

# HIGH END FOR LABORATORY AND PRACTICE.

The 5-axis milling machine  
for wet and dry machining.

# R5

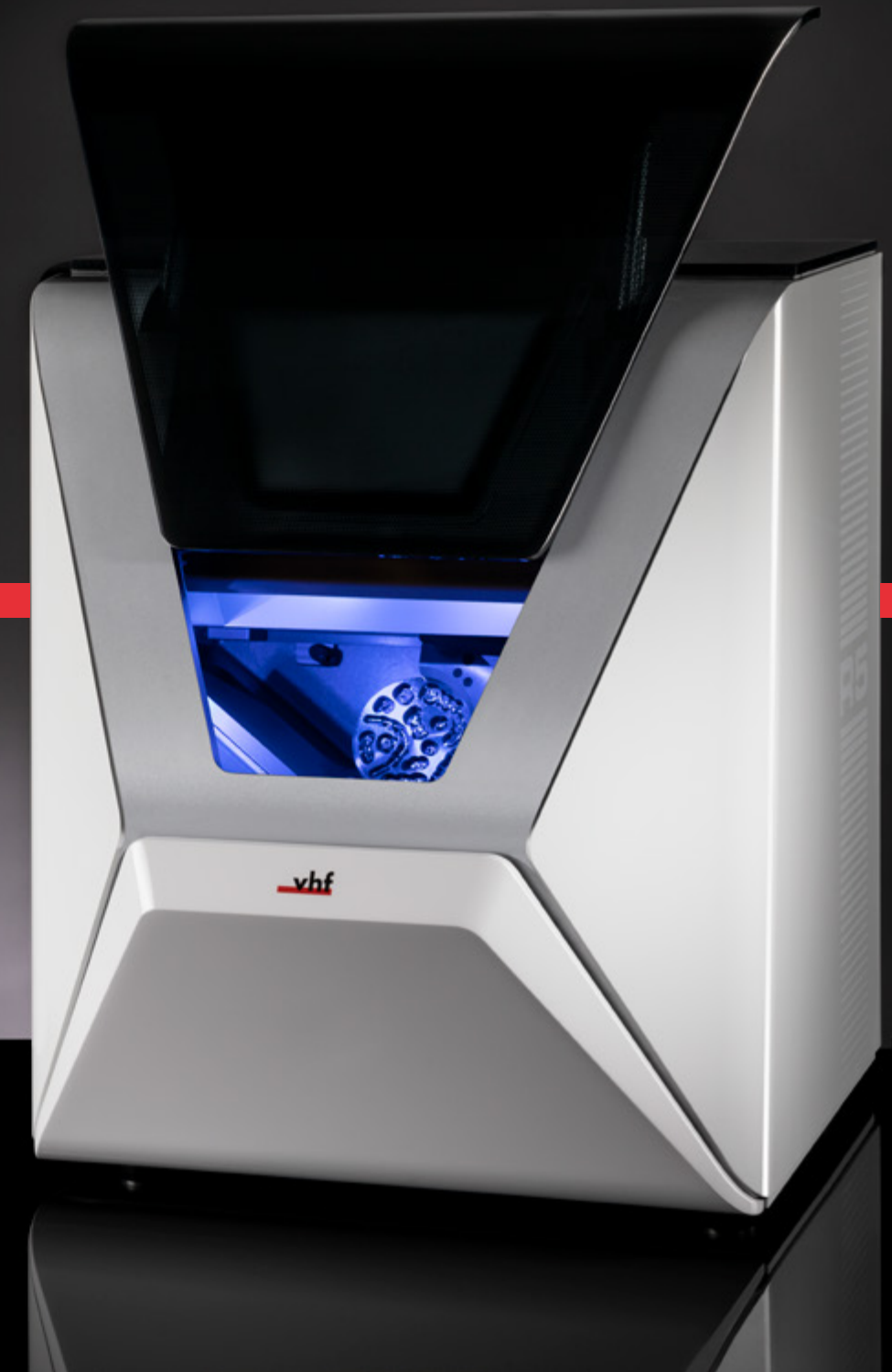


**vhf**  
CREATING PERFECTION

UN  
RI  
VALED



THE CHAMPIONS LEAGUE  
OF DENTAL TECHNOLOGY.



# THE GOLD STANDARD FOR LAB AND PRACTICE

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**The R5 can process everything, non-stop.**

Dry milling, wet milling or wet grinding? Everything is possible with the R5. It mills and grinds the hardest materials on the market, including all types of Ti and CoCr. This means that glass ceramics can be wet ground or titanium wet milled. Materials such as cobalt-chrome alloys, zirconia or PMMA are dry milled.

The logo for vhf, consisting of the lowercase letters 'vhf' in a bold, black, sans-serif font. A thick red horizontal bar is positioned directly beneath the letters 'v' and 'h', extending slightly beyond their width.



## EYECATCHING DESIGN AND OUTPUT

When intuitive technology meets advanced design: the R5 was awarded the world-renowned iF Design Award for its futuristic and pioneering appearance. The machine is a real eye-catcher in any laboratory. For its class, the machine is very compact and requires little space.

# IT IS BECAUSE WE THINK ABOUT PEOPLE, THAT AUTOMATION IS SO IMPORTANT TO US.

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Automation for the R5 is not only limited to the removable and thus easily loadable 16-fold tool magazine. It also enables the automated change of your desired materials. The R5 can conveniently be preloaded with up to 10 blanks or up to 60 blocks or abutments in the material magazine. This means that the R5 can process all materials for you – wet or dry – without interruption, in any order, and even overnight.





DIRECTDISC  
Technology

# NOT ONLY INGENIOUS, BUT SOON ALSO PATENTED. DIRECTDISC TECHNOLOGY.

Thanks to the DIRECTDISC Technology, the highly intelligent, automatic material changer can be conveniently loaded in seconds without tools and with just one hand, saving you valuable time.



Experience the elegant operation of the DIRECTDISC Technology in combination with the automatic material changer.

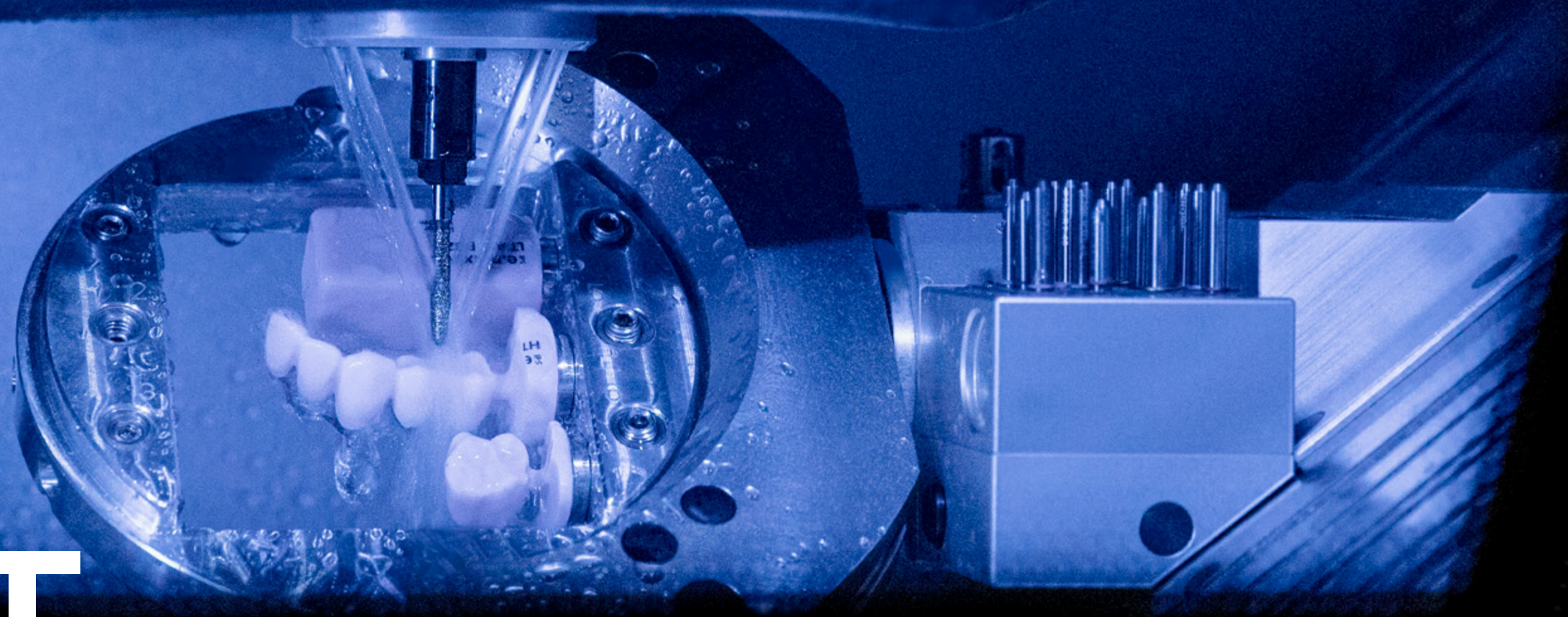
# THE MORE DIRECT, THE BETTER. DIRECTCLEAN TECHNOLOGY.

Quickly and effortlessly switch between wet and dry processing with the **DIRECTCLEAN** Technology. Ionizer, self-cleaning process and dryer form a unique package – so ingenious that we have applied for a patent.

DIRECTCLEAN  
Technology

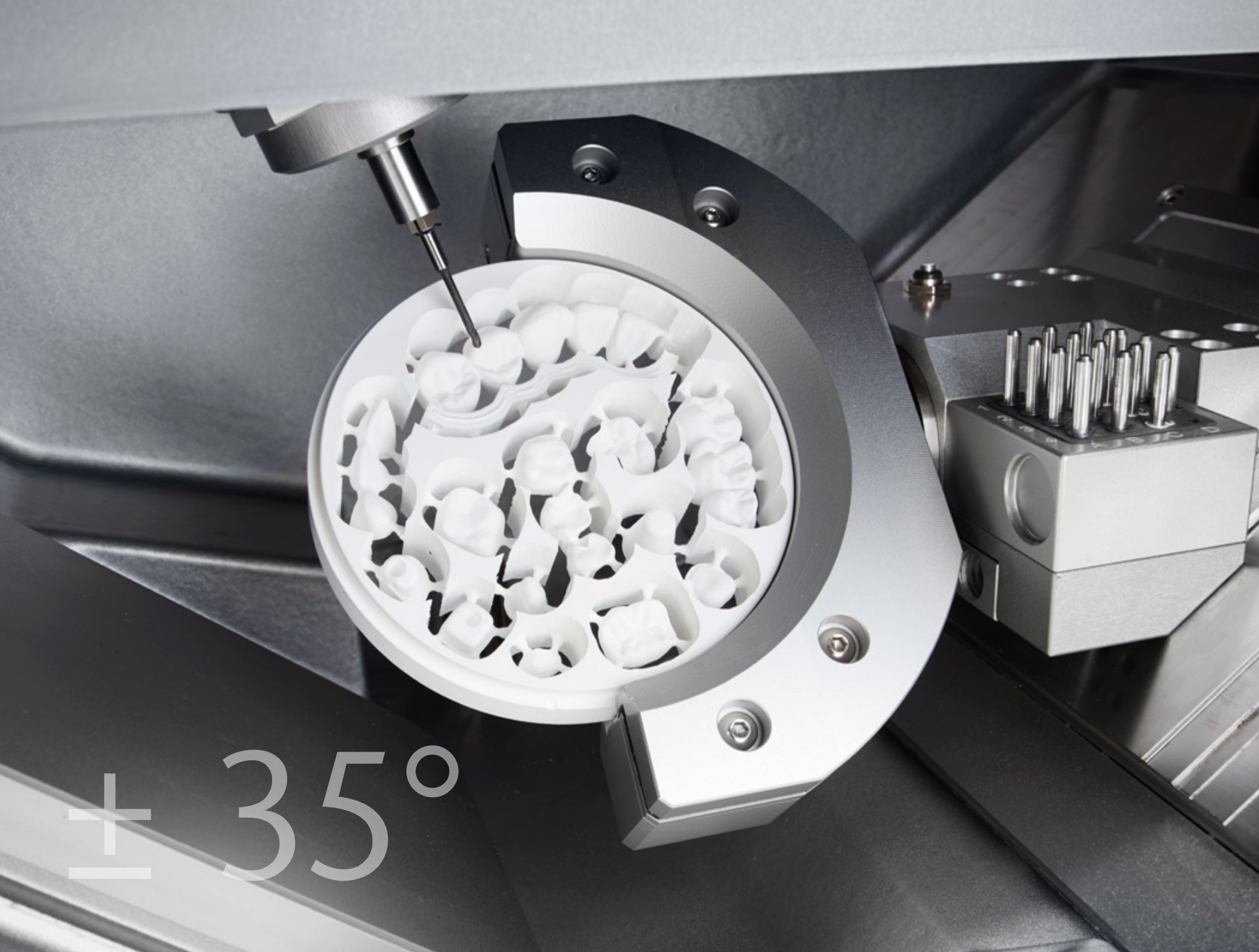


# CON VE NIENT



ULTIMATE USER EXPERIENCE THROUGH INTUITIVE TECHNOLOGY





## PRODUCE RESTORATIONS IN ULTRA-HD.

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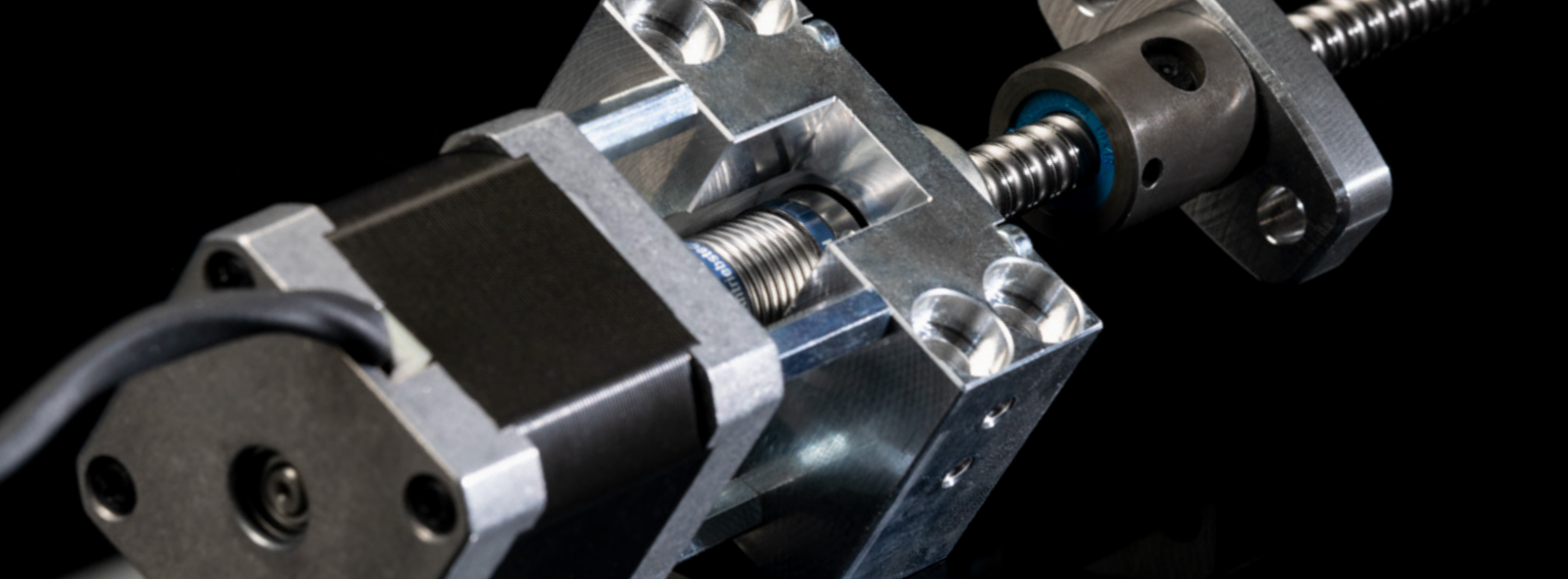
A solid, internal cast aluminum body ensures particularly low-vibration operation. This is the prerequisite for highly precise and aesthetic restorations.



The R5 weighs an impressive 150 kg – with an edge length of only 60 cm! With these dimensions, you can set up the R5 practically anywhere.



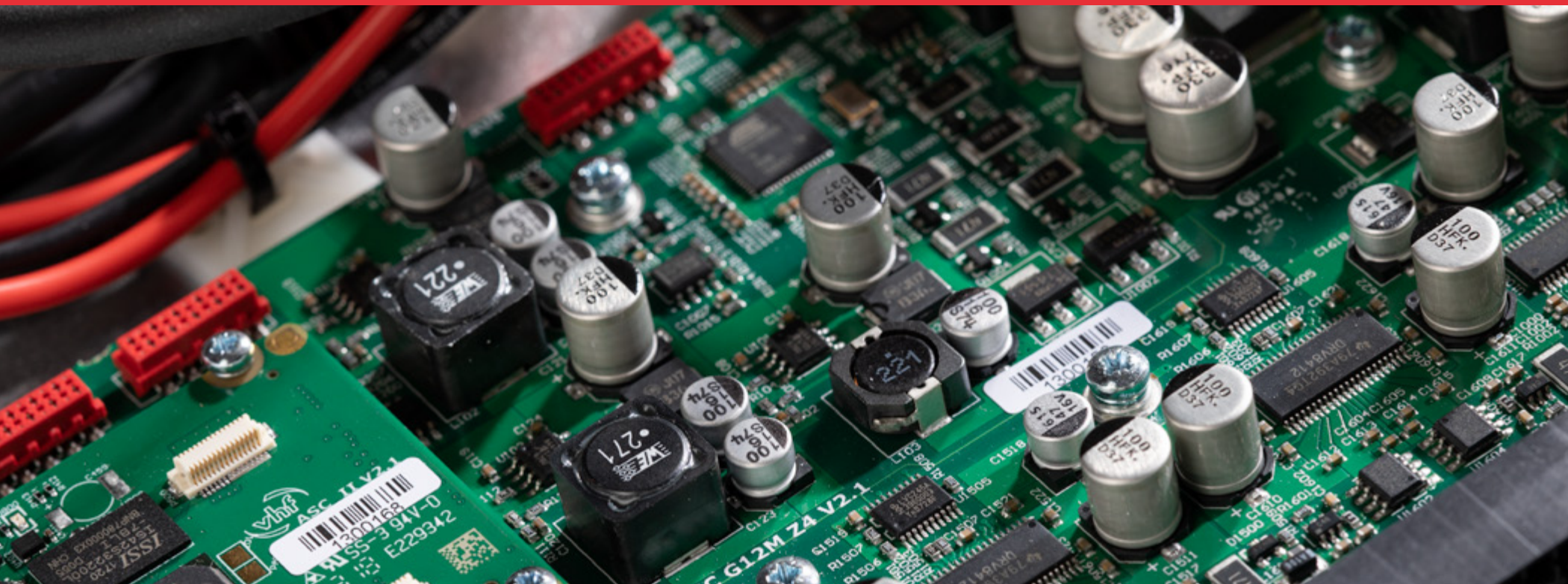
The B-axis is located directly on the spindle and rotates by  $\pm 35$  degrees. This means that the workpiece holder only needs one axis of rotation and the entire system gains stability – for even more accurate results!



Top:  
Ball screws ensure maximum accuracy with low wear.

Bottom:  
State-of-the-art control electronics offer best performance.

## HIGH-PRECISION RESULTS THANKS TO HIGH-PRECISION COMPONENTS.



Industrial-quality guides and drives, such as the rolled ball screws, enable you to achieve the most accurate results.



The R5 has a repetition accuracy of an incredible 3  $\mu\text{m}$ . This ensures that your restorations fit perfectly, every time.



State-of-the-art FPGA-based control technology from our sister company vhf elektronik GmbH guarantees you fast and smooth processes.



With spindle speeds of up to 80,000 rpm, your orders can be processed at maximum speed. Powerful 800 watts of performance offer you large power reserves.

## ECONOMIC EFFICIENCY: IT HAS NEVER BEEN AS DECISIVE AS IT IS TODAY.

### DIRECT DISC

The revolutionary blank fixation with our **DIRECTDISC** Technology saves valuable time through tool-free, one-handed clamping without complicated screwing.

### DIRECT CLEAN

The unique **DIRECTCLEAN** Technology enables wet and dry processing on the fly.

### PURE WATER

Thanks to **PUREWATER** no grinding additives are needed, except for titanium processing – that's user-friendliness from vhf. For you, this means: absolutely environmentally friendly, no costly environmental regulations and no expensive disposal of process water.



The water is reliably cleaned from chips and dust by various filters. The water container with the filters is easily accessible in the bottom housing flap.

10  
discs

Up to 10 blanks can be stored in the automatic changer and processed without interruption.

60  
blocks

Alternatively, the automatic changer system can store up to 60 blocks or 60 prefab abutments.

16  
tools

The easy-to-load, removable magazine for 16 tools enables non-stop operation without the need for user intervention.

### DIRECT MILL

The **DIRECTMILL** Technology is another highlight from vhf. This processing method has revolutionized the entire production of dental restorations: as soon as the first paths of milling are calculated by the CAM, the machine starts milling in parallel. This intelligent way of production saves you valuable time.





## MATERIAL, INDICATION, SCANNER, SOFTWARE: ENJOY THE FREEDOM OF CHOICE.

Being open to all materials has always been a matter of course at vhf. Thus, vhf continuously validates and expands the spectrum – and you benefit from constantly growing processing possibilities.

### Free choice of materials

The R5 offers you an almost unlimited choice of materials for machining in the 98 mm disc format. In addition, you can currently process over 50 block materials from a wide range of manufacturers – with more to come.

### Impressive choice

In addition, you can process more than 800 titanium and CoCr abutments from a wide range of manufacturers.

### Absolute variety

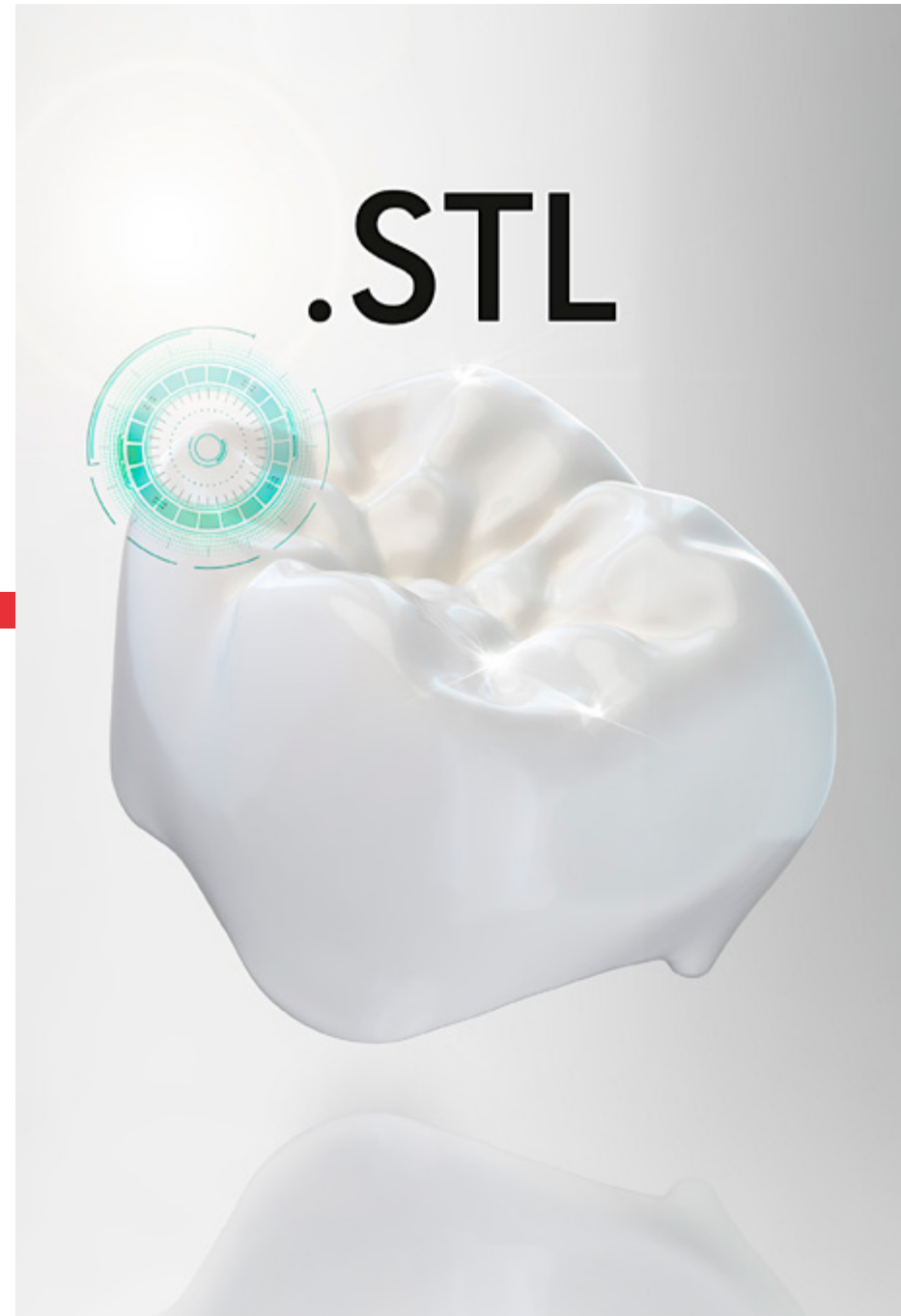
With the R5 you can fabricate crowns, bridges, fully anatomical crowns and bridges, inlays, onlays, abutments, telescopic crowns, models, model casts, bite splints, implant bars, veneers, drill templates, dentures and table tops, etc., from a wide range of materials. Easily design excellent restorations from plastics materials, wax, zirconia, composites, CoCr, model plaster, glass ceramic or titanium.

## THE FUTURE BELONGS TO OPEN SYSTEMS AND STREAMLINED WORKFLOWS.

Digital workflows have become an indispensable part of dentistry. With the R5 from vhf, you enjoy the full freedom of an open system. Due to the STL import, you have a connection to all common CAD programs. Via this standardized data format, which has been tried and tested in the 3D world for over 30 years, all desired indications can be transferred from the design (CAD) to the production stage (CAM) in a fast and reliable process and without any loss of quality. This allows you to initiate a reliable production process at any time.

*CAD = Computer Aided Design*

*CAM = Computer Aided Manufacturing*



## SCREW CHANNELS IN HIGHEST QUALITY.

With the R5 from vhf, screw channels for hybrid implant restorations can be easily drilled into ceramic blocks without any relevant difference in flexural strength compared to pre-drilled materials. Simply bypass the use of pre-drilled blocks and ease the nesting process at the same time.

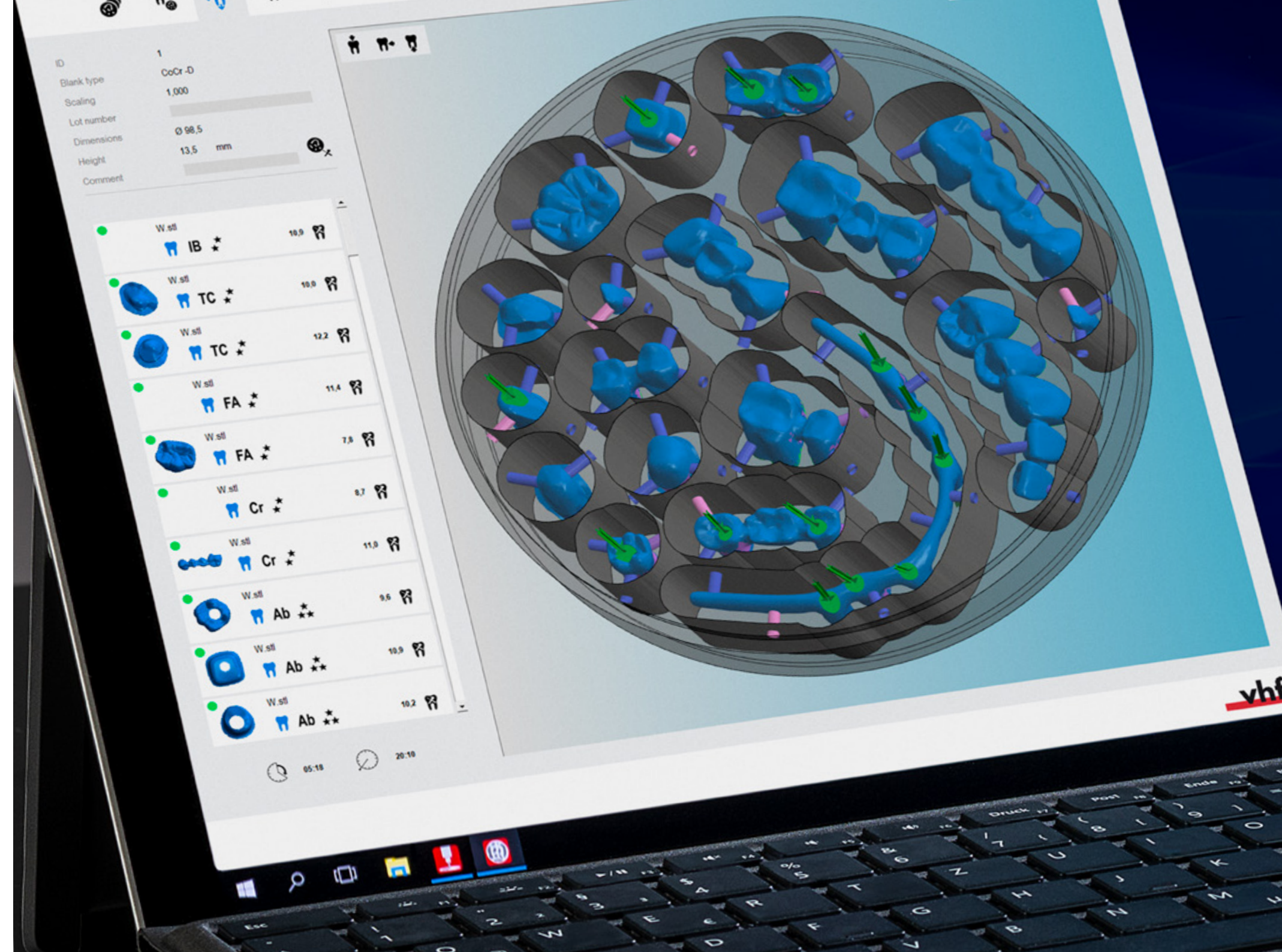
## INGENIOUSLY SIMPLE – THE DENTALCAM SOFTWARE.


While many companies can provide a machine – vhf provides a dental cam solution that includes the machine and CAM software for your digital workflow.

Software development has been an integral part of vhf's DNA for over 30 years and you benefit from it day by day. Perfectly matched to our dental machines, our **DENTALCAM** software offers you an intuitive user interface thanks to its clear user guidance and consistent 3-dimensional presentation – to get the best results.

Thanks to the **DIRECTMILL** Technology integrated in **DENTALCAM**, we reduce the workflow from preparation to production start enormously: For example, the duration from loading a simple crown to the start of milling on the machine is reduced to less than one minute. We call this maximum efficiency.

The **DENTALCAM** software package is already included in the R5 machine price. Ongoing software updates keep you up to date.





# ACCURATE

A RESTORATION IS ALWAYS  
ONLY AS GOOD AS THE TOOLS,  
WITH WHICH IT WAS MADE.

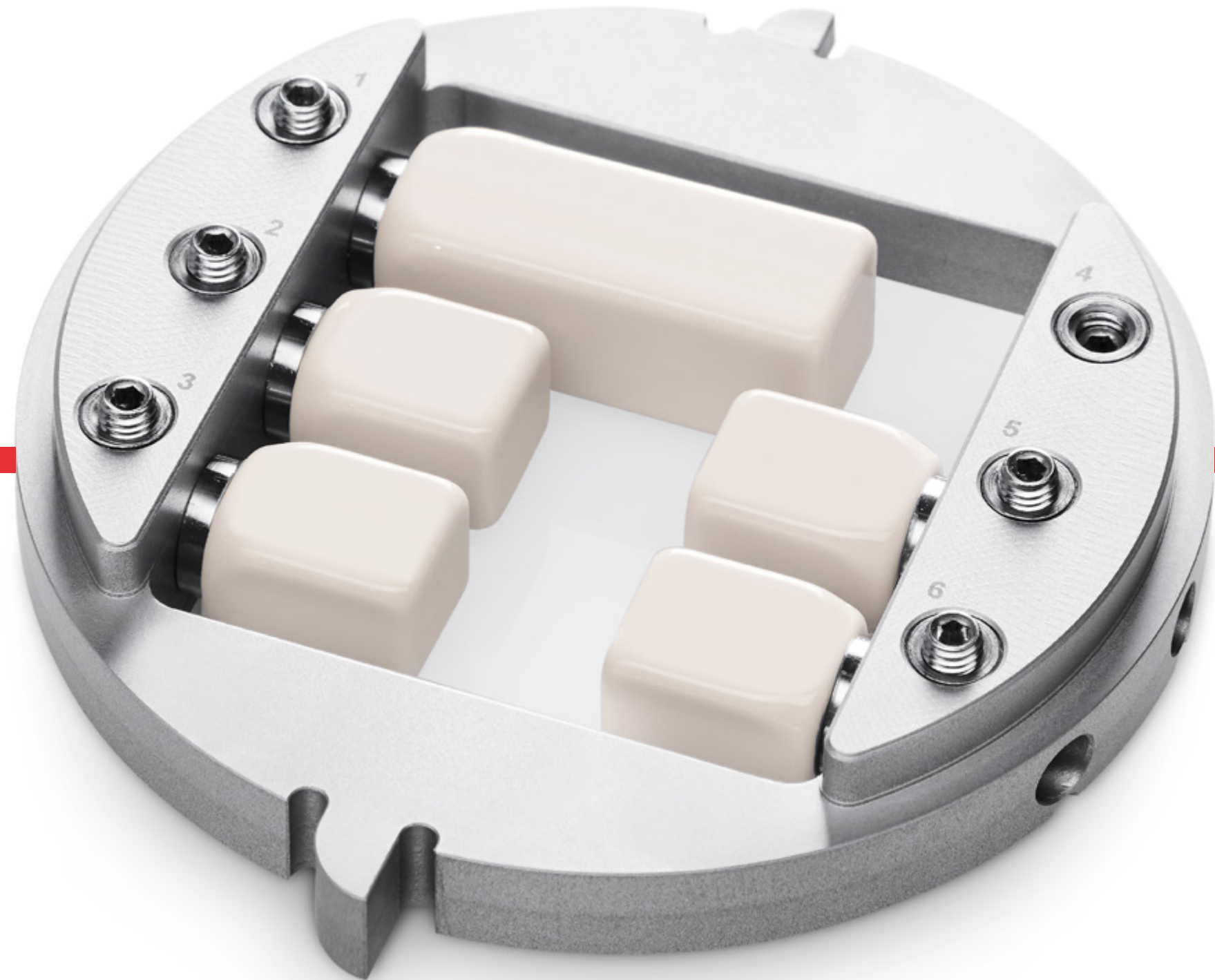
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## VHF DENTAL TOOLS ARE MANUFACTURED BY A PARTICULARLY QUALITY-CONSCIOUS SUPPLIER: OURSELVES.

The vhf tool specialists research and develop together with laboratory users and material manufacturers in order to produce the best possible tools. With our dental milling cutters and grinding tools, you can machine all materials commonly used in dental technology. The tools are available with optimized cutting edge geometries and adapted coatings. This ensures that for each material the optimum balance is achieved between the best possible surface quality of the material to be machined and the longest possible service life of the tool. By the way, vhf produces all dental tools itself: in its modern six- and seven-axis precision grinding centers directly at the company headquarters.

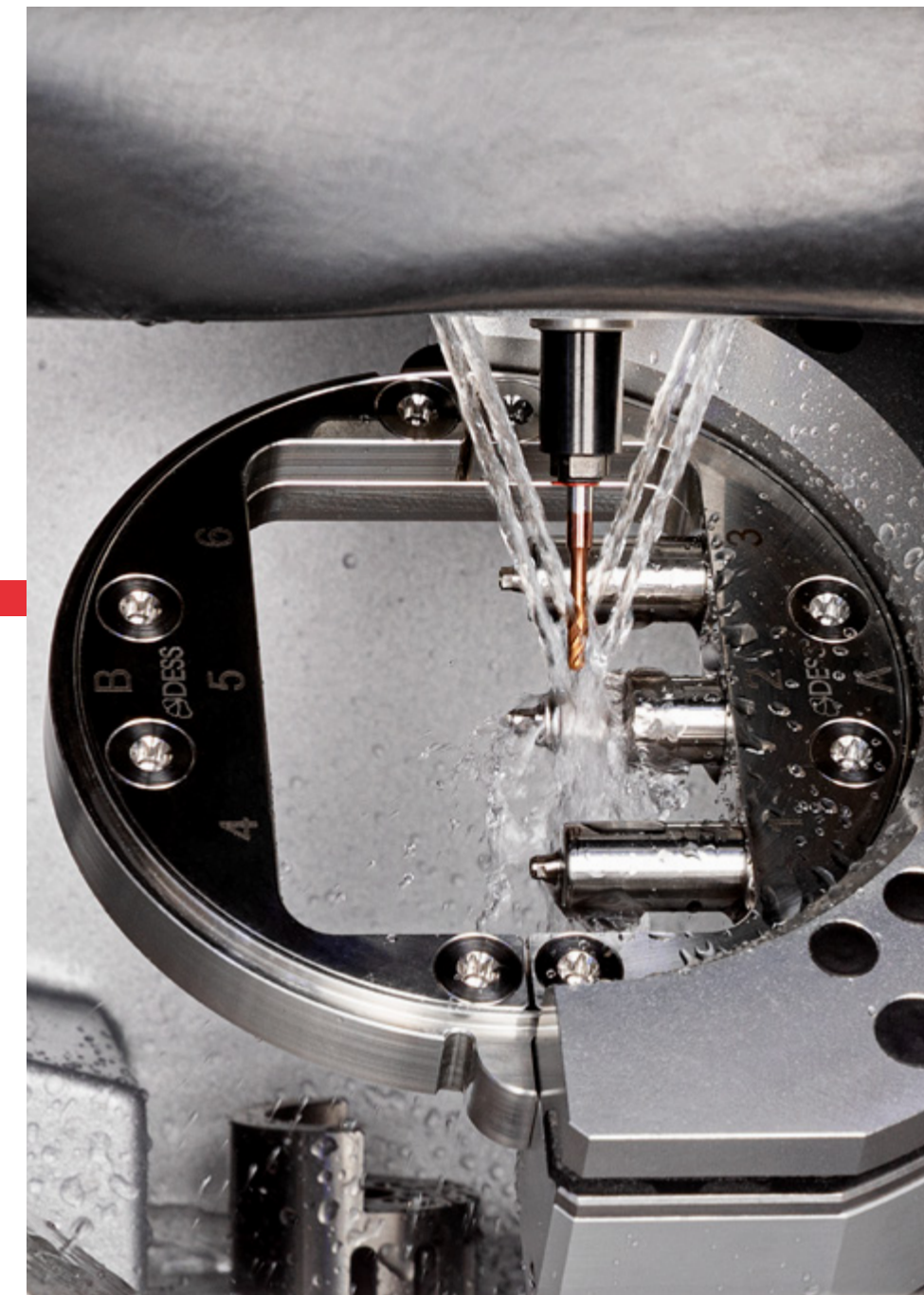






**PERFECTLY MATCHED  
TO YOU AND YOUR R5:  
ACCESSORIES FROM VHF.**

Of course, vhf also offers the matching block holders as well as abutment holders for all common systems. In this way, all operations can be completed with the R5 at the highest precision.



# A CLASS OF ITS OWN: SERVICE MADE BY VHF.

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As a pioneer in the dental CAM sector, service is a matter of culture for us. Together with our sales partners, we ensure that vhf users always achieve perfect results with their machine. For the technical service on our machines, we therefore train our specialist dealers intensively and regularly at our headquarters and online. For vhf customers, this means optimal support by their certified dealer.

The vhf machines are manufactured according to the highest quality standards and offer a long life cycle with low maintenance intervals. Should a repair be necessary, our authorized dealers or the vhf service team will help quickly and reliably. And finally, the 24-month warranty is an important part of the vhf service package.



# OUR CUSTOMERS SWEAR BY THE R5. SEE FOR YOURSELF WHY ...

No matter how convinced we are of the comfort, freedom and precision offered by our R5 dental milling machine, only one thing is important: that our customers are completely satisfied with this machine.



**Dr. Miguel Stanley**

Founder and CEO of White Clinic,  
Lisbon, Portugal

*“ This machine is literally milling everything and it is very user-friendly. It works with any product, STL file, and design system – this is complete freedom!*



Would you like to know how a complete workflow runs step by step with the R5? Then take a look at the video.



**Dr. Michael Scherer**

Dentist and dental CAD/CAM pioneer,  
Sonora, California

*“ When I go home, I literally have the R5 working and when I get back, 10 discs are ready for me in the next morning – this makes it really simple!*



You would like to know why the R5 is revolutionizing same-day dentistry? Then take a look at the video.

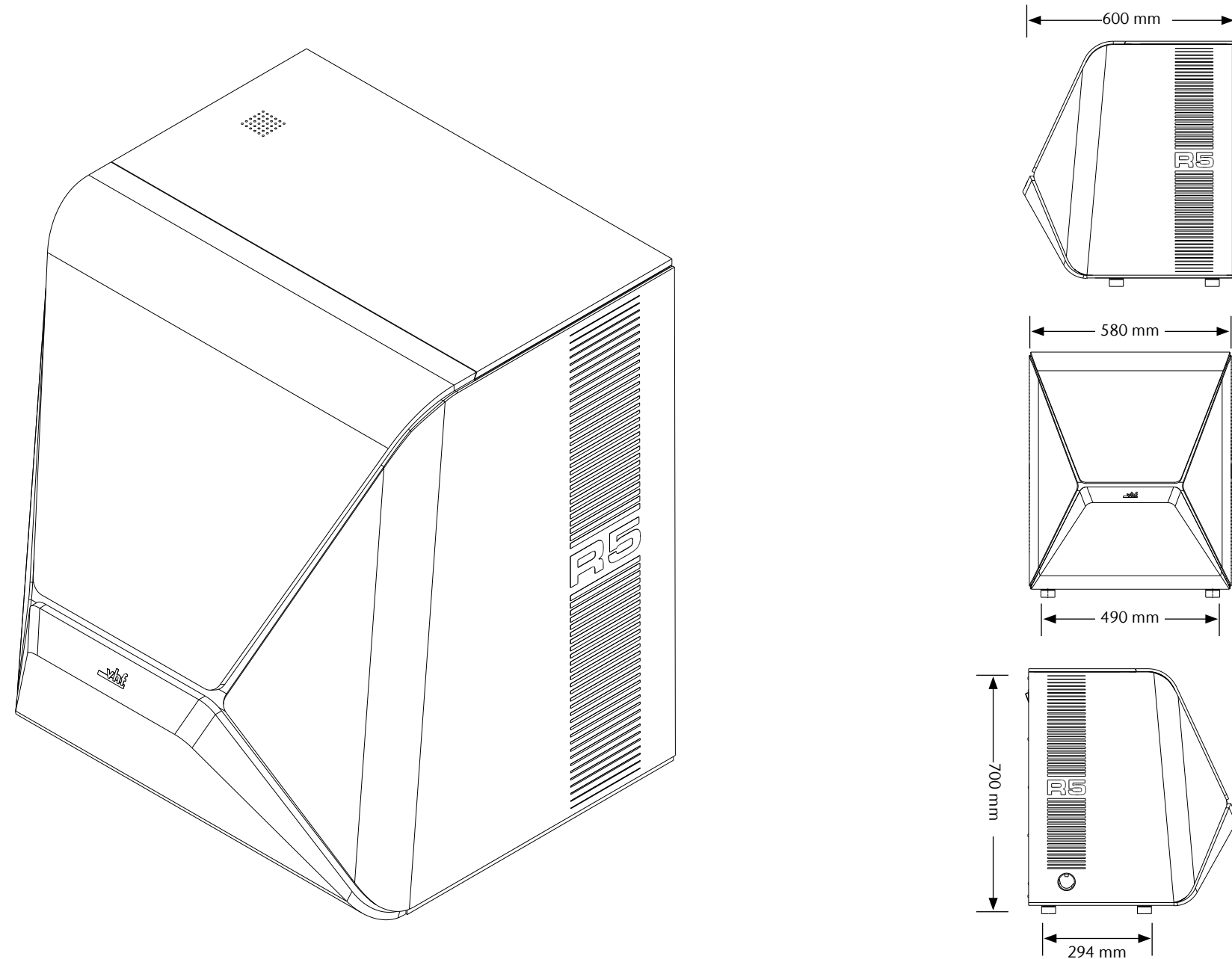


**Marko Haesler**

Owner of the dental laboratory Schlegel,  
Trebsen, Germany

*“ The results are consistently very good and the various technical refinements make everyday work much easier. We are thrilled with the option that the machine cleans itself after wet grinding, dries itself and can then immediately start a dry milling job automatically.*

# THE NUMBERS SPEAK FOR THEMSELVES. TECHNICAL DATA.



## GENERAL

<b>Fields of application</b>	Dry and wet machining
<b>Materials</b>	Plastic materials, wax, zirconia, composites, CoCr, model plaster, glass ceramics, titanium - Discs: height 10–40 mm, diameter 98.5 mm - Blocks up to 45 × 20 × 20 mm
<b>Indications</b>	Crowns, bridges, fully anatomical crowns and bridges, inlays, onlays, abutments, telescopic crowns, models, model castings, bite splints, implant bars, veneers, drilling templates, dentures, table tops etc.

## BASE SYSTEM

<b>Construction</b>	Machine bed made of solid cast aluminum body
<b>Housing</b>	Sheet steel, white high-gloss lacquer finish with working chamber door and flap combination for blank changer/cooling liquid tank
<b>Number of axes</b>	5
<b>Linear axes X-/Y-/Z-axis</b>	Precision ball screws, rolled version · motors with resolution < 1 µm · ground precision guides made of high-alloy steel · repetition accuracy ± 0.003 mm
<b>Rotary axis A-axis</b>	Backlash-free Harmonic-Drive® with highest concentricity · rotation angle: 360°, infinite
<b>Rotary axis B-axis</b>	Precision ball screw with rotary transmission · Angle of rotation: ± 35° · Axis arrangement in the tool
<b>Control unit</b>	5-axis simultaneous control electronics with continuous path progression and dynamic pre-calculation · hardware-based real-time operating system with standardised command set · FPGA-integrated processor · updateable hardware · real-time path calculation via dedicated hardware engines in the FPGA · four-quadrant control of the motors for particularly smooth running · multiple analogue and digital I/Os for controlling the peripherals · integrated inverter for synchronous and asynchronous motors, electronic gate detection · Ethernet and USB interface
<b>Lighting</b>	RGB LED lighting with status display (3x working chamber / 1x blank changer)
<b>Camera system</b>	Integrated in the working chamber for easy remote support and possibility of internal recording

## SPINDLE

<b>General</b>	High-frequency spindle, synchronous with pneumatic tool clamping · sealing air to prevent debris from entering · automatic cone cleaning
<b>Speed</b>	Up to 80,000 rpm
<b>Power</b>	Peak power (Pmax): 800 watts · nominal power (S6): 600 watts · continuous power (S1): 440 watts
<b>Bearing</b>	4-fold hybrid ceramic ball bearing · concentricity deviation at inner cone < 3 µm
<b>Collet</b>	Stainless steel collet with ceramic coating for tools with a shank diameter of 3 mm and max. 40 mm total length

## AUTOMATION

<b>Tool change</b>	Tool magazine for 16 tools, removable · Length measurement and tool breakage monitoring via precision measuring key
<b>Workpiece change</b>	Integrated blank changer for up to 10 blanks, block holders or abutment holders · Design in DIRECTDISC Technology · Robot arm with pneumatic gripper · Monitored end positions

<b>Access to the working chamber</b>	Motorized opening and closing of the working chamber, movement parallel to the chassis
<b>Access to combination chamber</b>	Access to the multi-purpose compartment containing the blank changer and cooling liquid tank via an electric flap

## PROCESSING MODES

<b>Dry</b>	Air nozzles on the spindle · Hose connection for external suction unit on the side of the housing · vacuum sensor for monitoring the suction unit · 24 V switch output for controlling suction units · Powerful ioniser with 2 ion nozzles
<b>Wet</b>	Liquid nozzles on the spindle · integrated cooling liquid tank (3 litres) with active carbon filter system · flow-sensor for monitoring the liquid supply · <b>PUREWATER</b> : no grinding additives except for titanium processing
<b>Wet / Dry</b>	<b>DIRECTCLEAN</b> Technology (ionization/rinsing/drying/ventilation) for any change between wet and dry processing

## CONNECTION REQUIREMENTS

<b>Compressed air</b>	6 bar · 100 l/min · 8 bar · 110 l/min · Air purity according to ISO 8573-1:2010
<b>Power</b>	100-240 volts · 50/60 Hz, 750 watts
<b>Extraction system</b>	Filter class M, 3500 l/min extraction capacity at 220 hPa
<b>Data</b>	10/100/1000 Mbit/s BaseT port (auto-sensing) Ethernet via RJ-45 socket

## ENVIRONMENTAL CONDITIONS

<b>Operating temperature</b>	Between 10 °C and 35 °C
<b>Air moisture</b>	Max. 80 % (relative), non-condensing

## APPROVALS

<b>All models</b>	CE, VDE
<b>North America model</b>	UL, FCC (according to ANSI/UL 61010-1)

## DIMENSIONS & WEIGHTS

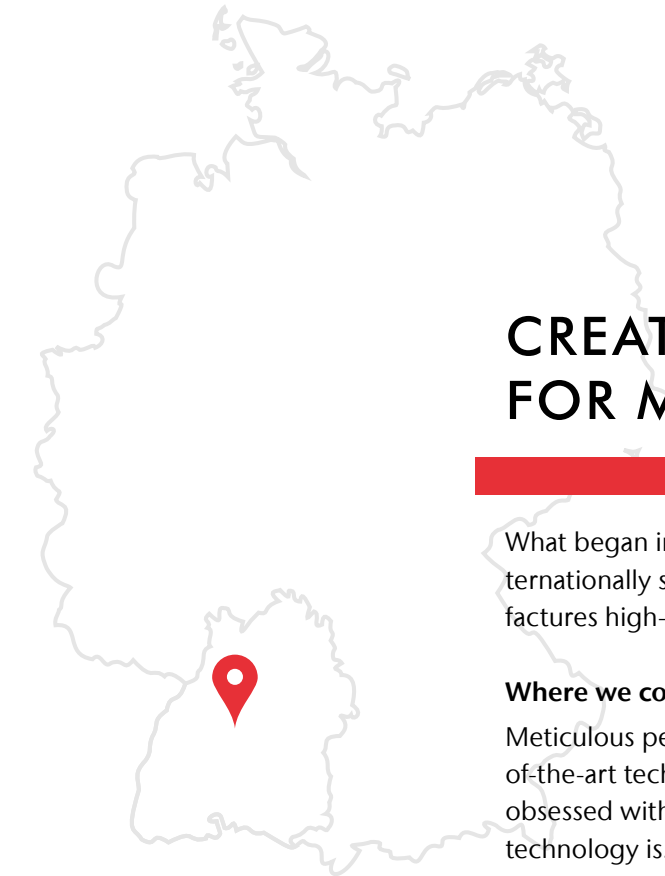
<b>Dimensions (W/D/H)</b>	580 × 600 × 700 mm with closed flap 580 × 720 × 880 mm with open flap
<b>Footprint (W/D)</b>	490 × 294 mm
<b>Weight</b>	150 kg

## SCOPE OF DELIVERY

<b>CAM Software</b>	DENTALCAM software included
<b>Holder systems</b>	Abutment holders for various systems (optional)
<b>Accessories</b>	Spindle service set · calibration set incl. micrometer · brush for nozzle plate · cleaning brush · microfibre cloth · spare filters · active carbon pellets · Tec Powder (3 bags) · spare wiper for viewing window · tool magazine inserts (1 piece) · Torque wrench · 2 Allen wrenches · drill bit (tool positions) · measuring pin · power cable · Ethernet network cable · carrying aid for transporting the machine · operating instructions



Home of high-tech:  
the R5 is manufactured  
on the vhf campus,  
south of Stuttgart.



## CREATING PERFECTION: FOR MORE THAN 30 YEARS.

What began in 1988 as a start-up by young technology enthusiasts has become today an internationally successful company. With more than 300 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. We will gladly show you our production process during a guided tour at our facilities.

## QUALITY RUNS IN THE FAMILY. THE SAME-DAY DENTISTRY MACHINE Z4.

You only want to process blocks and prefab abutments?  
Then the little brother of the R5 is the right mill for you.

The Z4 with its digital integrated workflow enables more  
pleasant patient treatment with first-class crowns in just  
one session.

More at [vhf.de/en/Z4](http://vhf.de/en/Z4)



**Z4**

**R5**



# CREATING PERFECTION



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