

**IT'S THE TOOL THAT MAKES
RESTORATIONS PERFECT.**

vhf milling and grinding tools
for dental technology

Tools



vhf
CREATING PERFECTION

A close-up photograph of a dental lathe machine. The machine is made of dark metal and features a tool holder on the right side, which contains several cylindrical metal tools. On the left, a water spray is directed at a dental crown being worked on. The crown is mounted on a rotating part of the machine. The background is dark and out of focus.

MAKE NO COMPROMISE.
THE PERFECT TOOL FOR EVERY MATERIAL.



DURABLE AND PRECISE: VHF DENTAL TOOLS.

Only by choosing a first-class tool will you also achieve first-class results. The tool is the decisive element between your dental milling machine and the material to be machined.

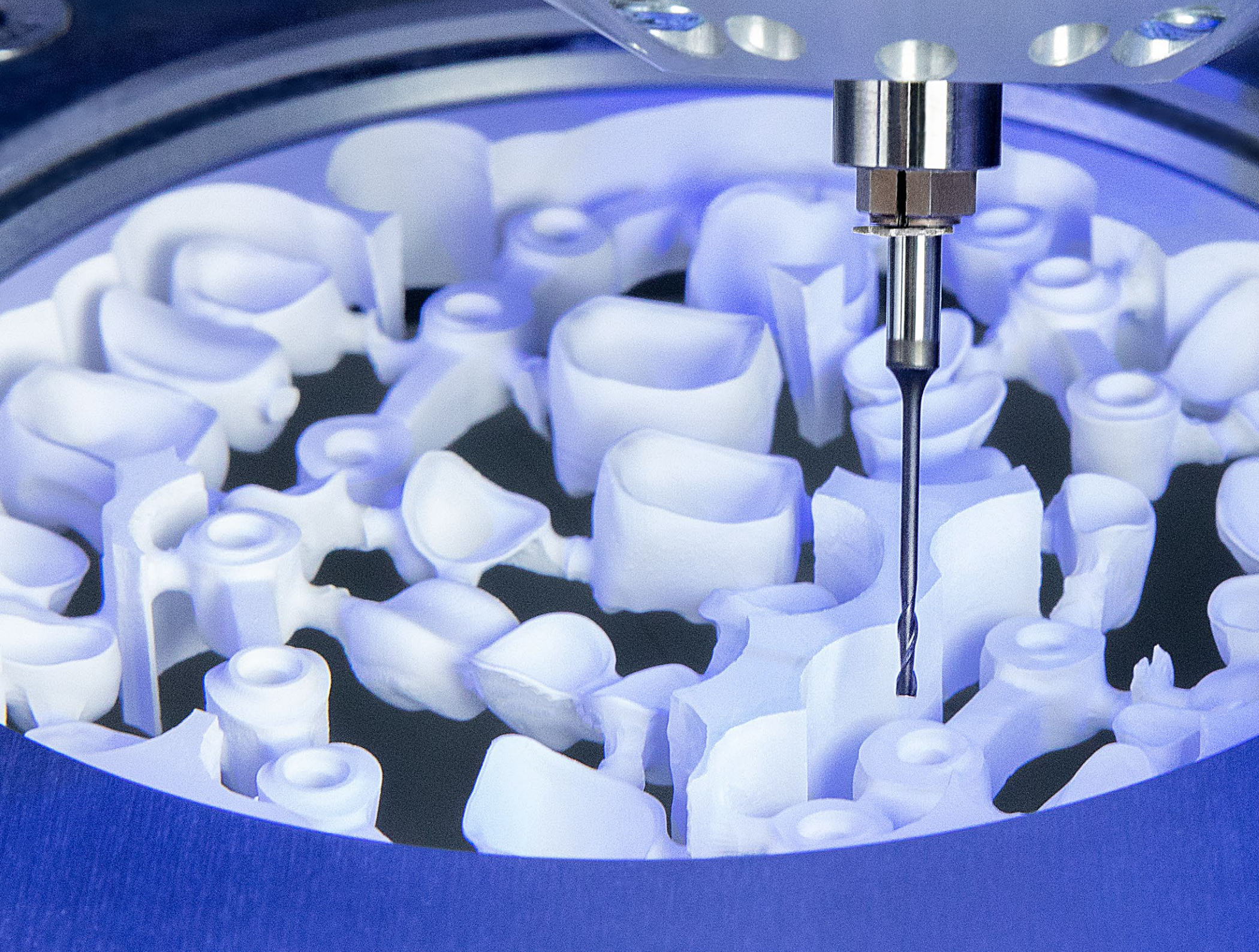
For this purpose, the vhf tool specialists constantly research and develop together with material manufacturers and laboratory users in order to produce the best possible tools.

FOR THE WHOLE RANGE OF MATERIALS.

The dental cutters and grinding tools from vhf have sophisticated cutting edge geometries for the machining of all material classes: Wax, PMMA, zirconia, composites, titanium, cobalt-chrome and glass-ceramics.

Therefore, you can rely on the sophisticated products of vhf for dental tools. Because long tool endurance and high process reliability with best surface quality are available at an attractive price-performance ratio: with original milling and grinding tools by vhf.





THE BEST PERFORMANCE ONLY COMES FROM THE ORIGINAL.

In order to be able to offer you the greatest possible variety of materials, there is a continuous validation process of new dental materials at vhf. All components of the CAM system play a role in this process – i.e. machine, tool and the corresponding machining strategies in the DENTALCAM software form an optimally coordinated overall package. Thus, the tool is always in focus during all developments and tests.

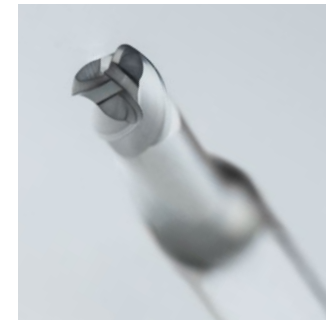
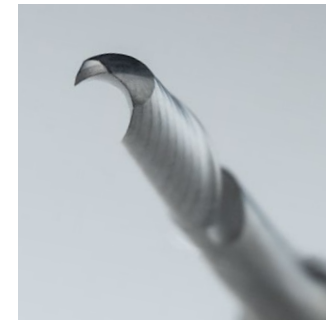
When using tools which are not matched to the machine and software, for example those from third-party suppliers, this perfect interaction cannot be guaranteed. In addition to reduced tool life, tool breakage and reduced milling quality, machine components such as the high-precision spindle bearings can also suffer.

Play it safe and get optimum results as well as a long machine life – thanks to a perfectly balanced overall system from vhf.

RADIUS CUTTERS

This special dental radius cutter has a semicircular rounded tip. It is available with cutting-edge diameters of 0.3 mm to 2.0 mm. While the 2.0 mm tool is mainly used for efficient roughing, tools with smaller diameters of 0.3 or 0.6 mm are mainly used for finely finishing or carving out fissures. Due to the especially long undercut of these tools (except for 0.3 mm universal cutters and 0.6 mm cutters for CoCr and titanium), undercuts in the material can also be reached easily.

Depending on their field of application, the radius cutters have one to four cutting edges: for PMMA and wax there are, for instance, extremely sharp single-tooth cutters available with a very low tendency to clogging. On the other hand, the 2 mm cutters for the abrasive zirconia have three cutting edges and the CoCr cutters even have four, in order to reduce the wear for each cutting edge and to ensure greater process reliability.

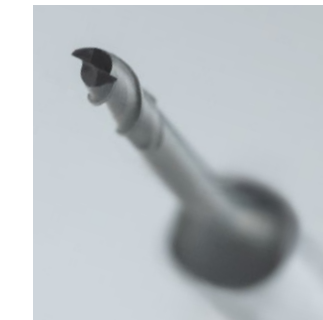


1-4	radius	
PMMA & Wax	ZrO ₂	composites
CoCr	Ti	

explanation see page 17

1-2	cyl. torus	
PMMA & Wax	ZrO ₂	composites
CoCr	Ti	

explanation see page 17



CYLINDRIC AND TORUS CUTTERS

Single-tooth cutters

The cutting edge of this tool with **flat face grinding** is extremely sharp and faceted. Thus the milling results are very smooth even at high feed rates and the risk of clogging is very low – even for plastics which tend to build up material.

This tool is available with a cutting-edge diameter of 2.5 mm; it is exclusively used for roughing PMMA and wax. Roughing with such a flat ground cutter reduces the milling time.

Double-tooth cutters

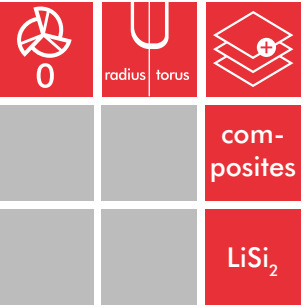
The double-edged cutters have a **cylindrical face grinding** and a cutting diameter of 0.5 mm and 1.2 mm. For milling 90° angles, e.g. in drillings and abutments, double-tooth cutters with flat face grinding and a cutting-edge diameter of 1.2 mm are used.

For machining non-precious alloys on a cobalt-chrome basis and titanium, this tool is available as **torus cutter** with a small edge radius which protects the cutting edges (only 1.2 mm diameter) – so the tool life will be extended.

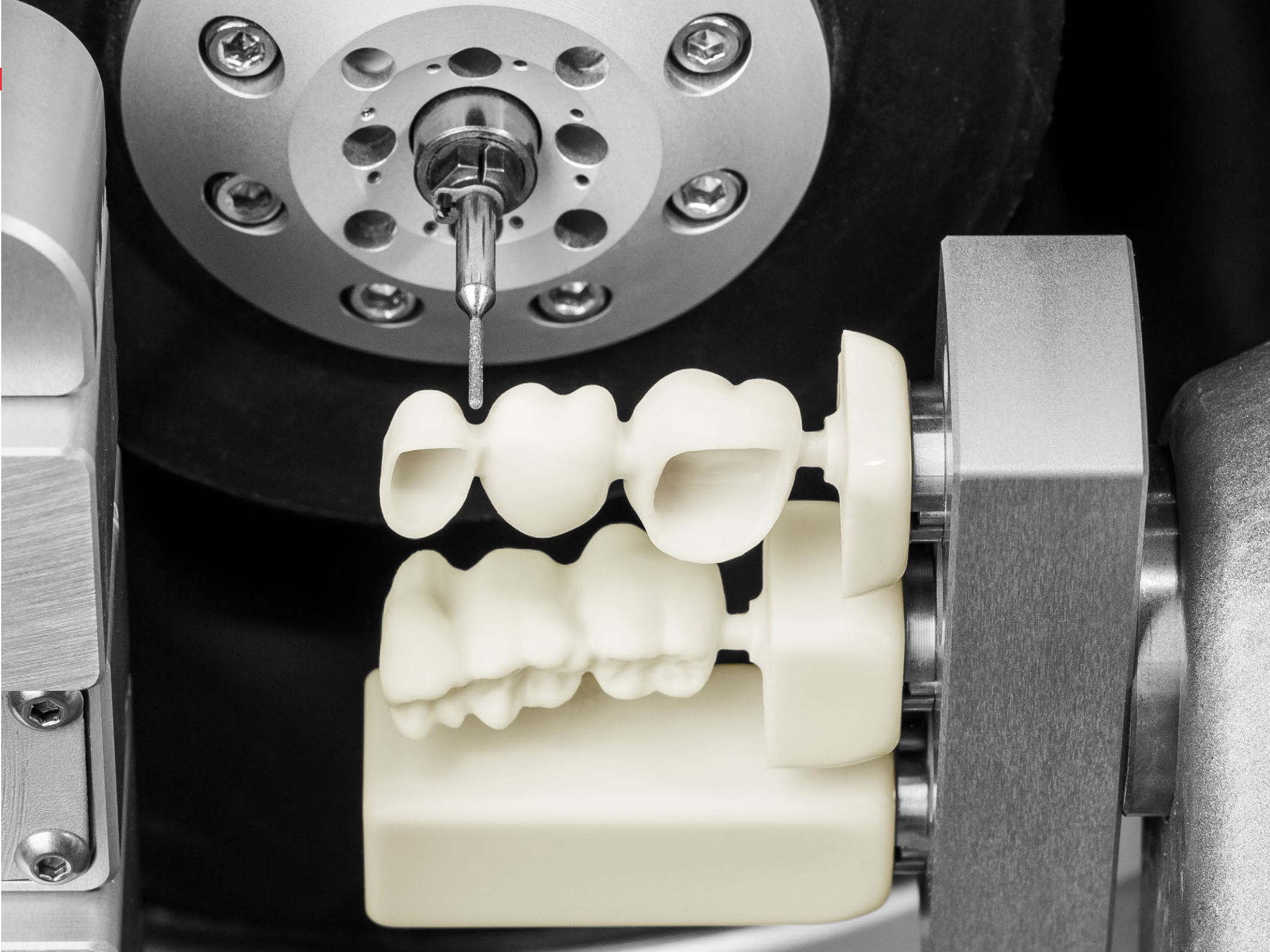
GRINDING TOOLS

For machining glass ceramics and composites, vhf offers torus and radius grinding tools with a diamond grit in different grain sizes. The two torus grinding tools with their fine grain size are mainly used for drillings and abutments. The 2.4 mm radius tools with their coarser grain size are used for roughing whilst the fine-grained radius grinding tools are used for the finishing process.

All tools are characterized by their excellent abrasion and break resistance as well as their extremely long endurance. The diamond grit with its especially good binding to the shank avoids micro-cracks and reduces the sensitivity to thermal impact. In addition, a close screening of the diamond size ensures consistent grain sizes and thus ensures the high dimensional accuracy of the entire tool.



explanation see page 17





SIMPLY INGENUOUS – INGENUOUSLY SIMPLE: THE VHF TOOL PACKAGING

The development department of vhf is not only concerned about the perfect cutting edge geometries of your tools, but also about a wonderfully easy handling. Therefore, vhf uses a unique multifunctional tool packaging instead of a conventional standard packaging.

With seven distinct colors, it is clearly visible which tool is applicable for which material class. The base colors of course also match the color-coded tool magazines of the Z4. The respective article number is prominently marked on the protective casing – you don't have to take the tool out of the packaging to see which tool you have in your hands.

The individual packages can be coupled, separated and combined as required by means of an innovative sliding mechanism so that you can maintain the best possible overview of the tool contingent, and prevent possible disorder in the workplace caused by individual tools lying around.

In addition, the innovative packaging makes handling not only easier, but also safer. You can conveniently insert and remove the tool stuck in the base into the tool changer of the milling machine without having to touch it with your hand. This reduces the risk of injury and tool breakage.

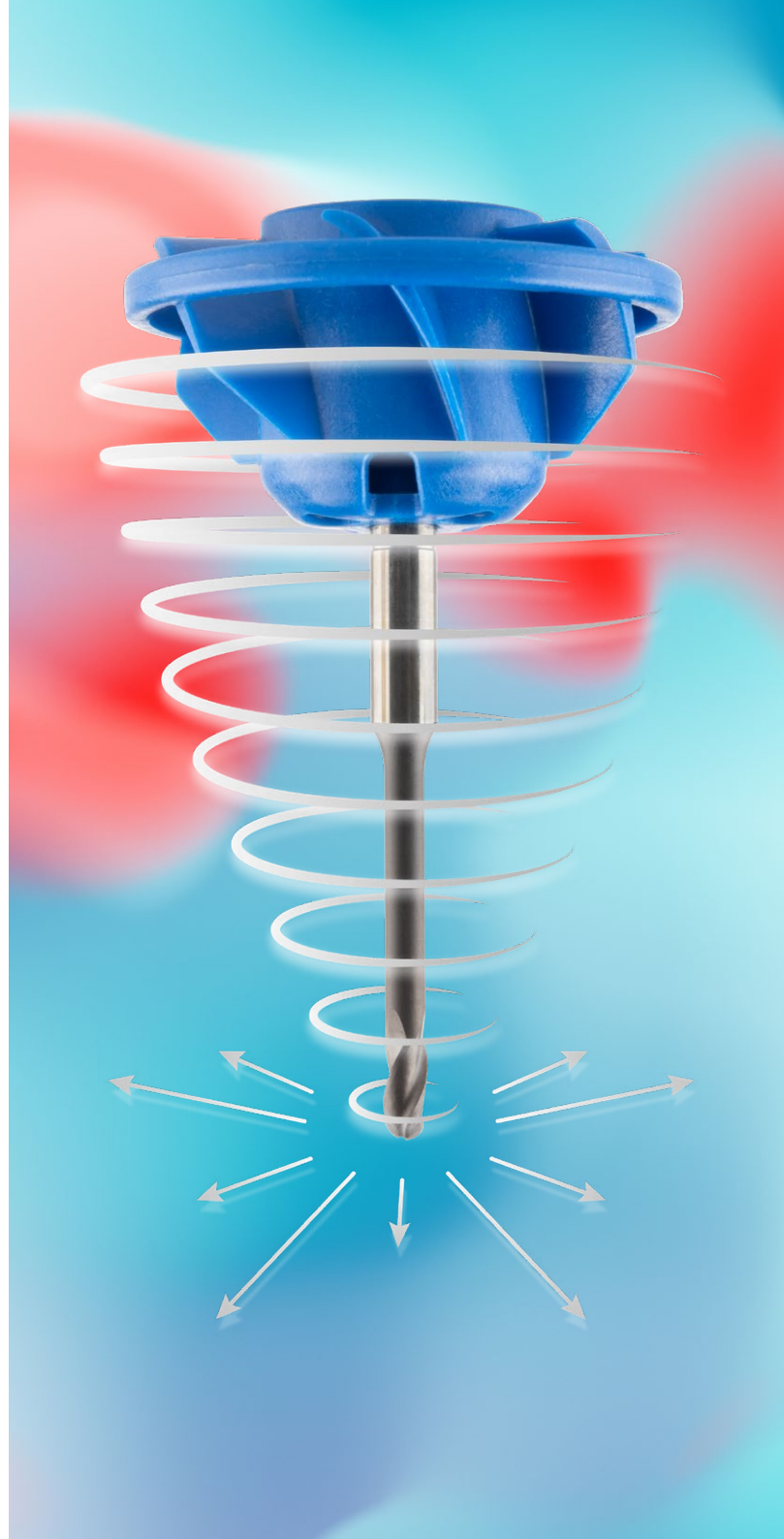


WAX AND PLASTICS (PMMA)
COMPOSITES
UNIVERSAL CUTTERS



ZIRCONIA (ZrO_2)
NON-PRECIOUS ALLOYS (CoCr) & TITANIUM
GLASS CERAMICS ($LiSi_2$) AND COMPOSITES





OUR AIRTOOLS MAKE A LOT OF WIND

The vhf tools do not only influence the excellent machining quality of your workpieces, they even enable a completely new machine generation: A unique innovation of our milling machines E5 and E4 is their freedom from compressed air. They require neither an external compressed air connection nor a built-in compressor. This is made possible by our patent-pending **AIRTOOL**.

Due to the high speeds of the high-frequency spindle, the turbine blades on the **AIRTOOL** generate a strong air flow towards the cutting edge of the tool, which keeps the workpiece free of chips and dust. In turn, chips and dust are removed by the connected suction unit. Thus, you can work without a compressed air connection and avoid the corresponding disadvantages. With these two machines of the vhf EASE Class and the **AIRTOOLS**, you enjoy maximum freedom in choosing the installation site and benefit from significantly lower operating costs.

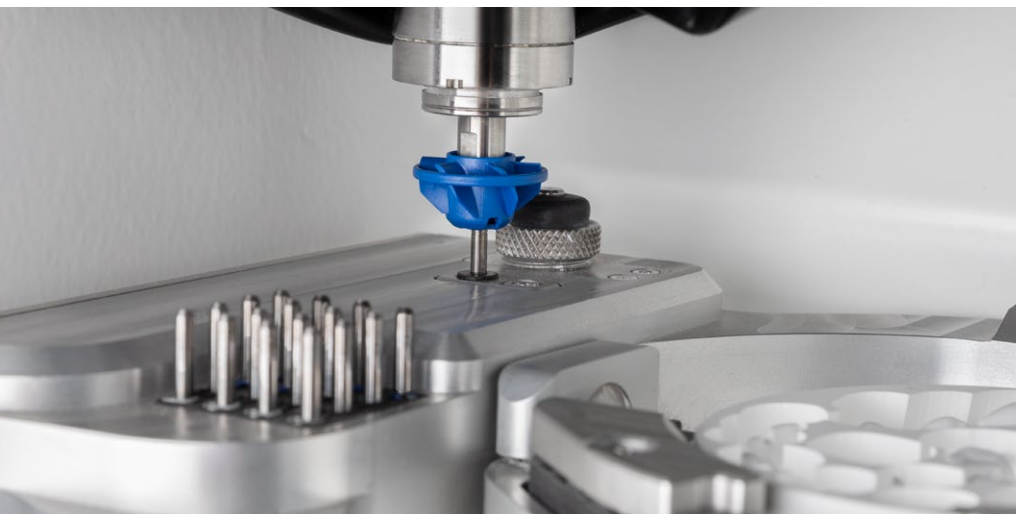


AIRTOOLS – THE SPECIALISTS FOR THE ROUGH WORK

The AIRTOOLS are only required for the first milling steps – the roughing process – which produces a particularly large amount of chips. Therefore, they are only available with cutting edge diameters from 2 mm. For the finer finishing process, you still use the standard tools from vhf.

The E5 and the E4 have a separate slot in the tool changer for the AIRTOOL. This means that your restorations are of course also produced fully automatically in the E series.

The color coding also shows for which material the respective AIRTOOL is used.



WAX AND PLASTICS (PMMA)

COMPOSITES

ZIRCONIA (ZrO₂)





› Rough machining of CoCr

ARTICLE NUMBER STRUCTURE

Each tool is labeled with a code to make it easy to identify. It is structured as follows:

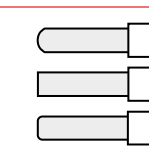
MATERIAL **CUTTING EDGE DIAMETER** – **CUTTING EDGE TYPOLOGY** **NUMBER OF TEETH**¹ **COATING**² – **TOTAL LENGTH**

¹ only for tools with teeth

² only for tools with a diamond coating

- C** composites
- G** glass ceramics (LiSi2)
- M** non-ferrous metals
- P** plastics/wax (PMMA)
- U** universal
- Z** zirconia

- R** radius
- F** cylinder (flat)
- T** torus



EXAMPLE

Z 100-R 2 D-40

Labels for the example code:

- Z: suitable for zirconia
- 100: 1,00 mm cutting edge diameter
- R: radius cutter
- 2: 2 teeth
- D: diamond coating
- 40: 40 mm total length

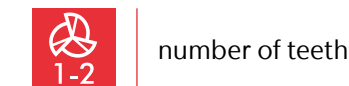
TOTAL LENGTH

Tools with a total length of 40 mm and tools for NEM with 35 mm are suitable for all vhf 5 axis machines.

Tools with a total length of 35 mm and tools for NEM with 32 mm are suitable for all vhf 4 axis machines.

Grinding tools always have a total length of 35 mm independantly from the machine type.

LEGEND TO THE ICONS



number of teeth



type of cutting edge



coating available – either some or all tools



tool series with diamond coating

D1 cutting edge diameter

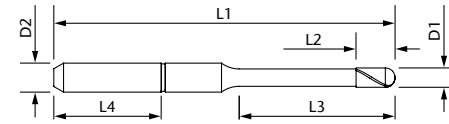
D2 shank diameter

L1 total length

L2 cutting edge length

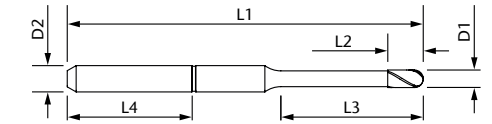
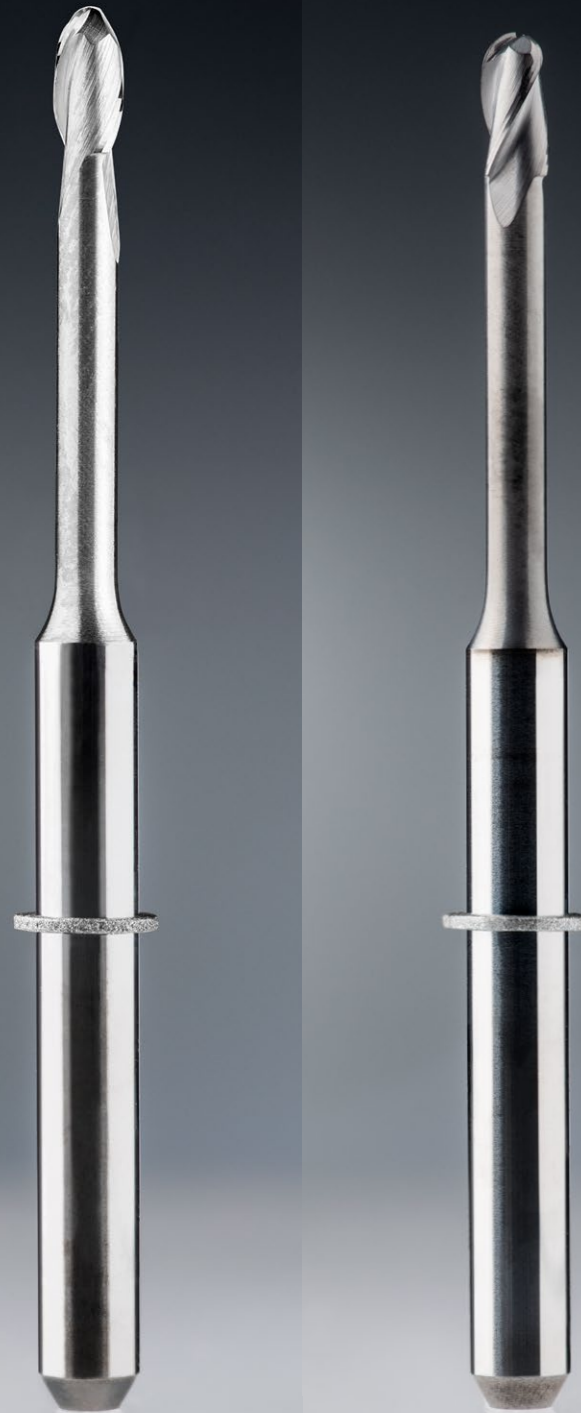
L3 undercut

L4 distance from tool tip to back of ring



WAX AND PLASTICS (PMMA)

article no.	tool type	coating	base color	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L1 (mm)
P100-R1-35	single tooth radius cutter	–	■	1.00	3.0	4.0	16.0	11	35
P100-R1-40	single tooth radius cutter	–	■	1.00	3.0	4.0	16.0	14	40
P200-R1-35	single tooth radius cutter	–	■	2.00	3.0	8.0	16.0	11	35
P200-R1-40	single tooth radius cutter	–	■	2.00	3.0	8.0	16.0	14	40
P100-R2-35	double tooth radius cutter	–	■	1.00	3.0	2.0	16.0	11	35
P100-R2-40	double tooth radius cutter	–	■	1.00	3.0	2.0	16.0	14	40
P200-R2-35	double tooth radius cutter	–	■	2.00	3.0	4.0	16.0	11	35
P200-R2-40	double tooth radius cutter	–	■	2.00	3.0	4.0	16.0	14	40
P250-F1-35	cylindric single tooth cutter	–	■	2.50	3.0	5.0	16.0	11	35
P250-F1-40	cylindric single tooth cutter	–	■	2.50	3.0	5.0	16.0	14	40
AIRTOOL for E4 and E5									
P250-F1-40-T	cylindric single tooth cutter / AIRTOOL	–	■	2.50	3.0	5.0	16.0	14	40
Tools for E3									
P140-R1-60	single tooth radius cutter	–	–	1.40	3.0	5.0	–	–	60
P300-R2-60	double tooth radius cutter	–	–	3.00	3.0	10.0	16.0	–	60



ZIRCONIA (ZrO₂)

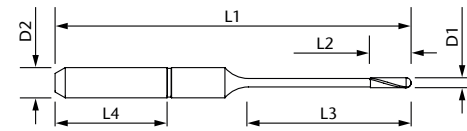
article no.	tool type	coating	base color	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L1 (mm)
Z100-R2-35	double tooth radius cutter	+	■	1.00	3.0	2.0	16.0	11	35
Z100-R2-40	double tooth radius cutter	+	■	1.00	3.0	2.0	16.0	14	40
Z200-R3-35	triple tooth radius cutter	+	■	2.00	3.0	4.0	16.0	11	35
Z200-R3-40	triple tooth radius cutter	+	■	2.00	3.0	4.0	16.0	14	40
Z060-R2D-35*	double tooth radius cutter	diamond	■	0.60	3.0	1.2	3.0	11	35
Z060-R2D-40	double tooth radius cutter	diamond	■	0.60	3.0	1.2	3.0	14	40
Z100-R2D-35*	double tooth radius cutter	diamond	■	1.00	3.0	2.0	16.0	11	35
Z100-R2D-40	double tooth radius cutter	diamond	■	1.00	3.0	2.0	16.0	14	40
Z200-R3D-35*	triple tooth radius cutter	diamond	■	2.00	3.0	4.0	16.0	11	35
Z200-R3D-40	triple tooth radius cutter	diamond	■	2.00	3.0	4.0	16.0	14	40
Z120-F2D-35*	cylindric double tooth cutter	diamond	■	1.20	3.0	5.0	16.0	11	35
Z120-F2D-40	cylindric double tooth cutter	diamond	■	1.20	3.0	5.0	16.0	14	40
AIRTOOL for E4 and E5									
Z200-R3D-40-T	triple tooth radius cutter / AIRTOOL	diamond	■	2.00	3.0	4.0	16.0	11	40

* The short diamond-coated tools may only be used for milling zirconium with Z4 | N4 | N4+ | K4 edition; they must not be used in K4 due to their lacking electric conductivity.

DIAMOND COATING

Benefit from a more than 10-fold longer life time by choosing diamond coated milling cutters. The coating has been specifically developed for abrasive materials. A well matched carbide substrate facilitates ideal adhesion for an extremely smooth crystalline diamond layer with maximum hardness. This results in highest abrasion resistance and a maximum quality of the milled surfaces.



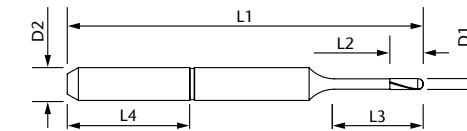
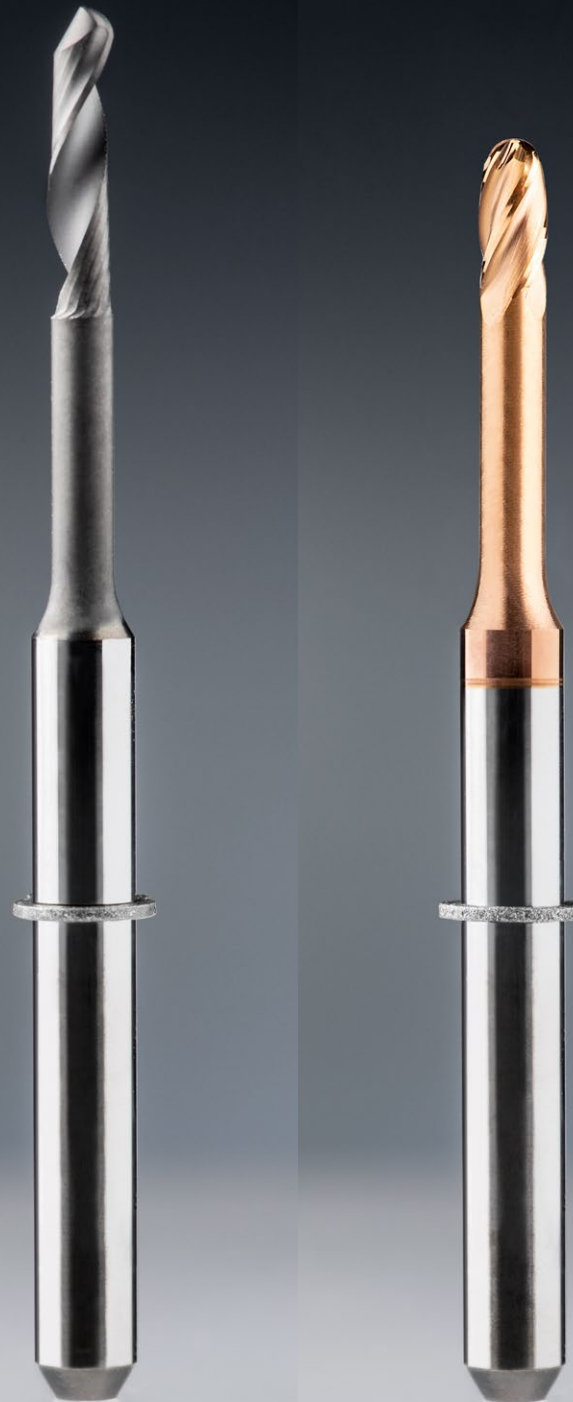


COMPOSITES

article no.	tool type	coating	base color	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L1 (mm)
C100-R1D-35	single tooth radius cutter	diamond	■	1.00	3.0	4.0	16.0	11	35
C100-R1D-40	single tooth radius cutter	diamond	■	1.00	3.0	4.0	16.0	14	40
C200-R1D-35	single tooth radius cutter	diamond	■	2.00	3.0	8.0	16.0	11	35
C200-R1D-40	single tooth radius cutter	diamond	■	2.00	3.0	8.0	16.0	14	40
C100-R2-35	double tooth radius cutter	+	■	1.00	3.0	2.0	16.0	11	35
C100-R2-40	double tooth radius cutter	+	■	1.00	3.0	2.0	16.0	14	40
C200-R2-35	double tooth radius cutter	+	■	2.00	3.0	4.0	16.0	11	35
C200-R2-40	double tooth radius cutter	+	■	2.00	3.0	4.0	16.0	14	40
AIRTOOL for E4 and E5									
C200-R1D-40-T	single tooth radius cutter/ AIRTOOL	diamond	■	2.00	3.0	8.0	16.0	14	40

DIAMOND COATING

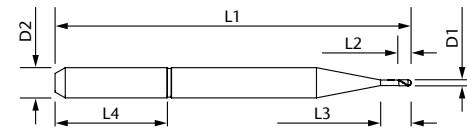
Benefit from a more than 10-fold longer life time by choosing diamond coated milling cutters. The coating has been specifically developed for abrasive materials. A well matched carbide substrate facilitates ideal adhesion for an extremely smooth crystalline diamond layer with maximum hardness. This results in highest abrasion resistance and a maximum quality of the milled surfaces.



NON-PRECIOUS ALLOYS (CoCr) & TITANIUM*

article no.	tool type	coating	base color	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L1 (mm)
M060-R2-32	double tooth radius cutter	+	■	0.60	3.0	1.2	-	11	32
M060-R2-35	double tooth radius cutter	+	■	0.60	3.0	1.2	-	14	35
M100-R2-32	double tooth radius cutter	+	■	1.00	3.0	3.0	8.0	11	32
M100-R2-35	double tooth radius cutter	+	■	1.00	3.0	3.0	8.0	14	35
M200-R4-32	four tooth radius cutter	+	■	2.00	3.0	4.0	12.0	11	32
M200-R4-35	four tooth radius cutter	+	■	2.00	3.0	4.0	12.0	14	35
M120-T2-32	double tooth cutter with torus, 0.1 mm face radius	+	■	1.20	3.0	3.0	8.0	11	32
M120-T2-35	double tooth cutter with torus, 0.1 mm face radius	+	■	1.20	3.0	3.0	8.0	14	35

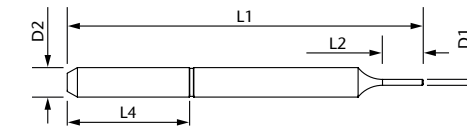
* Titanium may only be wet milled – only possible with R5 | Z4 | N4+ | S1 | S2 | S5.



UNIVERSAL CUTTERS*

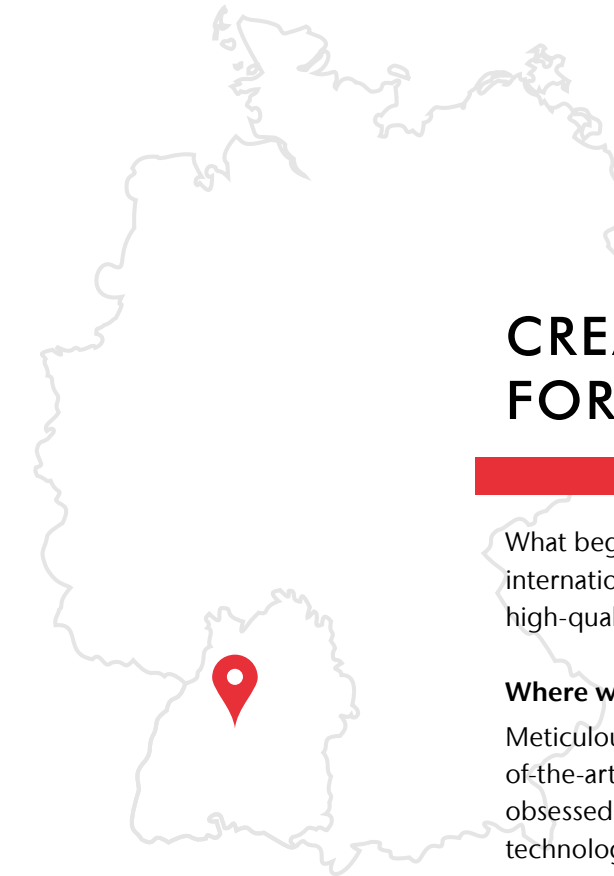
article no.	tool type	coating	base color	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L1 (mm)
U030-R2-35	double tooth radius cutter	-	■	0.30	3.0	0.6	-	11	35
U030-R2-40	double tooth radius cutter	-	■	0.30	3.0	0.6	-	14	40
U050-F2-35	cylindric double tooth cutter	-	■	0.50	3.0	1.5	3.0	11	35
U050-F2-40	cylindric double tooth cutter	-	■	0.50	3.0	1.5	3.0	14	40
U060-R2-35	double tooth radius cutter	+	■	0.60	3.0	1.2	3.0	11	35
U060-R2-40	double tooth radius cutter	+	■	0.60	3.0	1.2	3.0	14	40
U120-F2-35	cylindric double tooth cutter	+	■	1.20	3.0	5.0	16.0	11	35
U120-F2-40	cylindric double tooth cutter	+	■	1.20	3.0	5.0	16.0	14	40

* Suitable for machining wax and plastics (PMMA), zirconia and composites.



GLASS CERAMICS (LiSi₂) AND COMPOSITES

article no.	tool type	coating	base color	D1 (mm)	D2 (mm)	L2 (mm)	L3 (mm)	L4 (mm)	L1 (mm)
G060-R-35	radius grinding tool	diamond grit	□	0.60	3.0	5.5	-	12	35
G060-T-35	torus grinding tool	diamond grit	□	0.60	3.0	4.0	-	12	35
G100-R-35	radius grinding tool	diamond grit	□	1.00	3.0	8.0	-	12	35
G120-T-35	torus grinding tool	diamond grit	□	1.20	3.0	9.0	-	12	35
G240-R-35	radius grinding tool	diamond grit	□	2.40	3.0	16.0	-	12	35



CREATING PERFECTION: FOR 35 YEARS.

What began in 1988 as a start-up by young technology enthusiasts has become today an internationally successful company. With 350 employees, the vhf group now manufactures high-quality products day by day. Made in Germany.

Where we come from: the home of high-tech

Meticulous perfectionism and high quality standards: that's what you expect from state-of-the-art technology from Germany. In Baden-Württemberg, we may even be a bit more obsessed with details – here, where the heartland of mechanical engineering and medical technology is. This is the place where vhf was founded.

Who we are: a team with a shared vision

At vhf, we are proud of our employees – people who think ahead: Motivated and conscientious, they shape the future of the company. Our claim *Creating Perfection* puts into words what distinguishes vhf: the constant striving for perfection. This concerns every product, every tool and all software from the company. Going the “extra mile” is not a vision at vhf, but everyday life. This is what makes us different, this is the secret of our success.

How we work: quality conscious, independent, transparent and sustainable

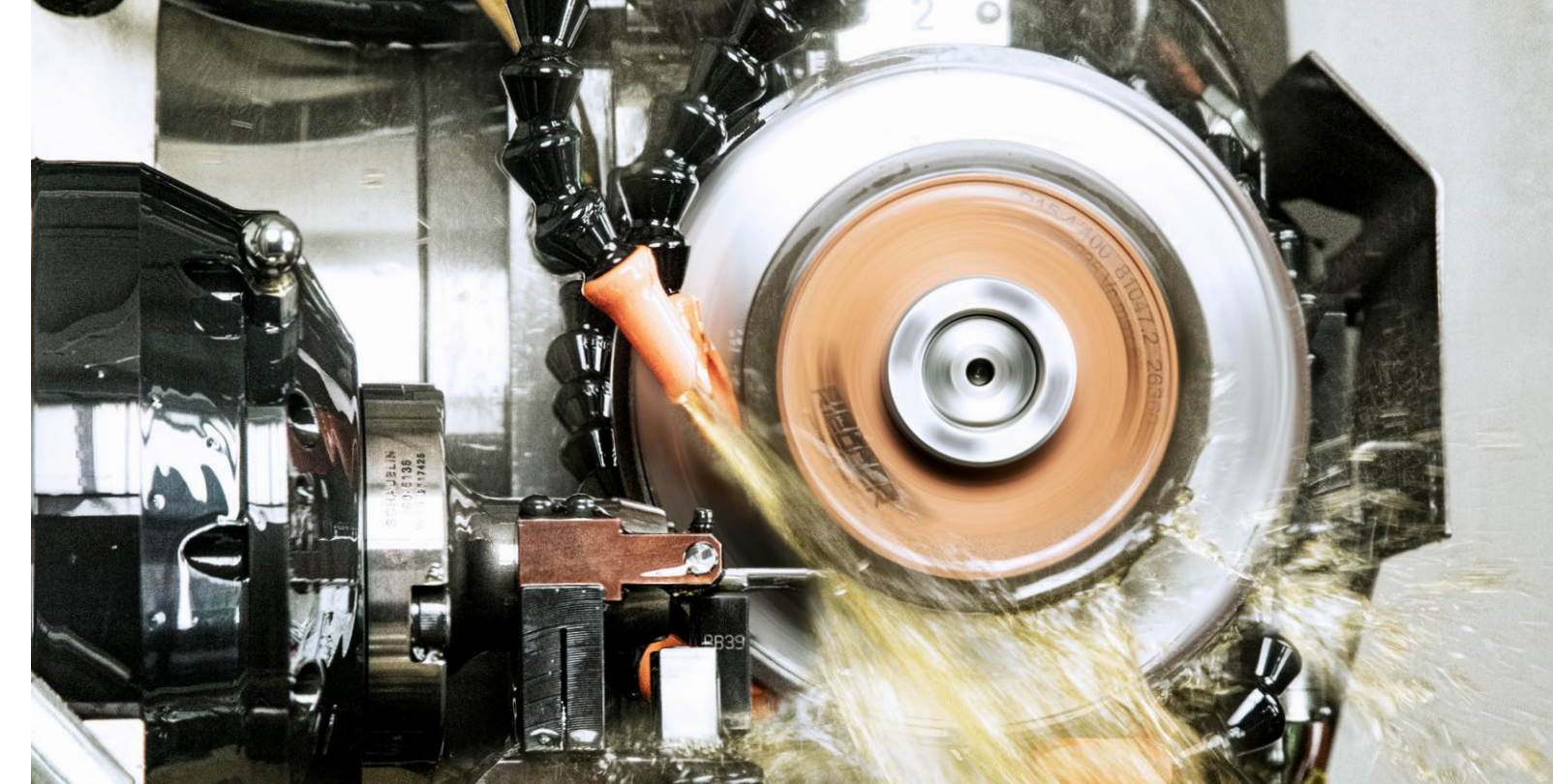
We produce milled parts for new machines on vhf milling machines with vhf tools – the best proof of their quality and practicability. We will gladly show you our production process during a guided tour at our facilities.



DENTAL TOOLS MADE BY EXPERTS. BY VHF.

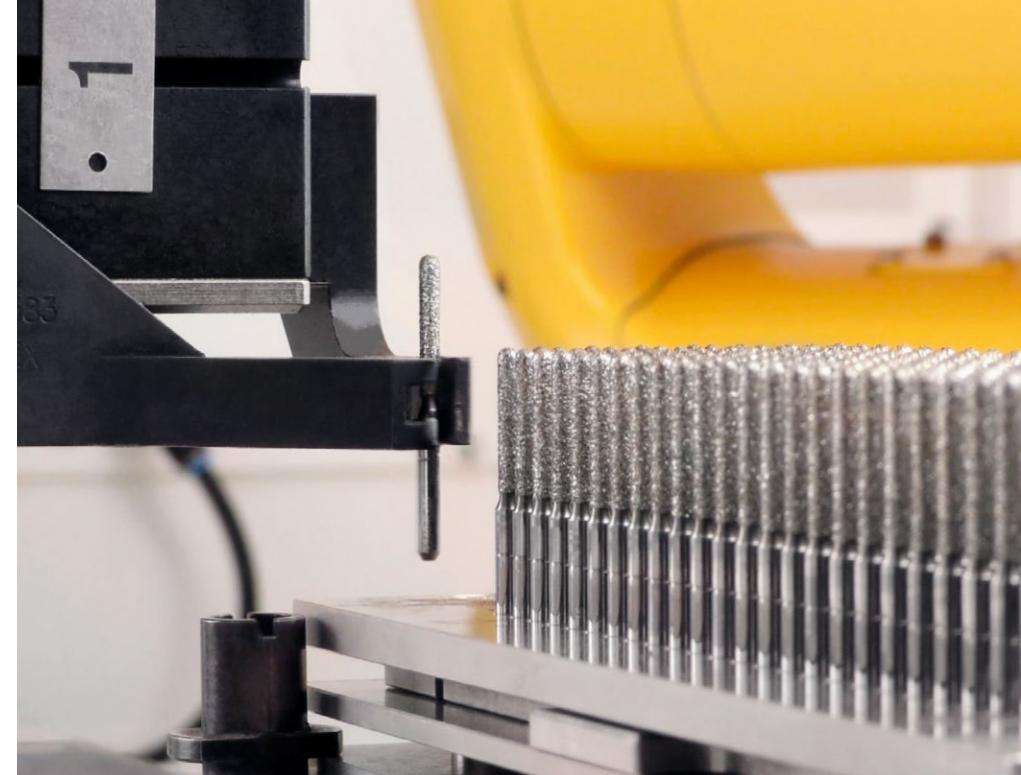
Our tool specialists develop sophisticated cutting geometries to tailor our tools to the precise machining of a wide variety of materials, from wax to cobalt-chrome. This ensures an optimum balance between the best possible surface quality of the processed material and the longest possible tool life.

Dental cutters from vhf consist of a super-fine grain carbide mixture from German production. It is characterized by high edge strength combined with high wear resistance and toughness – which further improves your workpiece quality and tool life.



VHF'S HIGHLY PRECISE TOOLMAKING. FOR YOUR TOP NOTCH RESTORATIONS.

All dental cutters are made by vhf on state-of-the-art six-axis precision grinding centers. They ensure an optimal production of complex high-quality tools.



LOWEST TOLERANCES. HIGHEST STANDARDS.

At vhf, compliance with the specified values for the finished tools is regularly checked by a complete measurement with a four-axis measuring machine. The check is carried out with four cameras at a resolution of 0.25 μm . Thanks to this non-contact measurement, we can reliably control the production process. Maximum precision is our top priority – to give you the best machining results.

The finished tools are checked fully automatically by the CNC measuring machine – so no quality defect remains undetected. This ensures an economical production with us and favorable prices with you.

All vhf dental tools are individually laser-marked. In addition, the colored tool packaging allows you to see at a glance which tool you hold in your hands – ideal for quickly equipping your tool changer.

WE DON'T STOP AT TOOLS. GET TO KNOW OUR MACHINES.

We have been able to convince you of our dental tools. But do you also know about our milling and grinding machines? We offer our users an optimal overall CAD/CAM system: thanks to perfectly matched components, you can process all common materials in the dental industry on vhf machines. Be it dry or wet processing – vhf has the perfect solution for you.

Let's take, for example, the R5 and Z4: vhf's high-end machines have already received international awards for their futuristic design and pioneering innovations. The R5 is a true multi-talent: it automatically exchanges blanks and blocks and lets you produce around the clock. The R5 brings revolutionary features such as **DIRECTDISC** Technology and **DIRECTCLEAN** Technology. For the increasingly relevant same-day dentistry, we have developed the Z4. Thanks to the integrated workflow, you can operate from the intraoral scanner to the milling machine under one single user interface and familiarize yourself with just one software.

More at dental.vhf.com



Z4

R5



CREATING PERFECTION

GET IN TOUCH.

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