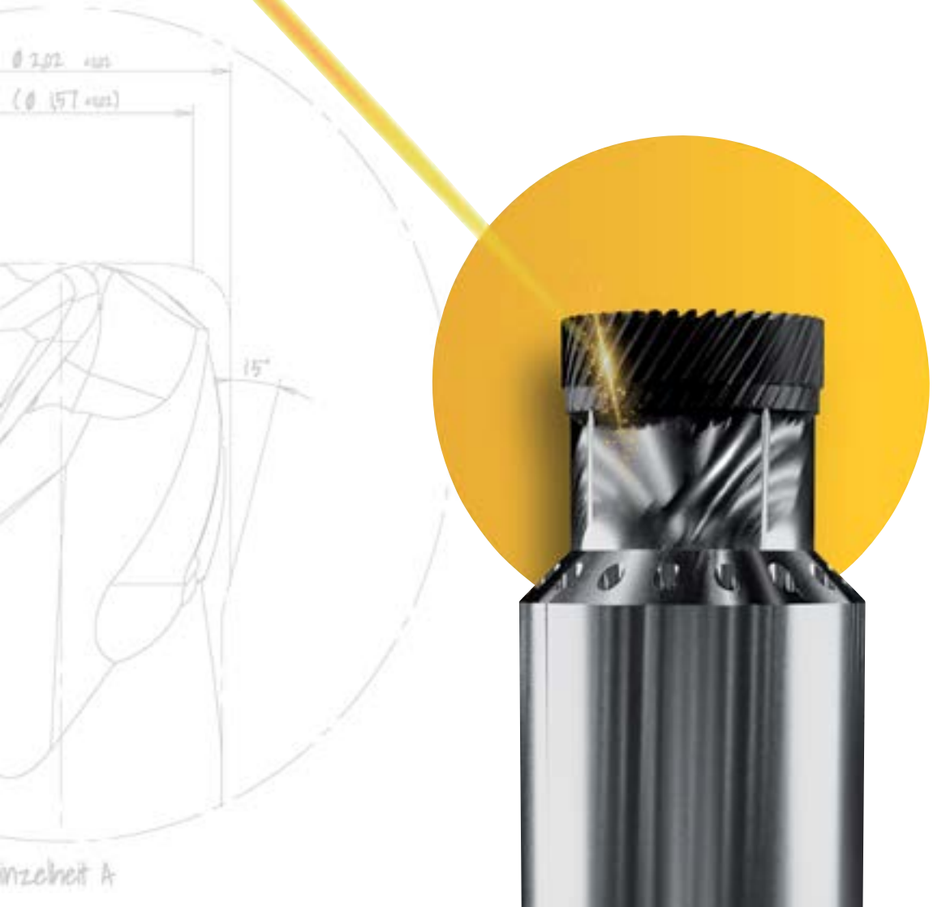
Application Examples

MARLIN 3D LASER SERIES

ZECHA



MARLIN 3D LASER SERIES

MACHINING OF ULTRA-HARD MATERIALS

ZECHA presents the new MARLIN 3D LASER SERIES, an innovative Solution for machining ceramics and solid carbide.

The latest laser technology offers decisive advantages and flexibility to produce highly precise, complex and detailed 3D tool geometries. This novel series revolutionizes tool design and improves efficiency.

PCD and CVD blanks or cutting materials made entirely of PCD or CVD are used for ball nose and torus mills and drilling tools.

On the following pages you will find some examples of the tools in practice. They show the tools used and the milling strategies employed in each step.

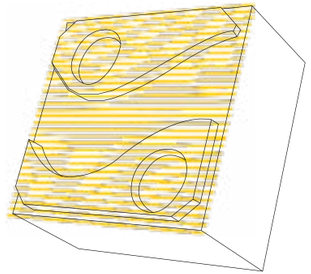
T28 COMPONENT MADE OF FULLY SINTERTED ZIRCONIUM

This example, which was milled from fully sintered zirconium dioxide, shows how easily the 28-tooth tool cuts through the ceramic and the perfect surface it leaves behind.

966P.T28.0400.005.050

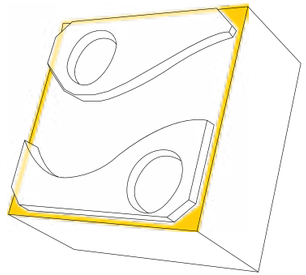
01. SURFACE-MILLING COMPONENT TOP

Tool:	966P.T28.0400.005.050
RPM:	19,496
Feedrate:	437 mm/min
Offset:	0.000 mm
woc:	2.000 mm
doc:	0.050 mm
Runtime:	00:01:00 h



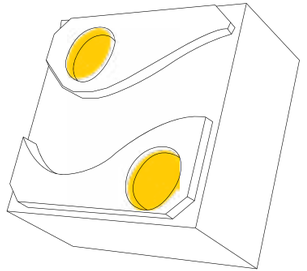
02. MILLING OUTER CONTOUR

Tool:	966P.T28.0400.005.050
RPM:	19,496
Feedrate:	437 mm/min
Offset:	0.000 mm
woc:	0.100 mm
doc:	1.000 mm
Runtime:	00:04:10 h



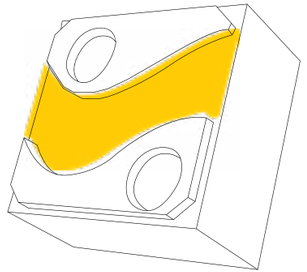
03. DRILLING HOLES

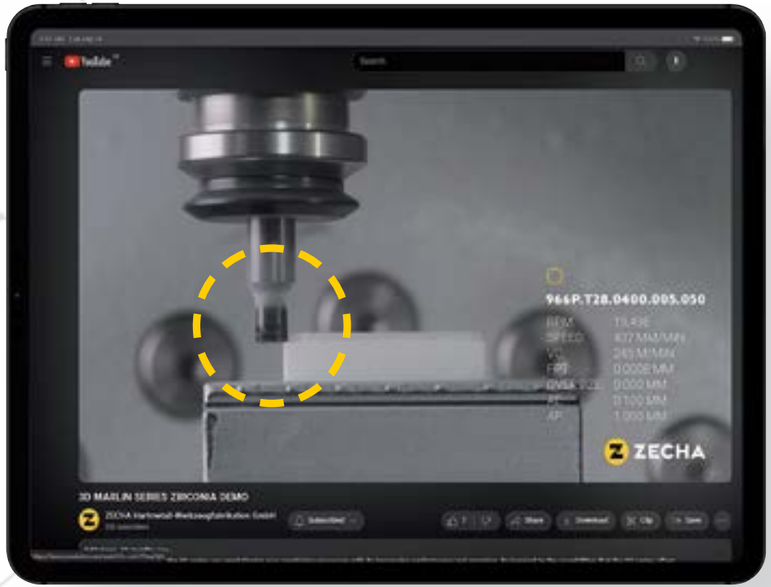
Tool:	966P.T28.0400.005.050
RPM:	19,496
Feedrate:	437 mm/min
Offset:	0.000 mm
woc:	Full-Gauge
doc:	0.030 mm
Runtime:	00:01:40 h



04. TROCHOIDAL WAVE GROOVE

Tool:	966P.T28.0400.005.050
RPM:	19,496
Feedrate:	437 mm/min
Offset:	0.000 mm
woc:	0.100 mm
doc:	1.000 mm
Runtime:	00:11:50 h





SEE IT IN ACTION

Filmed in ZECHA's in-house test facilities on the KERN Micro-HD, you can see how the tools effortlessly cut through fully sintered zirconium oxide using the previously listed feeds and speeds.

Scan the QR code and you will be taken directly to the video on ZECHA's YouTube page.

FLOW CELL MADE OF FULLY SINTERED ZIRCONIUM

This component was produced in collaboration with Röders, OPEN MIND, and the Deggendorf Institute of Technology using a variety of tools from the 3D MARLIN SERIES, with grinding pins, end mills and drills all performing equally impressively in the production of this interesting piece.

9911.0400.050.160M

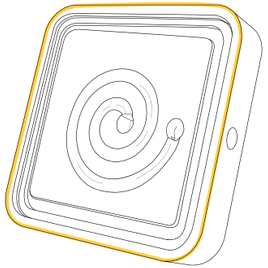
01. ROUGHING OUTER CONTOUR

Tool:	9911.0400.050.160M
RPM:	38,000
Feedrate:	1000 mm/min
Offset:	0.100 mm
woc:	0.050 mm
doc:	5.500 mm
Runtime:	00:13:00 h

966P.T28.0400.005.050

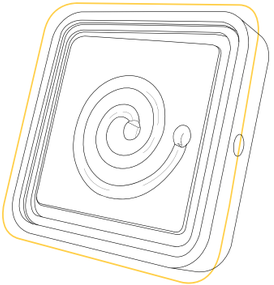
02. SURFACE-MILLING OUTER STEP

Tool:	966P.T28.0400.005.050
RPM:	14,324
Feedrate:	401 mm/min
Offset:	0.000 mm
woc:	0.030 mm
doc:	0.100 mm
Runtime:	00:01:15 h



03. FINISHING OUTER CONTOUR

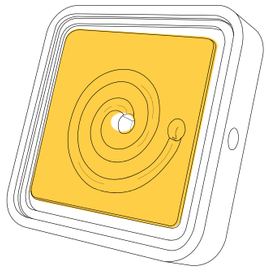
Tool:	966P.T28.0400.005.050
RPM:	14,324
Feedrate:	401 mm/min
Offset:	0.000 mm
woc:	0.050 mm
doc:	1.000 mm
Runtime:	00:01:00 h



966P.T28.0400.005.050

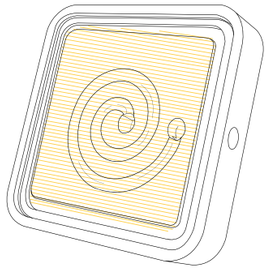
04. ROUGHING POCKET

Tool:	966P.T28.0400.005.050
RPM:	14,324
Feedrate:	401 mm/min
Offset:	0.020 mm
woc:	0.050 mm
doc:	1.000 mm
Runtime:	00:33:00 h



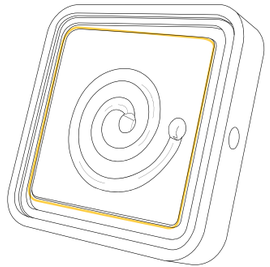
05. FINISHING POCKET SURFACE

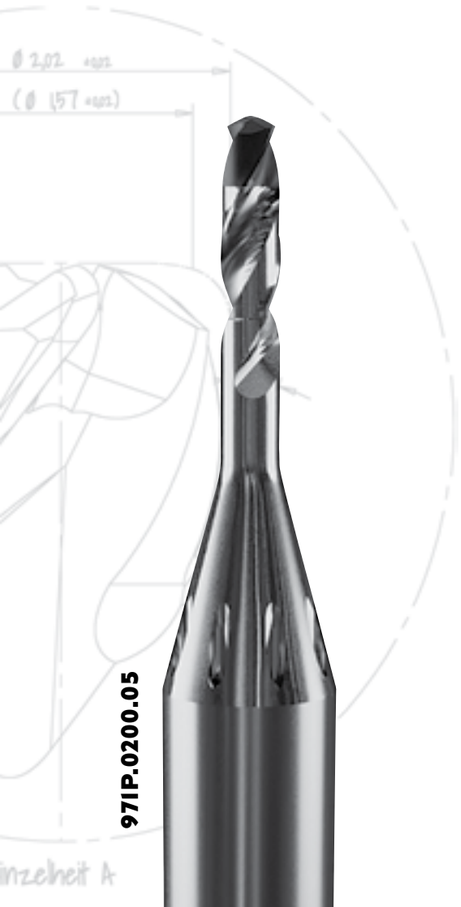
Tool:	966P.T28.0400.005.050
RPM:	14,324
Feedrate:	401 mm/min
Offset:	0.000 mm
woc:	0.020 mm
doc:	0.020 mm
Runtime:	00:09:00 h



06. FINISHING POCKET CONTOUR

Tool:	966P.T28.0400.005.050
RPM:	14,324
Feedrate:	401 mm/min
Offset:	0.000 mm
woc:	0.020 mm
doc:	1.000 mm
Runtime:	00:00:20 h

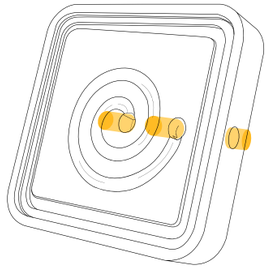




971P.0200.05

07. DRILL HOLES TOP AND SIDES

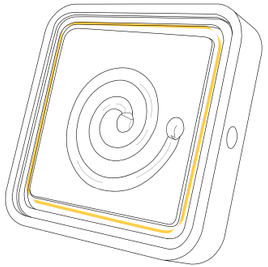
Tool:	971P.0200.05
RPM:	5,000
Feedrate:	15 mm/min
Fz drilling:	0.003 mm
Chip break:	from 5 mm with 3 mm
Runtime:	00:02:30 h



962P.T5.0100.010.008

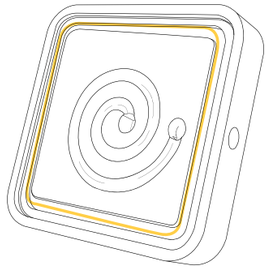
08. ROUGHING SEALING GROOVE

Tool:	962P.T5.0100.010.008
RPM:	31,831
Feedrate:	255 mm/min
Offset:	0.000 mm
woc:	1.000 mm
doc:	0.020 mm
Runtime:	00:07:00 h



09. FINISHING SEALING GROOVE

Tool:	962P.T5.0100.010.008
RPM:	31,831
Feedrate:	450 mm/min
Offset:	0.002 mm
woc:	0.010 mm
doc:	0.500 mm
Runtime:	00:03:45 h

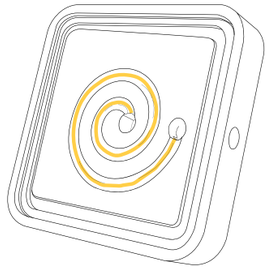


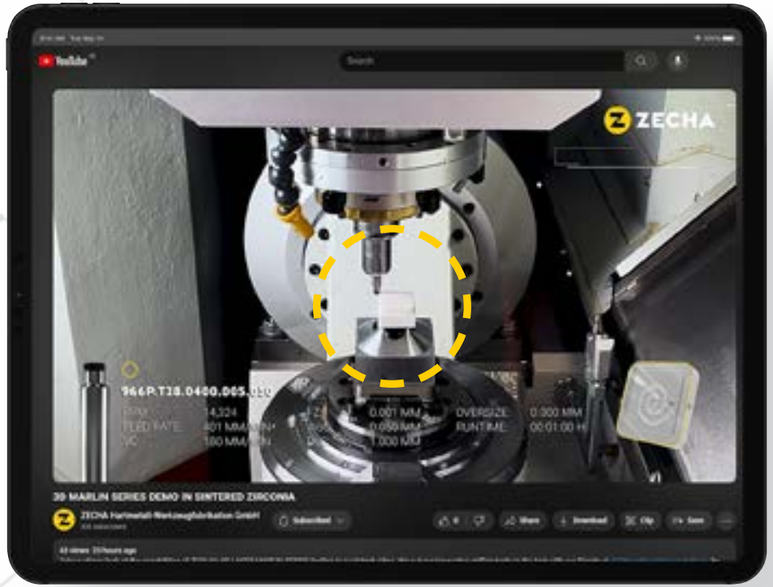
10. ROUGHING
HELICAL GROOVE

Tool:	962P.B6.0100.050.013
RPM:	38,000
Feedrate:	480 mm/min
Offset:	0.020
woc:	0.100
doc:	0.050
Angle:	20°
Runtime:	00:04:45 h

11. FINISHING
HELICAL GROOVE

Tool:	962P.B6.0100.050.013
RPM:	38,000
Feedrate:	480 mm/min
Offset:	0.000 mm
woc:	0.020 mm
doc:	0.020 mm
Angle:	20°
Runtime:	00:17:00 h





SEE IT IN ACTION

This component was produced for a seminar on milling zirconium dioxide with the help of our friends at THD Deggendorf.

Scan the QR code to see the technology in action...

MIKROIMPLANT MADE FROM FULLY SINTERED ZIRCONIUM

This component is a microimplant made of fully sintered zirconium dioxide, which we produced in collaboration with YourTool Odonics GmbH in Austria, a high-end contract manufacturer.

The micro dimensions of this workpiece show that the 3D MARLIN SERIES offers the stability and precision required for such work, even at the micro level.

9910.0400.050.160M

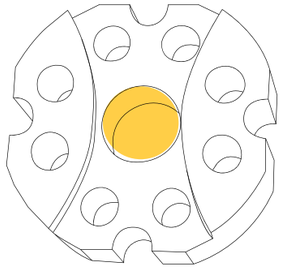
01. ROUGHING
SURFACE AREA HELIX

Tool:	9910.0400.050.160M
RPM:	40000
Feedrate:	800 mm/min
Offset:	0.050 mm
woc:	0.030 mm
doc:	Up to 3 mm
Coolant:	Oil
Runtime:	00:05:00 h

971P.0200.05

02. DRILLING
D 2 MM

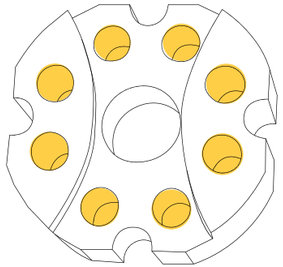
Tool:	971P.0200.05
RPM:	4,800
Feedrate:	5 mm/min
Fz Drilling:	0.0008 mm
Drill depth:	2.500 mm
Coolant:	Oil
Runtime:	00:01:00 h



971.0097

03. DRILLING
D 0.97 MM

Tool:	971.0097
RPM:	9500 U/min
Feedrate:	8 mm/min
Fz Drilling:	0.001 mm
Drill depth:	2.200 mm
Coolant:	Oil
Runtime:	00:02:00 h



966P.T21.0300.005.030

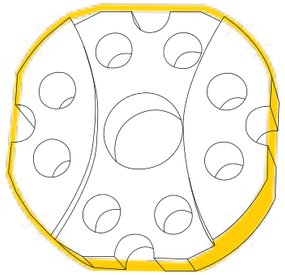
04. FINISHING
SURFACE AREA HELIX

Tool:	966P.T21.0300.005.030
RPM:	19,000
Feedrate:	400 mm/min
Offset:	0.000 mm
woc:	0.100 mm
doc:	0.050 mm
Coolant:	Oil
Runtime:	00:03:00 h

9910.0400.050.160M

05. ROUGHING
OUTER CONTOUR

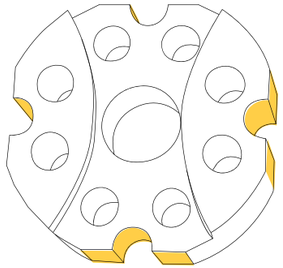
Tool:	9910.0400.050.160M
RPM:	40,000
Feedrate:	800 mm/min
woc:	0.030 mm
doc:	2.700 mm
Coolant:	Oil
Runtime:	00:01:00 h



9910.0400.050.160M

06. ROUGHING
LATERAL CHAMFERS

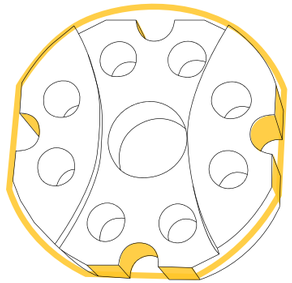
Tool:	9910.0400.050.160M
RPM:	40,000
RPM:	800 mm/min
woc:	0.030 mm
doc:	2.700 mm
Coolant:	Oil
Runtime:	00:02:00 h



966P.T21.0300.005.030

07. FINISHING OUTER CONTOUR

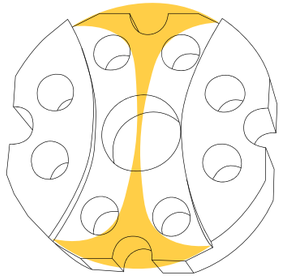
Tool:	966P.T21.0300.005.030
RPM:	19,000
Feedrate:	400 mm/min
Offset:	0.000 mm
woc:	0.010 mm
doc:	0.700 mm
Coolant:	Oil
Runtime:	00:06:00 h



9910.0200.020.080M

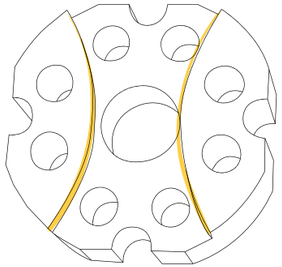
08. ROUGHING TROCHOIDAL RECESS

Tool:	9910.0200.020.080M
RPM:	43,000
Feedrate:	500 mm/min
Offset:	0.050 mm
woc:	0.020 mm
doc:	0.500 mm
Coolant:	Oil
Runtime:	00:02:00 h



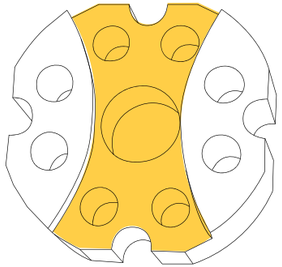
09. FINISHING
INNER SIDE STEP

Tool:	962.T5.0150
RPM:	38,000
Feedrate:	200 mm/min
Offset:	0.000 mm
woc:	0.050 mm
doc:	0.020 mm
Coolant:	Oil
Runtime:	00:04:00 h



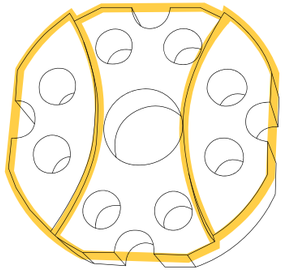
10. FINISHING
INNER BASE STEP

Tool:	962.T5.0150
RPM:	38,000
Feedrate:	200 mm/min
Offset:	0.000 mm
woc:	0.050 mm
doc:	0.020 mm
Coolant:	Oil
Runtime:	00:01:00 h



II. FINISHING
CHAMFER EDGES

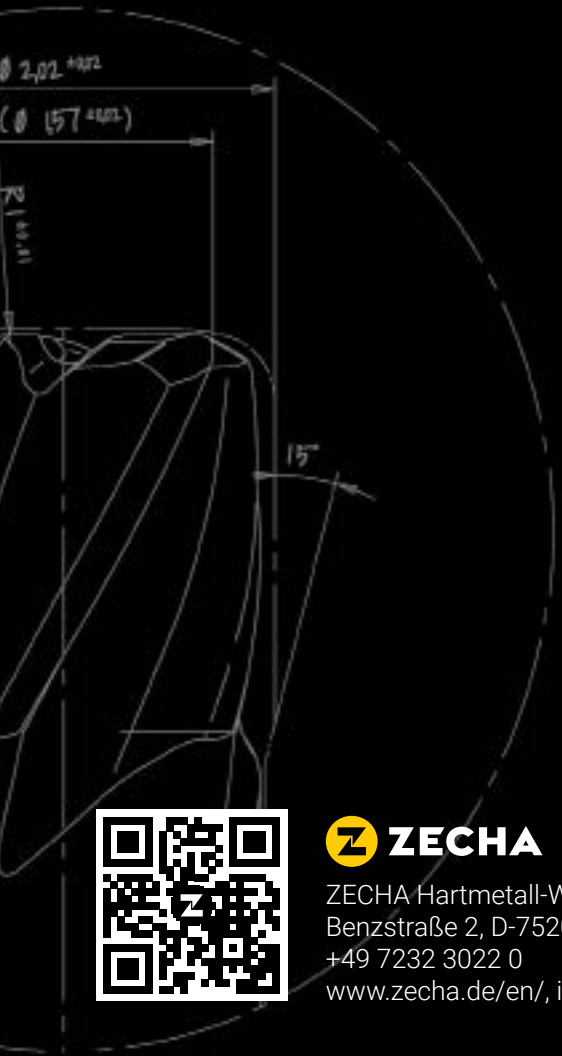
Tool:	D1,4 Chamfer Tool 90°
RPM:	15,000
Feedrate:	200 mm/min
Offset:	0.000 mm
woc:	0.050 mm
doc:	0.050 mm
Coolant:	Oil
Runtime:	00:01:00 h



SEE IT IN ACTION

Curious to see what the milling strategies and tools look like in practice? Watch the milling of this piece on the YouTube channel of our ‚subsidiary' AlienTools.

Simply scan the QR code with your mobile and you will be redirected to the video on YouTube.



ZECHA

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