Full efficiency in wet processing.

Your top performer in the laboratory for wet grinding and milling of blocks and titanium abutments.

PERFORMANCE CLASS

vhf
CREATING PERFECTION

Our compact wet milling powerhouse.

The powerful best-seller for wet processing almost all materials.

The essence of wet grinding

The N4+ from vhf's **PERFORMANCE** CLASS is an efficient wet processing machine for grinding and milling blocks made of glass ceramics, composites and zirconia as well as CoCr and titanium abutments. It is impressive not only due to its high precision and fast drives, but also its ultra-compact housing with a closed fluid circuit. Eight fine nozzles on the spindle direct the cooling liquid precisely onto the effective area between the tools and the blank, delivering an optimal cooling effect with the cost-saving use of cooling liquid.

The N4+ also has plenty of power for fast results: The machine's spindle offers a strong 800 W of power and can achieve rotational speeds of up to 80,000 rpm.

The top performer for your laboratory

These performance features make the N4+ the ideal machine for demanding wet processing and turned it into a best seller. You can process up to three blocks or prefabricated abutments at the same time, saving you valuable time for material changes.

The N4+ is also the ideal addition to our K5+ specialist for dry milling discs. Combined, these two machines can handle almost any laboratory indication.

Screw channel manufacturing

Another highlight of the N4+: You can use it to easily drill screw-access channels for hybrid implant restorations in ceramic blocks. Their strength does not differ significantly from factory pre-drilled materials. In fact, such "meso" blocks are significantly more expensive and their nesting process more challenging. This gives you two advantages: greater ease of use alongside reduced costs.

Scientific study confirms:

Tested precision with the N4+

Scientists at the University of Washington confirm the N4+'s outstanding precision of -10 µm to +26 µm in the demanding milling of titanium abutments.

Did you know?

Spindle bearings with major impact on milling quality

That is why vhf uses a 4-fold hybrid ceramic bearing for the milling spindle – particularly advantageous for processing metals. You benefit from a longer spindle service life, better surface quality and accuracy of fit of your milled objects.

Ideal for any practice laboratory that wants to provide dentists with high-quality dental restorations quickly and easily.

Janine Sparks, CDT
University of Maryland,
Baltimore, USA

With the N4+, your work is particularly sustainable – thanks to pure**water** Technology, no grinding additives are required, except for titanium processing.

Compelling arguments? Lots of them!

The key features of the N4+.

Fast & precise

Milling and grinding in ultra HD

Premium spindle with 4-fold ball bearing made of hybrid ceramic for maximum concentricity

Ultra-high rotational speeds of up to 80,000 rpm with 800 W of power

Water cooling for perfect results, even in continuous operation

3 µm repetition accuracy

Industrial-grade quality made in Germany with solid cast body

Independent

Around 40 machinable block materials from a great variety of manufacturers – and the trend is rising

1300+ implant platforms for prefabricated titanium and CoCr abutments from a wide range of manufacturers

Ideal for laboratories and practice labs

Cost-effective

pure**water**: no grinding additives required, except for titanium processing

Work on up to 3 blocks up to 45 mm in length at the same time

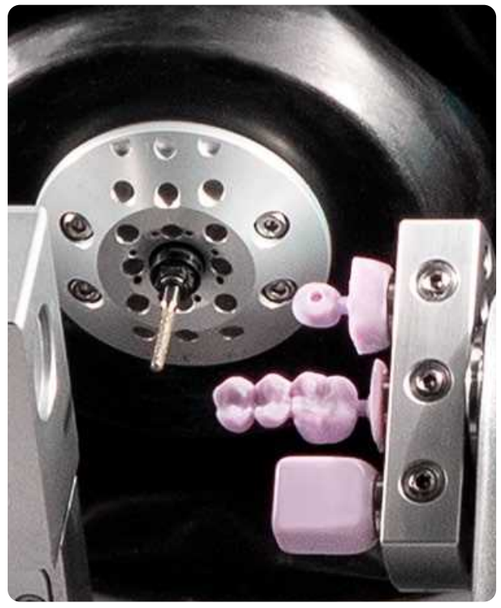
Milling screw-access channels – saves costs for meso blocks

Conveniently removable tank

Automatic changer for 8 tools

Ultra-easy operation with dental**cam** and its open interface to CAD software and materials

The large fluid tank can easily be removed from the drawer. The integrated activated carbon filter system ensures a clean cooling liquid.



With the N4+, you can machine blocks up to 45 mm in length – and do so particularly quickly thanks to the high spindle speeds and 800 W of power.

The effortlessly removable tool magazine offers space for eight tools and can be conveniently equipped outside the machine.

Material, manufacturer, indication.

Enjoy the freedom of choice.*

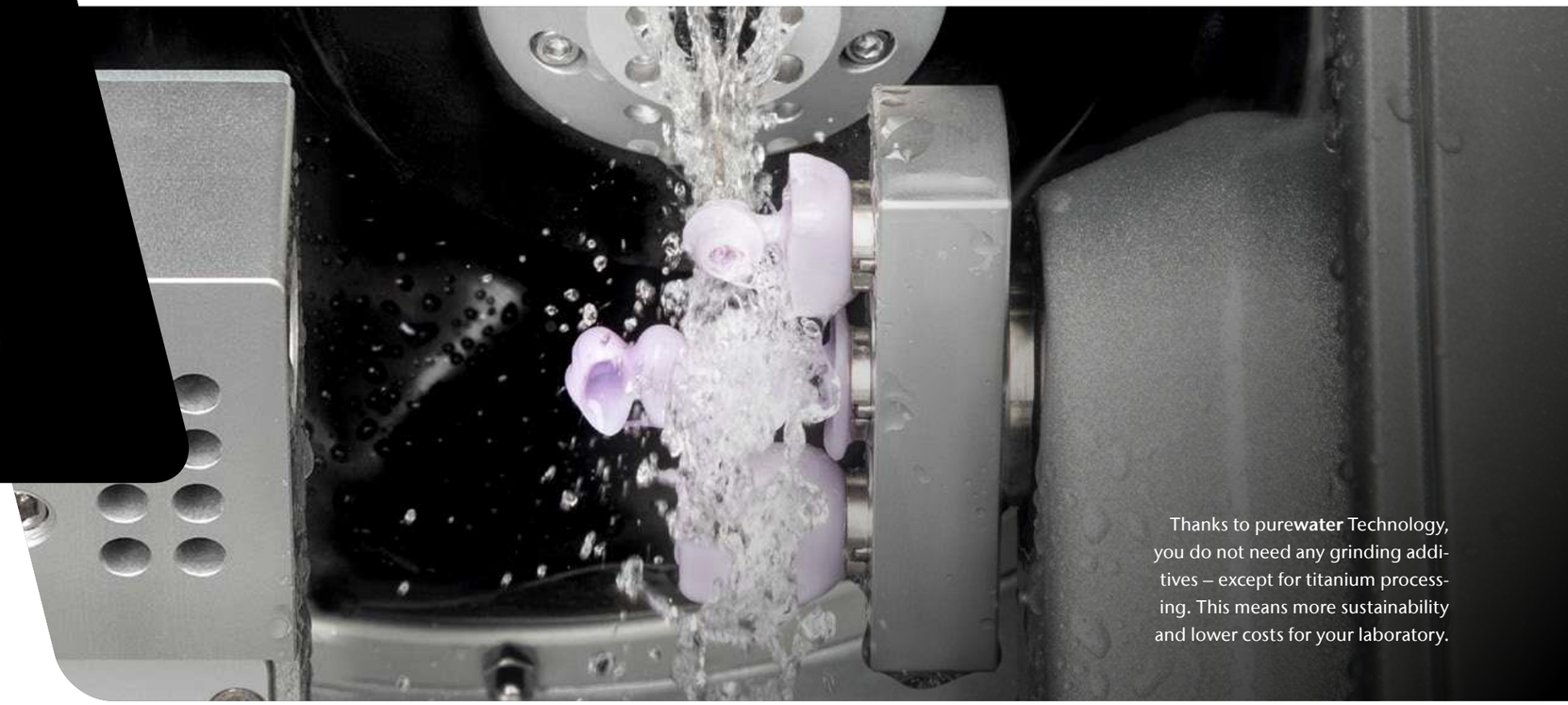
Crown | Bridge	Inlay | Onlay	Veneer
Occlusal splint	Full denture	Denture-framework
Implant bar	Abutment	Screw-retained crown
Screw-retained bridge	Surgery guide	Primary crown
Secondary crown	Model plate	Model tooth die

- Composites
- Plastics Wax
- Glass ceramics
- Zirconia
- 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).

I was surprised how easy to use and reliable the N4+ is. The workflow is unbelievably fluid, in particular when milling disilicate crowns on implants, veneers, and inlays.

Ricardo Schäfer
Schäfer Dental+Lab, Buenos Aires, Argentina



Thanks to pure**water** Technology, you do not need any grinding additives – except for titanium processing. This means more sustainability and lower costs for your laboratory.

Technical data

General

Fields of application: Wet machining

Materials: Glass ceramics, titanium, zirconia, composites, plastic materials

• Blocks up to 45 × 20 × 20 mm

Indications: Crowns, bridges, fully anatomical crowns and bridges, inlays, onlays, abutments, veneers, table tops

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 cooling liquid tank integrated in the drawer

Number of axes: 4

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

Rotary axis (A-axis): Rotary axis with high run-out accuracy · rotation angle: 200°

Control unit: 4-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 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

Lighting: RGB LED lighting with status display

Camera system: Integrated in the working chamber for easy remote support and possibility of internal recording

Spindle

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

Speed: Up to 80,000 rpm

Power: Peak power (P_{max}): 800 watts · nominal power (S6): 600 watts · continuous power (S1): 440 watts

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

Collet: Stainless steel collet with ceramic coating for tools with 3 mm shank diameter and max. 35 mm total length

Automation

Tool change: Tool magazine for 8 tools, removable · length measurement and tool breakage monitoring via precision measuring key · access through working chamber door, safety lock

Processing mode

Wet: Multiple fluid nozzles on the spindle · integrated cooling liquid tank (3.5 litres) with active carbon filter system · flow-sensor for monitoring the liquid supply · pure**water**: no grinding additives necessary, except for titanium processing

Connection requirements

Compressed air: 4 bar: 25 l/min up to 8 bar: 45 l/min · air purity according to ISO 8573-1:2010

Power supply: 100 – 240 volts · 50/60 Hz, 640 watts

Data: 10/100/1000 MBit/s BaseT port (auto-sensing) Ethernet via RJ-45 socket

Environmental conditions

Operating temperature: Between 10 °C and 35 °C

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

Approvals

All models: CE, VDE

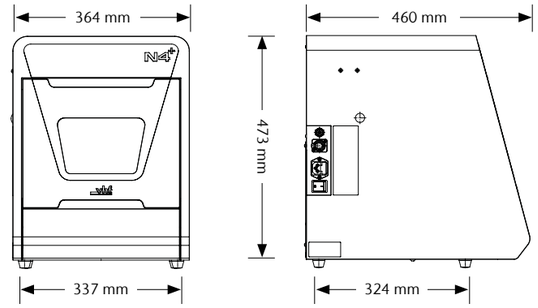
North America model: UL 61010-1, CAN/CSA C22.2 No. 61010-1 (pending)

Dimensions & weights

Dimensions (W/D/H): 364 × 460 × 473 mm · 364 × 667 × 473 mm with open flap and drawer

Footprint (W/D): 337 × 324 mm

Weight: 52 kg



Scope of delivery & accessories

CAM software: vhf dental**cam**

Holder systems: Abutment holders for various systems (optional)

Accessories: Spindle service set · calibration set incl. micrometer · Tec Liquid set · brush for nozzle plate · cleaning brush · spare fine filter · active carbon pellets · Tec Powder (3 bags) · tool magazine inserts (2 pieces) · spare screws blank holder · torque wrench · emergency release key · drill bit (tool positions) · measuring pin · compressed air hose with pressure reducer · power cable · Ethernet network cable · carrying aid for transporting the machine · operating manual

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 option of 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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