

# Top performance. Nonstop.

The high-endurance top performer for wet and dry processing of blocks and discs in the laboratory.



PERFORMANCE CLASS

# Milling from dusk to dawn. And even longer.

Convenient manufacturing around the clock: dry, or wet as an option.

## High degree of automation

The S5 is a 5-axis highly automated milling and grinding machine. You benefit from non-stop performance thanks to an eight-fold blank changer and a 16-fold tool magazine.

With a small flap in the left front, simply load the blank changer with up to eight discs or holders for blocks or abutments. The machine automatically inserts the correct blank for your milling job. Then, without requiring any operating steps, the S5 works for you around the clock.

The repetition accuracy of 3 µm ensures first-class results every time while the second rotary axis (B axis), with its tilt angle of up to  $\pm 30$  degrees, enables precise milling of undercuts as well.

## Diversity that pays dividends

The machine bed made from a solid cast body makes the S5 extremely stable at compact external dimensions. In

addition, vibrations are reduced and the mechanics are optimally protected – for reliable first-class blank quality.

The high machine rigidity and the powerful spindle also enable metal processing. With the optional wet grinding module, the S5 is also suitable for wet processing of glass ceramics or titanium. Due to its many innovative features, it works extremely economically and efficiently. Your advantage: maximum indication versatility at a fair price.

## Everything stays clean

The three integrated ionizers considerably reduce the cleaning effort on the S5 by essentially neutralizing the static charge of acrylic chips, such as PMMA. Air nozzles that distribute the ionized air in the working chamber support this feature.

## Retrofit at any time:

### Double your options with the wet grinding module

The S5 can be equipped with a wet grinding module. Liquid nozzles are already mounted to the spindle to cool the tool during grinding. In the separate unit, an air circulation system separates the extraction mixture of air and liquid into two circuits. The wet grinding module can therefore be operated with a dry suction unit. Double your options with the S5 and benefit from very simple handling!



Very precise and super fast –  
the results are almost  
like polished.



Kris Schermerhorn  
Northern Virginia Dental Lab  
Triangle, Virginia/USA



With the wet grinding option (top), the S5 can do both: wet grinding of materials such as glass ceramics and dry milling of materials such as plastics, zirconia or CoCr (left).

# Compelling arguments? Lots of them!

The key features of the S5.

## Fast & precise

Mills the hardest materials on the market in ultra HD

Premium spindle with precision bearings, powerful 600 W and 60,000 rpm

3 µm repetition accuracy

Machine bed made of a solid cast body for the lowest vibrations

100% developed and manufactured in Germany

## Independent

Sheer unlimited material variety in 98 mm disc format, around 40 block materials and 800+ prefabricated titanium and CoCr abutment blanks

Great indication versatility thanks to a rotating angle of ± 30° in the 5<sup>th</sup> axis and blanks with a thickness of up to 30 mm (metals up to 22 mm)

Optional wet grinding module

Processing of all materials. including CoCr, titanium and glass ceramics

## Cost-effective

Milling and grinding around the clock with an automatic changer for 8 discs, 24 blocks or 48 prefabricated abutment

Automatic changer for 16 tools

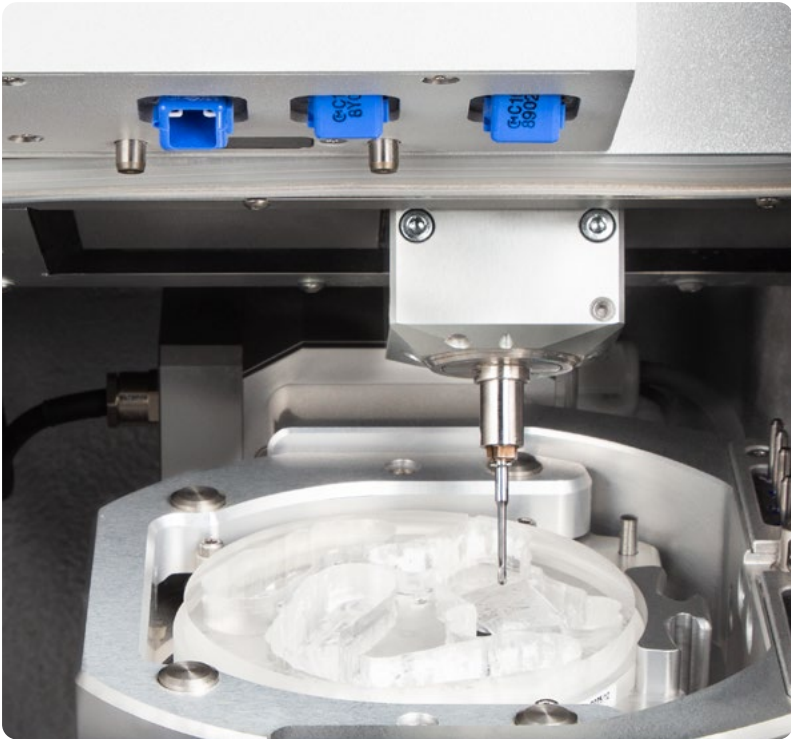
3 ionizers for easy machine cleaning

1 QuickFrame magnetic holder for tool-free clamping of discs

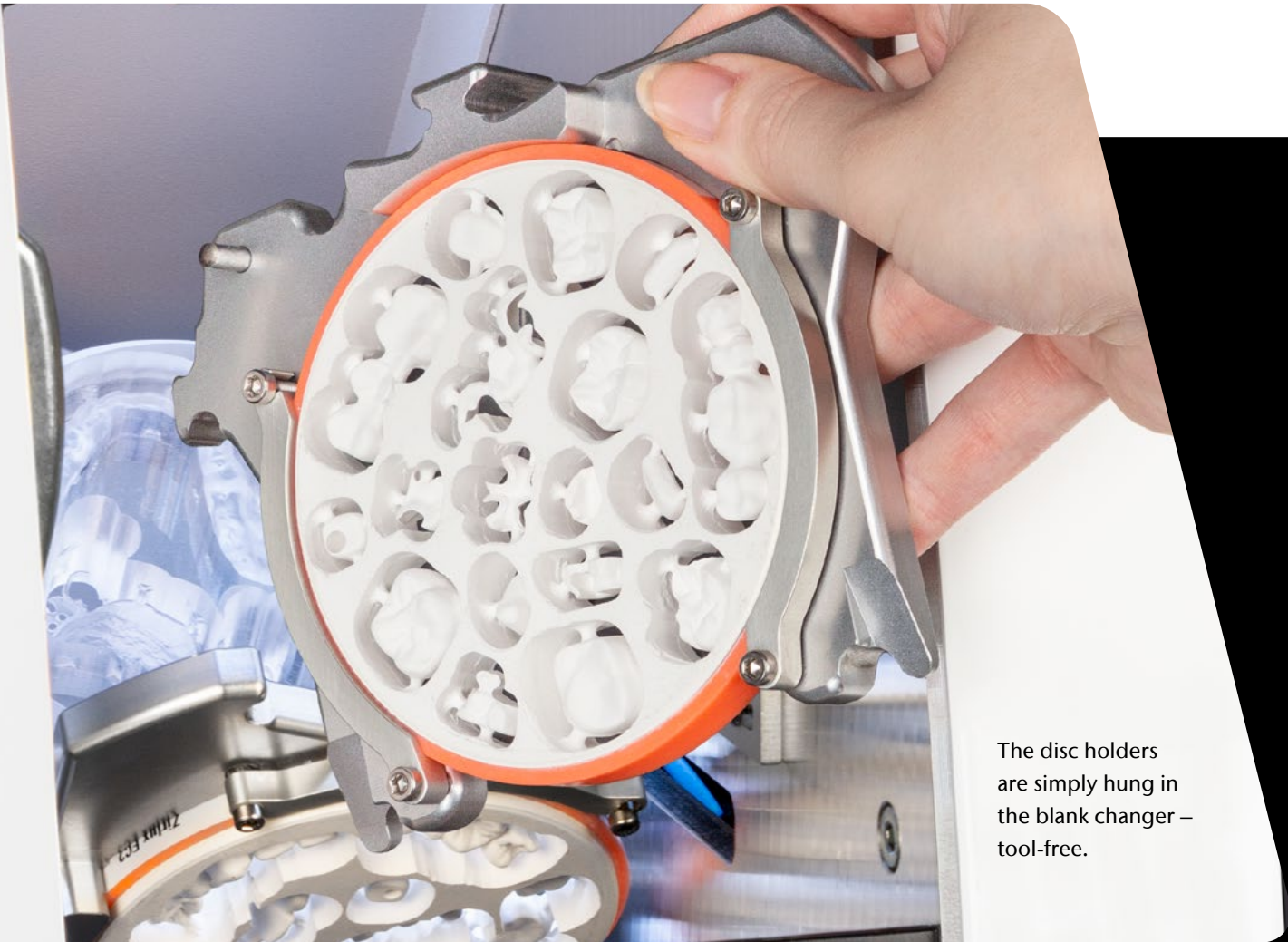
Ultra-easy operation with dentalcam and its open interface to CAD software and materials



QuickFrame magnetic holder for tool-free clamping of discs (one holder is included in the scope of delivery).



The three integrated ionizers (blue nozzles) neutralize the static charge of acrylic chips – for a clean working chamber and minimal cleaning effort.



The disc holders are simply hung in the blank changer – tool-free.

## Material, manufacturer, indication.

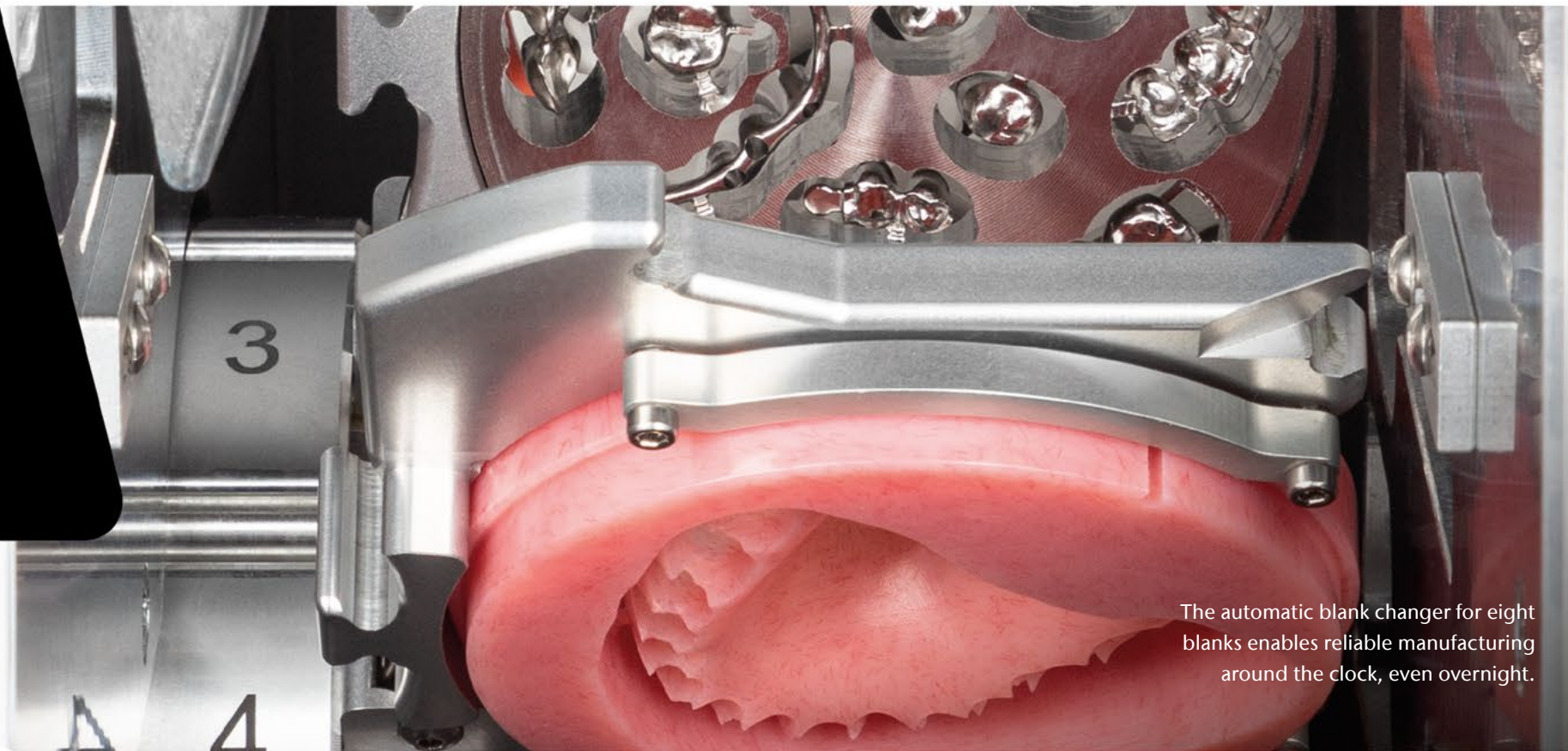
Enjoy the freedom of choice.\*

|                                                                                                             |                                                                                                     |                                                                                                            |                |
|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------|----------------|
|  Crown   Bridge        |  Inlay   Onlay |  Veneer               | Composites     |
|  Occlusal splint       |  Full denture  |  Denture-framework    | Plastics Wax   |
|  Implant bar           |  Abutment      |  Screw-retained crown | Glass ceramics |
|  Screw-retained bridge |  Surgery guide |  Primary crown        | Zirconia       |
|  Secondary crown       |  Model plate   |  Model tooth die      | Titanium       |
|                                                                                                             |                                                                                                     |                                                                                                            | CoCr           |

\* Be sure to review local and/or national regulations and/or regulations by other authorized organizations or entities (e.g. professional associations, health authorities).

Our milling machines run six days a week, 24 hours a day. The ionizer turns cleaning into child's play. Unbelievable how well it works!

Jay Collins  
CEO Cornerstone Dental Labs  
Bristol, Pennsylvania/USA



The automatic blank changer for eight blanks enables reliable manufacturing around the clock, even overnight.

## Technical data

### General

**Fields of application:** Dry and wet machining

**Materials:** Plastic materials, wax, zirconia, composites, CoCr, model plaster, glass ceramics, titanium

- Discs, height 10–30 mm (metals up to 22 mm), diameter 98.5 mm
- Blocks up to 45 × 20 × 20 mm

**Indications:** 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.

**Warranty:** 24 months/2,000 hours of operation (whichever comes first)

### Base system

**Construction:** Machine bed made of solid cast aluminum body

**Housing:** Sheet steel housing, white high-gloss lacquer finish with working chamber flap and material changer flap

**Number of axes:** 5

**Linear axes (X-/Y-/Z-axis):** Precision ball screws · motors with resolution < 1 µm · ground precision guides made of high-alloyed steel · repetition accuracy ± 0.003 mm

**Rotary axis (A-axis):** Backlash-free Harmonic-Drive® with highest concentricity · rotation angle: 360°, infinite

**Rotary axis (B-axis):** Precision ball screw with rotary transmission · rotation angle: ± 30° · axis arrangement in the workpiece

**Control unit:** 5-axis simultaneous control electronics with continuous path progression and dynamic pre-calculation · hardware-based real-time operating system with standardized command set · FPGA-integrated processor · updateable hardware · real-time path calculation via 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, gate detection · Ethernet and USB interface

**Lighting:** RGB LED lighting with status display in the working chamber and in the blank changer

### Spindle

**General:** High-frequency spindle, synchronous with pneumatic tool clamping · sealing air to prevent debris from entering · automatic cone cleaning

**Speed:** Up to 60,000 rpm

**Power:** Peak power ( $P_{max}$ ): 600 watts · nominal power (S6): 450 watts · continuous power (S1): 300 watts

**Bearing:** 4-fold hybrid ceramic ball bearing · concentricity deviation at inner cone < 3 µm

**Collet:** Stainless steel collet for tools with 3 mm shank diameter and max. 40 mm total length

### Automation

**Tool change:** Tool magazine for 16 tools · length measurement and tool breakage monitoring via precision measuring key · access via working chamber flap, safety-locked

**Workpiece change:** Material changer for up to 8 discs, block holders or abutment holders · robot slide with pneumatic gripper · monitored end positions · access via separate material change flap, monitored

### Processing modes

**Dry:** 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 switching output for controlling suction units · ionizer with 3 ion nozzles

**Wet:** Liquid nozzles on the spindle · flow-sensor for monitoring the liquid supply · optional wet grinding module with optical level indication by permanent, non-contact ultrasonic measurement and air circulation system is not included and is required

### Connection requirements

**Compressed air:** 6 bar: 60 l/min up to 8 bar: 73 l/min · air purity according to ISO 8573-1:2010

**Power supply:** 100–240 volts · 50/60 Hz, 850 watts

**Extraction system:** Filter class M, 3,000 l/min extraction capacity at 220 hPa

**Data:** USB connection

### Environmental conditions

**Operating temperature:** Between 10 °C and 35 °C

**Air moisture:** Max. 80 % (relative), non-condensing

### Approvals

**All models:** CE, VDE

**North America model:** UL, FCC (according to ANSI/UL 61010-1)

### Dimensions & weights

**Dimensions (W/D/H):** 700 × 444 × 561 mm · 700 × 683 × 561 mm with open flaps

**Footprint (W/D):** 599 × 266 mm

**Weight:** 106 kg

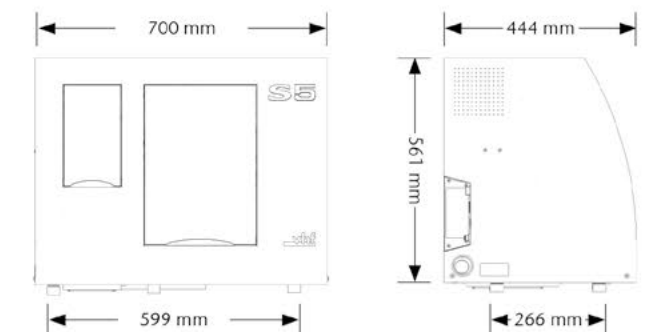
### Scope of delivery & accessories

**CAM software:** vhf dentalcam

**Holder systems:** Disc holders (8 pieces) · QuickFrame holder · 3-fold block holders · abutment holders for various systems (optional)

**Accessories:** Spindle service set · calibration set incl. stirrup measuring screw · working chamber crevice nozzle · tool magazine inserts (2 pieces) · spare screws for blank holder and tool magazine cover · Torx and Allen wrenches · emergency release key · drill bit (tool positions) · measuring pin · compressed air hose with pressure reducer · power cable · USB cable · carrying aid for transporting the machine · operating instructions

Subject to changes and errors.



# The PERFORMANCE CLASS at a glance.

The top performers in the dental laboratory.

The **PERFORMANCE CLASS** machines are top performers in the dental laboratory, allowing you to work ultra-efficiently. Here we offer pure dry or wet processing machines as well as a combination thereof.

The **K5** is the compact and high-quality specialist for dry processing of discs. The **K5+** also offers a significant plus in comfort and spindle performance.

The **N4+** is the ideal addition to the K models for wet processing of blocks. Combined, the two machines can handle almost any indication.

The **S5** is a dry milling machine equipped with an eight-fold material changer. It also offers the optional grinding and milling glass ceramics or prefabricated abutments with an optional wet grinding module.



## CREATING PERFECTION.

**vhf – synonymous with innovation and perfection since 1988.**

With over 35 years of experience in mechanical engineering, vhf is one of the leading manufacturers of dental milling machines. As a full-service CAM provider, vhf carefully develops and produces every single milling machine as well as the perfectly matched tools and software completely in-house. Everything from a single source. Made in Germany.

**Service. A matter close to our hearts.**

Despite their short maintenance intervals and particularly long service lives, servicing your machines is very important to us. We support you with our user-friendly dental**portal**, numerous online tutorials and personal support through our international service network.



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