

CNC machines | tools



for dental laboratories



Welcome

► N4 Impression

Wet grinding of glass ceramics/composites and milling of titanium in the smallest space without external unit. Ideal for the practice laboratory. ► **page 6**

4

Axes

3

Blocks

8

Tools

Wet

Grind
&
Mill

► K4 edition

The compact milling machine with automatic tool changer for a wide range of materials and indications. ► **page 10**

4

Axes

1

Disc

7

Tools

Dry

Mill



► K5 Impression

5 axis dry milling of extra thick blanks or blocks with an especially great rotation range for challenging tasks. ► **page 12**

5

Axes

1

Disc

16

Tools

Dry

Mill



► S1 | S2 Impression

Highest automation grade for efficient machining with blank changer. For dry milling and optionally also for wet grinding. ► **page 16**

5

Axes

8

Discs

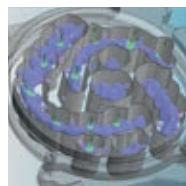
16

Tools

Dry
Wet &Mill
Grind &

► DentalCAM software

A powerful software package which does not require any previous knowledge due to its clearly structured user guidance. ► **page 26**



► Tools

Radius cutters, cylindric cutters and grinding tools with sophisticated cutting edge geometries for all common dental materials. ► **page 30**



vhf camfactory AG



vhf camfactory AG

Since 1988, vhf camfactory AG has been a manufacturer of highly precise, fast and robust **CNC milling machines**. Possible fields of application extend from micro-machining to large-volume mould making. Since 2008, vhf has successfully taken part in the dental market with its micro-machining systems of the Impression line.

The company has its headquarters in Ammerbuch which is approximately 30 kilometres southwest of Stuttgart. At the moment vhf has a staff of more than 200 employees and has a **manufacturing capacity of 3,000 machines** per year. In 2016 vhf has established a new **U.S. subsidiary** in Hauppauge, NY, from where we can better advise and support our American dental partners.

The secret of **success**...

With more than **25 years of experience in machine-building** and the **development of CAM software** as well as with the competence of our partners from the vhf group, we achieve a **high in-house production depth**: the complete **electronics** originate from the vhf elektronik GmbH and all **milling tools** are developed and produced by the vhf tools AG.

The vhf camfactory AG does not only all (technical) **design works**, we also manufacture the machine parts for the dental systems on **vhf industrial milling machines**. In our final assembly, the machines are built together and tested extensively. It is this high in-house production depth that makes the **sensational market price** of the vhf machines possible – and you as our partner can realize **top profit margins** though.



Made in Germany

Welcome

Distribution via **resellers only**

vhf milling and grinding machines for dental technology are exclusively available through OEM partners and the specialised trade. vhf does not directly sell to end customers – hence we are not competing with you. As **vhf reseller** you sell the machines in the classic vhf look in your respective sales area. As **OEM partner** you sell the machines in your own design and can distribute them world-wide.

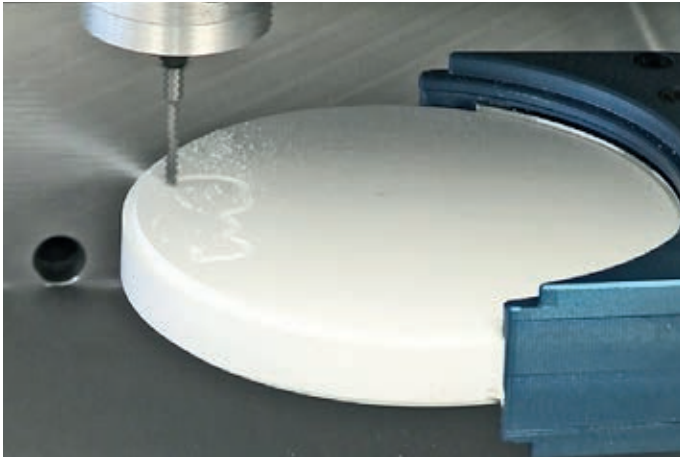
The OEM machines are real **masters of disguise**: Depending on the purchase quantity, OEM systems either get a different-coloured coating or even an individual housing construction. Furthermore, in an OEM partnership **individual agreements** are possible. In any case, **confidentiality** is very important for us in such a partnership – each OEM partner may decide whether their company is listed as a vhf reseller or not.



Out of the **box**

vhf's milling and grinding machines impress by their **extremely compact construction**. Packed in a stable carrier box you deliver the machine to your customer. The necessary accessories are also inside the box. At the customer's place you only have to unpack everything and set it up – **no complex installation or assembly works** are necessary. You connect all cables of the machine and the computer, install the software and you are ready to start. And in case of service, this process also works the other way round.

vhf camfactory AG



Efficient operation

Due to the **Direct-Mill function** which is integrated in the DentalCAM software, you save plenty of time. While the calculation of the milling paths is still running, the milling process will be started. All further calculations will proceed in the background.

Additionally, the machining comfort can be considerably increased by different degrees of automatization, for instance with an **automatic blank changer** for up to eight blanks. And finally a special highlight: Due to the rock-solid construction and their high manufacturing quality, you can process **non-precious alloys on CoCr basis** with all vhf dental milling machines!

Service friendliness

As our reseller you are responsible for the technical support of the end customers. In order to facilitate your work, the machines are **service-friendly constructed**. Moreover, they have some features which reduce the service effort. One example is the integrated **working chamber sealing air concept**, which protects the mechanics against dust and chippings and thus also the investment of your customer. Hence, we are able to give a **24-months bring-in warranty** even on machines which mill zirconia every day.

Your technicians get comprehensive instruction and training courses by vhf. Of course we offer you **excellent second level support** and help your technicians with words and deeds in the case that they feel at a loss.



Made in Germany

N4 Impression

✓ 4 simultaneously working axes

The rotary axis (A axis) has a rotation range of +190° to -10°.

✓ automatic changer for 8 tools

The two removable changer stations for four tools each will be equipped with just a few moves. The material will then be machined fully automatized and you can spend your time with other useful things until you remove the finished work.

Haptic tool measurement for usage of diamond-coated tools.

✓ machine bed of massive aluminium cast

The machine bed of massive aluminium cast facilitates highest stability and a low-vibration operation.

✓ worldwide applicable

Due to far range switching mode power supply for 100–240 V and 50/60 Hz with country-specific mains plug.

Certification according to ANSI/UL 61010-1 for exports to the USA and Canada

✓ ideal for the practice lab

The N4 is an ideal machine for practice laboratories for producing cases without time delay and higher costs for an external production.

Or you specifically add the wet grinding machine N4 Impression to the already existing machines for dry processing in the dental laboratory. It will save you cleaning which becomes necessary in an alternating operation between wet and dry processing in one machine.

✓ powerful and highly precise spindle

With 4-fold hybrid ceramic ball bearings and a nominal power of 300 W under continuous load.



✓ sophisticated protective mechanisms

Protection of the danger zone during the machining process with an automatic safety interlock at the front cover.

A flexible rubber gaiter protects mechanics, electronics and spindle effectively from humidity.

4
Axes

3
Blocks

3
Abutments

8
Tools

Wet

Grind
Mill &

PMMA

ZrO₂

Com-
posites

LiSi₂

Ti

✓ especially efficient cooling

Eight liquid nozzles which are arranged at the spindle cool the whole tool evenly from the tip to the shank at all machining stages.

✓ fully integrated liquid cooling system

Closed liquid cooling system – no external module for pump etc. necessary.

Comfortable filling and cleaning due to removable drawer for liquid tank and filter for separating grinding particles.

✓ wide range of indications

For crowns, bridges (also fully anatomical), inlays, onlays, abutments, telescope crowns, veneers, table-tops, etc.

✓ no previous knowledge necessary

Very easy operation via provided CAM software DentalCAM with machining strategies that are especially adapted for grinding – no previous knowledge in milling or grinding necessary.



✓ university-validated accuracy

Researchers at the University of Washington measured the accuracy of prefabricated titanium abutments that were milled with a vhf N4 machine to within **-10 µm to +26 µm for precision.**

Source: John A. Sorensen, DMD, PhD, FACP; Hongseok An, DDS, MSD: The Desktop Dental Lab, in: Inside Dentistry, December 2015.

Machinable materials

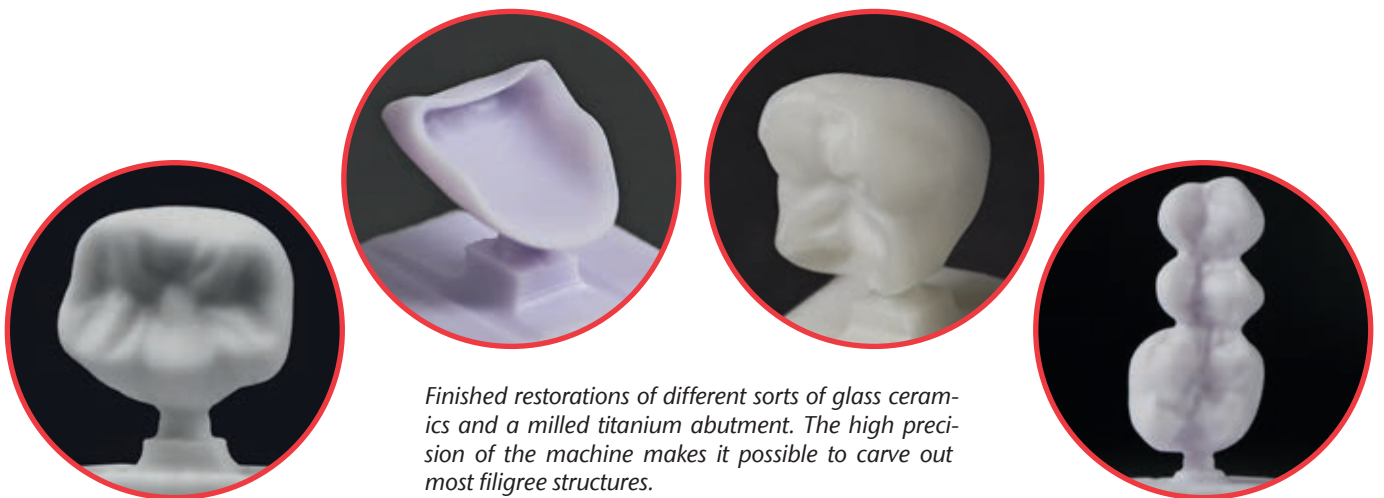


- glass ceramics (VITABLOCS® Mark II, VITA ENAMIC®, IPS Empress®, IPS e.max®, NICE, Obsidian, Celtra Duo)
- hybrid materials (VITA SUPRINITY® PC, SHOFU Block HC, GC Cerasmart, Ambarino High-Class, LAVA Ultimate, KZR-CAD HR)
- zirconium oxide
- composites
- PMMA
- prefabricated titanium abutments (several systems)

N4 Impression



Working chamber of the N4 Impression. Detail top right: the tool is evenly cooled by eight liquid nozzles.



Finished restorations of different sorts of glass ceramics and a milled titanium abutment. The high precision of the machine makes it possible to carve out most filigree structures.

4

Axes

3

Blocks

3

Abutments

8

Tools

Wet

Grind Mill &

PMMA

ZrO₂

Composites

LiSi₂

Ti

Key features

- wet machining
- approved glass ceramics types (VITABLOCS® Mark II, VITA ENAMIC®, IPS Empress®, IPS e.max®, N!CE, Obsidian, Celtra Duo), hybrid materials (VITA SUPRINITY® PC, SHOFU Block HC, GC Cerasmart, Ambarino High-Class, LAVA Ultimate, KZR-CAD HR), zirconium oxide, composites, PMMA, SHOFU, prefabricated titanium abutments (several systems)
- 4 axes, 3 linear axes and 1 rotary axis (+190° to -10°)
- dimensions (W/D/H): approx. 360 x 451 x 471 mm
- weight: approx. 50 kg
- fixing device for up to 3 blocks with round shanks (total positioning range for workpieces: 60 x 40 x 20 mm)
- manual block change
- 8 liquid nozzles at the spindle cool the tool from the tip to the shank
- removable drawer with filter for separating grinding particles
- automatic tool changer for up to 8 tools
- certification according to ANSI/UL 61010-1 for exports to the USA and Canada

Scope of delivery

- Impression compact system
- complete cable set
- keys for emergency release of the front cover
- service set for spindle maintenance
- service unit for compressed air plus hose Ø 6 mm
- 2 coarse filter mats (1 integrated, 1 replacement)
- calibration set and measuring pin
- 2.0 mm hexagon socket screw key
- 1 pair of tool changer inserts of rubber including 1 drill 2.8 mm
- 3 replacement screws for the workpiece holder
- 1 container of pH testing strips
- 1 litre cooling lubricant vhf Tec Liquid Pro including measuring cup (250 ml)
- USB dongle
- software package DentalCAM with control software
- manuals in German, English, Spanish, French or Italian

Order numbers

N4 Impression incl. DentalCAM	224505
Cooling lubricant vhf Tec Liquid Pro	239117
Grinding tools	page 30

vhf resellers and OEM partners can find all prices on our reseller price list.

K4 edition

✓ highest accuracy

The automatic axis measurement and compensation ensure a consistently high machining precision – and thus top-quality results.

✓ automatic changer for 7 tools

With K4 edition you get an automatic tool changer with seven stations which enables a complete machining of the workpiece without manual intervention of the operator. The haptic measuring pin enables the use of diamond coated tools so that you will benefit from a manyfold higher endurance.

✓ worldwide applicable

Due to far range switching mode power supply for 100–240 V and 50/60 Hz with country-specific mains plug.

Certification according to ANSI/UL 61010-1 for exports to the USA and Canada.



✓ sophisticated protective mechanisms

Protection of the danger zone during the machining process with an automatic safety interlock at the front cover.

Protection of the mechanics against machining debris as well as reduced wearing and maintenance effort due to integrated working chamber sealing air concept.

4
Axes

1
Disc

3
Blocks

7
Tools

Dry

Mill

PMMA

ZrO₂

Com-
posites

CoCr

✓ wide range of materials and indications

Machining of plastics, wax, zirconium oxide and composites up to non-precious alloys on cobalt-chrome basis.

For crowns and bridges (also fully anatomical), inlays, onlays, abutments, telescope crowns, veneers, table-tops, etc..

✓ 4 simultaneously working axes

The integrated Harmonic Drive® rotary axes (A axis) has a rotary range of 360 degrees.

✓ no previous knowledge necessary

Very easy operation via provided CAM software DentalCAM with Direct-Mill function – no previous knowledge in milling necessary.

Key features

- dry machining
- plastics, wax, zirconium oxide, composites, CoCr
- 4 axes, 3 linear axes and 1 rotary axis (360°)
- dimensions (W/D/H): approx. 400 x 385 x 410 mm
- weight: approx. 45 kg
- fixing device for round universal blanks with a diameter of 98.5 mm with step and a thickness of 10 to 25 mm
- manual blank change
- automatic tool changer for 7 tools; haptic measuring pin for usage of diamond coated tools
- ANSI/UL 61010-1 certification for exports to the USA and Canada

Scope of delivery

- Impression compact system
- complete cable set
- keys for emergency release of the front cover
- service set for spindle maintenance
- hose connection for external vacuum cleaner
- 2.5 mm hexagon socket screw key
- calibration plate and measuring pin
- replacement tool measuring plate
- USB dongle
- software package DentalCAM with control software
- manuals in German or English
- service unit for compressed air plus hose Ø 6 mm
- 1 pair of tool changer inserts of rubber including 1 drill 2.8 mm

Order numbers

K4 edition incl. DentalCAM	237880
Extra equipment	page 24
Tools	page 30

vhf resellers and OEM partners can find all prices on our reseller price list.

K5 Impression

✓ 5 simultaneously working axes

In addition to the three linear axes in X, Y and Z, two rotary axes ensure many and varied machining options.

✓ rotation range up to ± 35 degrees

The B axis with its exceptional great rotation range makes the K5 ideal for model casts and surgical guides as well as prosthodontics and implantology.

✓ machine bed of massive aluminium cast

A cast body which is closed at five sides absorbs vibrations and ensures a **high stability of the whole machine**.

Additionally reinforced linear guides in X, Y and Z as well as a double mounted B axis further increase the rigidity of the whole axis system – so that you'll always get **first-class milling results**.

✓ automatic changer for 16 tools

In addition to the currently required tools, you can equip the tool changer with replacement tools right away. Thus you can continue working without interruption if a tool is worn out.

Haptic tool measurement for usage of diamond-coated tools.



✓ sophisticated protective mechanisms

Automatic safety interlock at the front cover while machining.

The established **working chamber sealing air concept** in combination with a **rubber gaiter** effectively protects the mechanics, electronics and spindle against machining debris.

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Axes

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Disc

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Blocks

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Tools

Dry

Mill

PMMA

ZrO₂

Com-
posites

CoCr

✓ blanks of up to 40 mm thickness

K5 lets you machine a **wide range of materials and indications**: discs and blocks of wax, plastics, model plaster, zirconium oxide and composites up to non-precious alloys on cobalt-chrome basis.

✓ powerful and highly precise synchronous spindle

With 4-fold hybrid ceramic ball bearings and a nominal power of 300 W under continuous load – well-balanced torque band.

✓ practical drawer for accessories

Your tools and blanks are well stored and immediately at hand. The drawer also holds an integrated **administrated tool board** (ATB) for your milling tools. Its 30 numbered slots will be administrated by the Dental-CAM software.

Blanks from S to XXL: great variety of materials with a thickness of up to 40 mm – you will find hardly any indication which you cannot realize with K5 Impression.



K5 Impression



The B axis of K5 Impression can be rotated by up to ± 35 degrees thus you can machine also extraordinary complicated undercuts. At the right: the 16-fold tool changer.



The accessory drawer holds your blanks and mounting tools. The milling tools in the tool board will be administrated by DentalCAM.

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Axes1
Disc3
Blocks16
Tools

Dry

Mill

PMMA

ZrO₂Com-
posites

CoCr

Key Features

- dry machining
- plastics, wax, zirconium oxide, composites, CoCr
- 5 axes: 3 linear axes and 2 rotary axes (360° and ± 35°)
- dimensions (W/D/H): approx. 450 x 530 x 630 mm
- weight: approx. 91 kg
- fixing device for universal blanks: Ø 98.5 mm with step and a thickness of 10–40 mm
- manual blank change
- automatic tool changer for 16 tools with haptic tool measurement
- ANSI/UL 61010-1 certification for exports to the USA and Canada

Scope of delivery

- Impression compact system
- complete cable set
- in accessory drawer integrated administrated tool board
- keys for emergency release of the front cover
- service set for spindle maintenance
- torque wrench 1.5 Nm for fixing the blanks
- calibration set (digital micrometer screw gauge 0–25 mm, 3 blanks, test tool) and measuring pin
- USB dongle
- software package DentalCAM with control software
- manuals in German or English
- service unit for compressed air plus hose Ø 6 mm
- tool changer inserts of rubber including 1 drill 2.8 mm

Order numbers

K5 Impression incl. DentalCAM	233234
Switching unit PSW02-T	235688
Other extra equipment	page 24
Tools	page 30

vhf resellers and OEM partners can find all prices on our reseller price list.

S1 | S2 Impression

✓ machine bed of massive aluminium cast

Thus these machines gain much stability at minimal exterior dimensions. Moreover, vibrations are reduced and the mechanics are optimally protected.

✓ automatic changer for 16 tools

In addition to the currently required tools, you can equip the tool changer with replacement tools right away. Thus you can continue working without interruption if a tool is worn out.

Haptic tool measurement for usage of diamond-coated tools.

✓ 5 simultaneously working axes

The second rotary axis (B axis) with a rotation range of up to ± 30 degrees enables you to mill undercuts and hence opens up new machining possibilities.



✓ worldwide applicable

Due to far range switching mode power supply for 100–240 V and 50/60 Hz with country-specific mains plug.

Certification according to ANSI/UL 61010-1 for exports to the USA and Canada.

✓ sophisticated protective mechanisms

Protection of the danger zone during the machining process due to an automatic safety interlock at the front cover.

Protection of the mechanics against machining debris as well as reduced wearing and maintenance effort due to integrated working chamber sealing air concept.

5
Axes8
Discs24
Blocks48
Abutments16
ToolsDry
Wet &Mill
Grind &

PMMA

ZrO₂Com-
posites

CoCr

LiSi₂

✓ **wide range of materials and indications**

Machining of plastics, wax, zirconium oxide and composites up to non-precious alloys on cobalt-chrome basis, glass ceramics and titanium.

For crowns, bridges (also fully anatomical), inlays, onlays, abutments, telescope crowns, model plates, model casts, bite splints, model dies, implant bars, veneers, table-tops, etc.

✓ **powerful and highly precise synchronous spindle**

With 4-fold hybrid ceramic ball bearings and a nominal power of 300 W under continuous load.



✓ **no previous knowledge necessary**

Very easy operation via provided CAM software DentalCAM with Direct-Mill function – no previous knowledge in milling and grinding necessary.

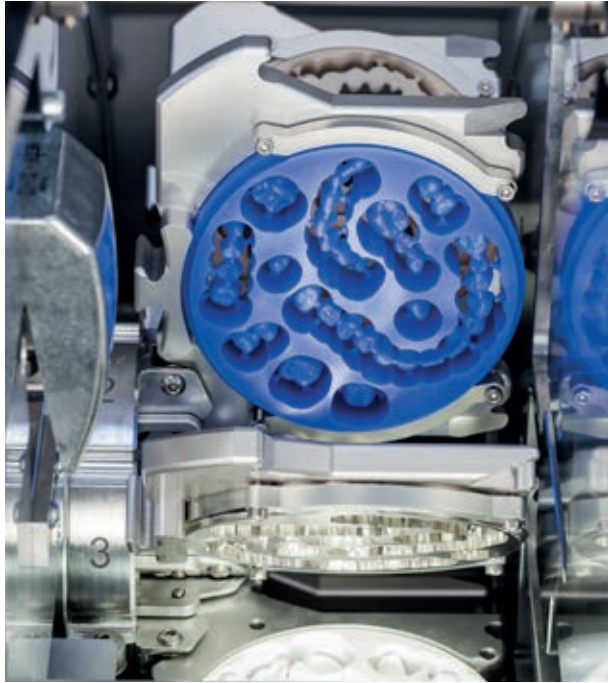
✓ **optional wet grinding module**

Both machines are prepared for connecting the wet grinding module. There are liquid nozzles already mounted at the spindle so that the tool will be optimally cooled while grinding. Thus you can also process glass ceramics or titanium.

✓ **automatic changer for 8 blanks**

Blanks can be loaded into the blank magazine through a separate front door. The appropriate blank for your milling job is then automatically transported into the working chamber. Hence, the machine can mill around-the-clock without further operation or supervision.

S1 | S2 Impression



Automatic changer of an S2 Impression for 8 blanks – they will be loaded automatically into the fixing device for machining.

Working chamber of a S2 Impression – blanks and tools will be exchanged automatically. The feeding from the blank changer is carried out via the shutter on the left side.



5
Axes

8
Discs

24
Blocks

48
Abutments

16
Tools

**Dry
Wet &**

**Mill
Grind &**

PMMA

ZrO₂

**Com-
posites**

CoCr

LiSi₂

Key features

- dry and wet machining
- plastics, wax, zirconium oxide, composites, CoCr, approved glass ceramics types, titanium
- 5 axes, 3 linear and 2 rotary axes (360° and ± 30°)
- dimensions (W/D/H): **S1**: approx. 490 x 445 x 540 mm, **S2**: approx. 692 x 445 x 540 mm
- weight: **S1**: approx. 75 kg, **S2**: approx. 95 kg
- fixing device for round universal blanks: Ø 98.5 mm with step and 10–30 mm thickness
- **S1**: manual blank change, **S2**: automatic changer for eight blanks
- automatic tool changer for 16 tools with haptic tool measurement
- external wet grinding module and holder for 3 blocks (optional) for wet machining
- certification according to ANSI/UL 61010-1 for exports to the USA and Canada

Scope of delivery

- Impression compact system
- complete cable set
- keys for emergency release of the front cover
- service set for spindle maintenance
- service unit for compressed air plus hose Ø 6 mm
- hose connection for external vacuum cleaner
- 3 mm or 2.5 mm hexagon socket screw key
- calibration set (digital micrometer screw gauge 0–25 mm, 3 blanks, test tool) and measuring pin
- 1 pair of tool changer inserts of rubber including 1 drill 2.8 mm
- USB dongle
- software package DentalCAM with control software
- manuals in German, English, Spanish, French or Italian
- **S2**: 8 blank frames for automatic blank changer

Order numbers

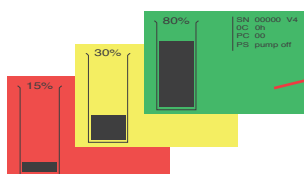
S1 Impression incl. DentalCAM	221191
S2 Impression incl. DentalCAM	221192
Extra equipment	page 24
Tools	page 30

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Wet Grinding Option

✓ new machining possibilities

Materials like glass ceramics and titanium which can only be wet processed complete the list of machinable materials.



The display shows beside other things the liquid level. Its colour additionally indicates whether the liquid level is in a critical state.

✓ sophisticated system for liquid treatment

Liquid treatment with triple filtering by integrated coarse filter, flat folded filter and fine filter; a contact-less ultrasonic sensor measures the exact liquid level.

✓ worldwide applicable

Due to far range switching mode power supply for 100–240 V and 50/60 Hz with country-specific power plug.

Certification according to ANSI/UL 61010-1 for exports to the USA and Canada.



✓ intelligent labyrinth air guiding system

No machine changeover necessary when switching between wet and dry machining due to patent pending intelligent air circulation system by labyrinth air guiding system.

The regularly used dry vacuum cleaner simply has to be connected to the wet grinding module instead of to the machine.

✓ best surface quality – short grinding times

Due to the rigid construction of the Impression S models and the highly precise spindle you will achieve high-class results by using the cooling lubricant vhf Tec Liquid Pro and the appropriate vhf grinding tools. For instance, it is possible to grind a fully anatomic crown of the materials IPS e.max® or VITABLOCS® Mark II within approximately 20 minutes.

S1

S2

Wet

Grind

Com-
positesLiSi₂

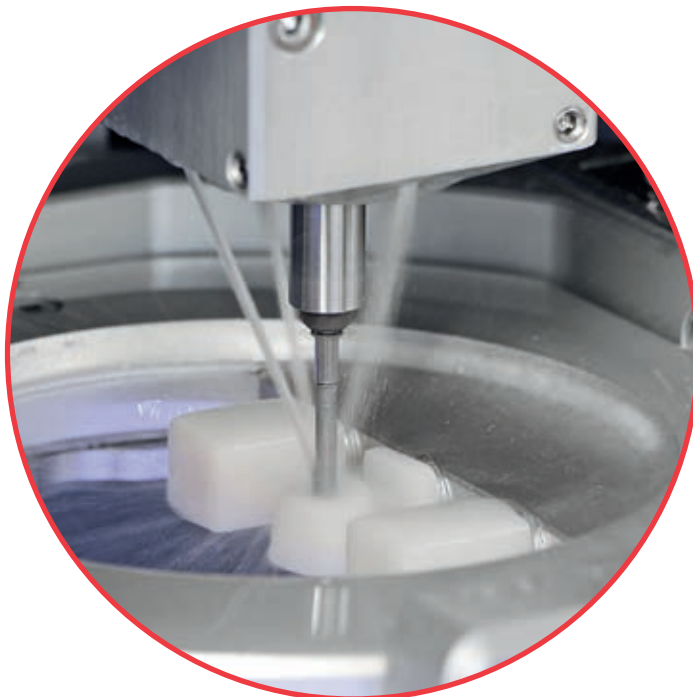
Ti

S1 | S2 Impression

Air guiding system



The suction mixture of air and liquid is divided into two circuits. Due to the intelligent labyrinth air guiding system, a large part of the humidity will be separated from the extracted air (at the top). So the wet grinding option can be operated with a dry vacuum cleaner, there is no additional device required.



Liquid treatment



The liquid is pumped through the fine filter container (at the right) where it will be separated from fine grinding particles. Afterwards the liquid will be pumped back to the CNC milling machine. The contact-less ultrasonic sensor constantly measures the liquid level and shows it on the graphics display.

Machinable materials



- glass ceramics (VITABLOCS® Mark II, VITA ENAMIC®, IPS Empress®, IPS e.max®, NICE, Obsidian, Celtra Duo)
- hybrid materials (VITA SUPRINITY® PC, SHOFU Block HC, GC Cerasmart, Ambarino High-Class, LAVA Ultimate, KZR-CAD HR)
- prefabricated titanium abutments (several systems)

Scope of delivery

- wet grinding module (W/D/H: 382 x 455 x 507 mm)
- external power adaptor: input 100–240 V and 50/60 Hz, output 24 V DC; with cables and country-specific mains plug
- connection hoses and -cables
- 3 fine filter cartridges and 3 coarse filter mats
- mounting wrench for fine filter container
- 1 container of pH testing strips
- 3 front cover seals
- roller set, 60 mm height
- 1 l cooling lubricant vhf Tec Liquid incl. measuring cup
- software extension for DentalCAM

Order numbers

Wet grinding option	225760
Cooling lubricant vhf Tec Liquid Pro	239117

Block holders	page 24
Grinding tools	page 30

vhf resellers and OEM partners can find all prices on our reseller price list.

Technical Data

N4 Impression

K4 edition

Fields of application	wet machining	dry machining
materials	glass ceramics, zirconium oxide, composites, titanium	plastics, wax, zirconium oxide, composites, CoCr
Indications	crowns, bridges, fully anatomical crowns and bridges, inlays, onlays, abutments, telescope crowns, veneers, table-top	crowns, bridges, fully anatomical crowns and bridges, inlays, onlays, abutments, telescope crowns, veneers, table-top
Basic system		
Construction	machine bed of massive aluminium cast	basic structure of aluminium precision plates
No. of axes	4	4
Positioning range	80 x 60 x 40 mm (X/Y/Z)	100 x 98 x 40 mm (X/Y/Z)
Drives	precise ball screw spindles for the 3 linear axes · motor resolution < 1 µm · ground steel precision guide rails · 4 mm lead	precise ball screw spindles for the 3 linear axes · motor resolution < 1 µm · ground steel precision guide rails · 4 mm lead
Repetition accuracy linear axes	± 0.003 mm	± 0.005 mm
Axis measurement	measurement of axes with calibration specimen · automatic axis compensation for exact results	automatic axis measurement and compensation for exact results
Housing	complete encapsulation of working chamber · automatic safety interlock at the front cover during the machining process	complete encapsulation of working chamber · automatic safety interlock at the front cover during the machining process
Working chamber illumination	yes, with status indication	yes
Dimensions (W/D/H)	approx. 360 x 451 x 471 mm	approx. 400 x 385 x 410 mm
Weight	approx. 50 kg	approx. 45 kg
Rotary axes		
Features	A axis: highest true running accuracy · rotation range: +190° to -10°	A axis: Harmonic Drive® free from backlash for highest true running accuracy · rotation range of 360°
Fixing device	for 3 blocks with round shanks (total positioning range for workpieces: 60 x 40 x 20 mm)	round universal blanks with a thickness of 10 to 25 mm and a diameter of 98.5 mm with step
Exchange of workpieces	manual exchange	manual exchange of blanks
Controller		
Features	type G12M · great smoothness of running and highly accurate · high processing speed due to exponential acceleration ramps · look-ahead feature for continuous velocity along the path · 4 digital in- and outputs each · 5 motor end phases · four quadrant controller · no fan necessary for cooling · extension slot for special features	type CNC 300 · synchronous interpolation of 4 axes · great smoothness of running and highly accurate · high processing speed due to exponential acceleration ramps · look-ahead feature for continuous velocity along the path · 6 digital inputs, 2 digital outputs · 4 motor end phases · Chopper controller · cooling via 3 fans
Spindle		
Features	synchronous spindle SFN 300P · nominal power under constant load (S1): 300 Watt · maximum power output (P _{max}): 600 W · rotational speed range up to 60,000 RPM · 4-fold hybrid ceramic ball bearings · radial deviation at internal cone of the precision shaft < 1 µm · sealing air prevents entering of foreign substances in the bearing area · cone cleaning	asynchronous high frequency spindle SF 170 · nominal power under constant load (S1): 170 W · maximum power output (P _{max}): 240 W · rotational speed range up to 60,000 RPM · double steel ball bearings · radial deviation at internal cone of the precision shaft < 1 µm · sealing air prevents entering of foreign substances in the bearing area
Collet chuck	pneumatic stainless steel collet chuck for tools with 3 mm shank diameter and max. 35 mm total length	pneumatically for tools with 3 mm shank diameter and max. 35 mm total length
Tool change		
Features	automatic tool changer for 8 tools with 2 removable changer stations for easy equipment · haptic tool length detection and tool breakage monitoring · diamond-coated tools can be used · monitoring of compressed air supply	automatic tool change station for 7 tools with length detection and breakage monitoring via haptic measuring pin · monitoring of compressed air supply
Wet grinding		
Features	tool is cooled by 8 liquid nozzles in full length (from tip to shank) · removable drawer for cooling liquid and filter · protection of mechanics, electronics and spindle by flexible rubber gaiter	—
Air extraction		
Features	no extraction necessary	openings in the rear panel of the working chamber for air extraction · connector for hose at the side of the housing · underpressure sensor for monitoring the air extraction · 24 Volt switching output
Other		
Extra equipment	—	switching unit PSW 01-RSV · administrated tool board
Special feature	certification according to ANSI/UL 61010-1 for exports to the USA and Canada	certification according to ANSI/UL 61010-1 for exports to the USA and Canada
Connection requirements		
compressed air supply	4 bar · 35 l/min – 8 bar · 50 l/min	6 bar · 80 l/min
power supply	100–240 V · 50/60 Hz	100–240 V · 50/60 Hz

K5 Impression

dry machining
plastics, wax, zirconium oxide, composites, CoCr, model plaster
crowns, bridges, fully anatomical crowns and bridges, inlays, onlays, abutments, telescope crowns, models, model casts, bite splints, implant bars, veneers, surgical guides, dentures, etc.

machine bed of massive aluminium cast

5

165.5 x 108 x 93 mm (X/Y/Z)

precise ball screw spindles for the 3 linear axes · motor resolution < 1 µm · ground steel precision guide rails · 4 mm lead

± 0.003 mm

measurement of axes with calibration specimen · automatic axis compensation for exact results

complete encapsulation of working chamber · automatic safety interlock at the front cover during the machining process

yes, with status indication

approx. 450 x 530 x 630 mm

approx. 91 kg

A axis: Harmonic Drive® free from backlash for highest true running accuracy · rotation range of 360°

B axis: pivoting via ball screw spindle · rotation range of up to ± 35°

round universal blanks with a thickness of 10 to 40 mm and a diameter of 98.5 mm with step

manual exchange

type CNC G12T · synchronic interpolation of 5 axes · great smoothness of running and highly accurate · high processing speed due to exponential acceleration ramps · look-ahead feature for continuous velocity along the path · 4 digital inputs, 4 digital outputs · 5 motor end phases · four quadrant controller · no fan necessary for cooling

synchronous spindle SFK 300P · nominal power under constant load (S1): 300 Watt · maximum power output (P_{max}): 500 W · rotational speed range up to 60,000 RPM · 4-fold hybrid ceramic ball bearings · radial deviation at internal cone of the precision shaft < 3 µm · sealing air prevents entering of foreign substances in the bearing area · cone cleaning

pneumatically for tools with 3 mm shank diameter and max. 40 mm total length

automatic tool change station for 16 tools · haptic tool length detection and tool breakage monitoring · diamond-coated tools can be used · monitoring of compressed air supply

—

opening at the housing side for air extraction · underpressure sensor for monitoring the air extraction · 24 Volt switching output

dental suction unit with fine filter · switching unit PSW 02-T · tool set starter edition

drawer for workpieces and milling tools with integrated administrated tool board as well as for operating and maintenance tools · certification according to ANSI/UL 61010-1 for exports to the USA and Canada

6 bar · 40 l/min – 8 bar · 50 l/min

100–240 V · 50/60 Hz

S1 | S2 Impression

dry and wet machining

plastics, wax, zirconium oxide, composites, CoCr, model plaster, glass ceramics, titanium crowns, bridges, fully anatomical crowns and bridges, inlays, onlays, abutments, telescope crowns, models, model casts, bite splints, implant bars, veneers, drilling templates, dentures, etc.

machine bed of massive aluminium cast

5

140 x 98 x 76 mm (X/Y/Z)

precise ball screw spindles for the 3 linear axes · motor resolution < 1 µm · ground steel precision guide rails · 4 mm lead

± 0.003 mm

measurement of axes with calibration specimen · automatic axis compensation for exact results

complete encapsulation of working chamber · automatic safety interlock at the front cover during the machining process

yes

S2: with additional illumination of the blank changer

S1: approx. 490 x 445 x 540 mm

S2: approx. 692 x 445 x 540 mm

S1: approx. 75 kg, **S2:** approx. 95 kg

A axis: Harmonic Drive® free from backlash for highest true running accuracy · rotation range of 360°

B axis: Harmonic Drive® free from backlash for highest true running accuracy · rotation range of ± 30°

round universal blanks with a thickness of 10 to 30 mm and a diameter of 98.5 mm with step; for wet grinding option: three-fold block holders

S1: manual exchange of blanks

S2: automatic blank changer for eight blanks

type CNC G12D · synchronic interpolation of 5 axes · great smoothness of running and highly accurate · high processing speed due to exponential acceleration ramps · look-ahead feature for continuous velocity along the path · 8 digital inputs, 8 digital outputs · 5 motor end phases · four quadrant controller · no fan necessary for cooling · optional Ethernet interface

synchronous spindle SFS 300P · nominal power under constant load (S1): 300 Watt · maximum power output (P_{max}): 600 W · rotational speed range up to 60,000 RPM · 4-fold hybrid ceramic ball bearings · radial deviation at internal cone of the precision shaft < 1 µm · sealing air prevents entering of foreign substances in the bearing area · cone cleaning

pneumatic stainless steel collet chuck for tools with 3 mm shank diameter and max. 40 mm total length

automatic tool change station for 16 tools · haptic tool length detection and tool breakage monitoring · diamond-coated tools can be used · monitoring of compressed air supply

3 liquid nozzles at the spindle for wet grinding · optionally: external wet grinding module (dimensions W/D/H: 382 x 455 x 507 mm)

opening at the housing side for air extraction · underpressure sensor for monitoring the air extraction · 24 Volt switching output

switching unit PSW 01-RSV · wet grinding option · administrated tool board · block holders for glass ceramics

S2: Blank Operation Board · Blank Frame Tower

certification according to ANSI/UL 61010-1 for exports to the USA and Canada

6 bar · 80 l/min

100–240 V · 50/60 Hz

Extra Equipment

Dental suction unit with fine filter

For machining zirconium oxide and other materials where fine dust particles are being produced, we recommend to use a suction unit with fine filter. For instance the Renfert Silent TS with its space-saving tower housing (see image).

⇒ Renfert Silent TS for all K and all S models: article no. 222089



Switching unit PSW

This small unit allows to switch a vacuum cleaner with a connection power of up to 230 V/16 A automatically by the control electronics of your Impression machine on and off and thus automatize your operational procedures. The PSW just has to be connected via the appropriate 24 Volt output.

⇒ PSW 01-RSV for K4 and all S models: article no. 221200

⇒ PSW 02-T for K5: article no. 235688

Tool set starter edition | Administrated tool board (ATB)

We have assembled a starter set with 30 items containing radius cutters and cylindric cutters for machining plastics, zirconium, composites and non-precious alloys. With the sets for K4 and S1/S2, you get the practical administrated tool board for free along with the tools. Its numbered slots will be administrated by the DentalCAM software. So all information remains linked with each tool and you can dispose in total of a much larger active pool of tools.

For machining glass ceramics a starter set with 10 items containing radius and torus grinding tools is available.

Due to the especially low set price, the order quantity is limited to one set per new wet grinding option respectively new machine.

⇒ Set milling tools for K4 edition: article no. 239125

⇒ Set milling tools for S1 | S2: article no. 237322

⇒ Set milling tools for K5: article no. 237323

⇒ ATB single: article no. 222688

⇒ Set grinding tools for S1 | S2 and N4: article no. 237324



Blank operation board (BOB)

This device consists of a elegant granite base-plate and an eloxed fixing plate of aluminium. Thus you can easily and safely insert new blanks or remove the already milled ones from the blank frames which are used in the automatic blank changer of S2 Impression. You do not risk that a valuable blank will fall down when working freehand and your table surface will be protected.

⇒ for S2: article no. 225046

Set Blank Frame Tower (BFT)

A practical add-on for the automatic blank changer of your S2 Impression. In its eight slots, you can space-savingly store frames for blanks or blocks which are currently not in use. This set contains eight frames for S2.

⇒ for S2: article no. 230777



Block and abutment holders

For the S and K models there are holders available for up to three blocks (dimensions up to 40 x 19 x 16 mm) with round shanks; each as specific type for S1 | K5 for manually clamping in the fixing device (see image left above) or as frame for S2 for usage with the automatic blank changer (left below).

The abutment holders are available in different variants: The N4 holder (PreFace® system right above) can fix two or three prefabricated abutments, the holder for the S machines (PreFace® system right below) can fix up to six abutments.

- ⇒ block holder for S1 | K5: art. no. 232325
- ⇒ block holder for S2: art. no. 232326
- ⇒ block holder for K4 edition: art. no. 241658
- ⇒ PreFace® abutment holder, 2-fold, for N4: art. no. 235157
- ⇒ NT-Preform® abutment holder, 3-fold, for N4: art. no. 238061
- ⇒ PreFace® abutment holder, 6-fold, for S1 | S2: art. no. 236400
- ⇒ NT-Preform® abutment holder, 6-fold, for S1 | S2: art. no. 238062



vhf Tec Liquid Pro – cooling lubricant for grinding works

A fully synthetic cooling lubricant which is water-soluble (5% emulsion concentrate). Its clear colouring facilitates a good observability of your workpieces during the grinding process and it can be easily removed while cleaning your machine and workpieces. Furthermore, it is especially mild to the skin without negative influence on technical aspects.

⇒ for S1 | S2 and N4: article no. 239117



Service trolley case

This robust and break-proof trolley case is an ideal support for each service technician. Its numerous compartments and three tool plates are equipped with high-quality tools and precise measuring devices from Germany. The case contains everything that is necessary for the service at your customer's premises. Thank to its spacious dimensions you still have room for own tools or parts.

⇒ for all machines: article no. 235090

DentalCAM

✓ comfortable placement aids

The software supports you in an optimal utilisation of space on the blank and during setting or editing of bars, drops and sinter bars. Additionally the bars can be either reduced or fully removed – this means a considerable reduction of reworking.

The 3D nesting enables a very precise alignment of your works – an especially useful feature for multi-layer materials.

✓ clearly structured user guidance and easy operation

Thus no previous knowledge necessary; operation via self-explaining icons and keyboard shortcuts for the most common functions; rotation of objects via scroll wheel.

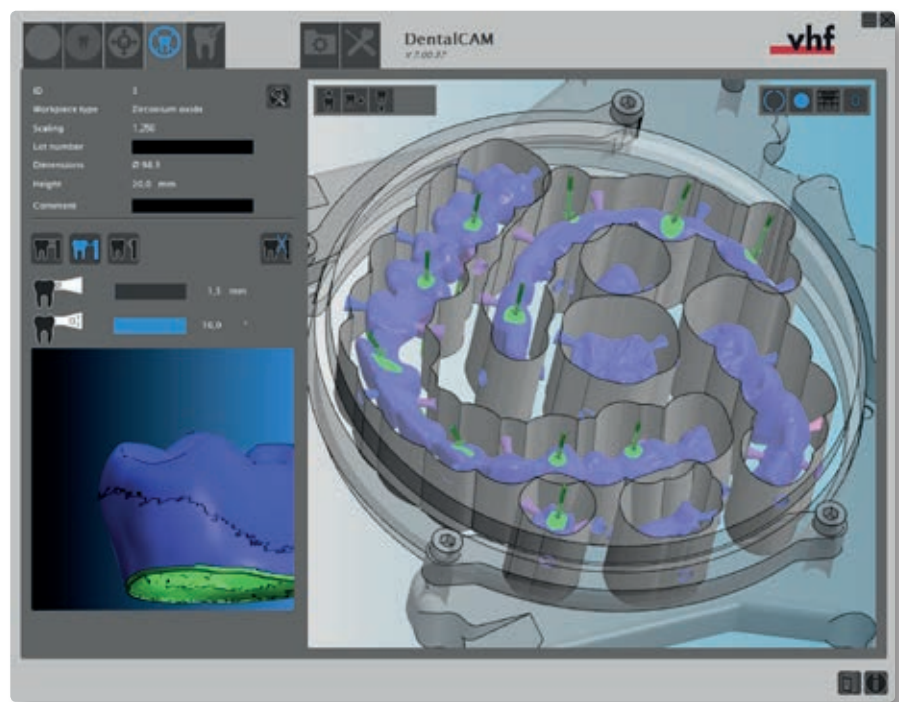
All relevant data concerning blanks, fixing devices and tools have been stored in the CAM software.

✓ maximum accessibility of undercuts

Due to the four- or five-axis path calculation, milling undercuts is no problem any longer.

✓ intelligent tool changer

Usage of backup tools if the main tool is worn out or broken. On top of that the program can regularly check whether the tool is broken.



Clear 3D nesting of your works. DentalCAM helps you with many convenient editing functions to ensure an efficient and comfortable nesting of the blank.

✓ Direct-Mill function

While the milling paths of other objects or the finishing processes are still being calculated, the machine already starts – thanks to the Direct-Mill function – the roughing process. The milling paths of the different tools will be calculated fully automated and highly optimised.

Furthermore, DentalCAM is still available while the job is calculated and you can continue your work in the meantime.

✓ machining CoCr, titanium and glass ceramics

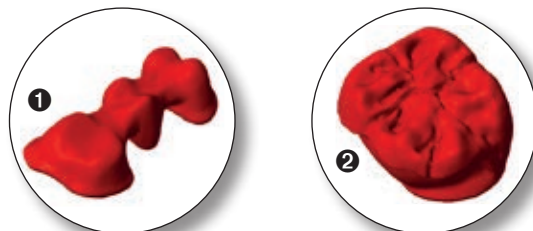
Thanks to finely tuned milling strategies, it is possible to mill non-precious alloys on cobalt-chrome basis and titanium.

For grinding glass ceramics, grinding strategies can be added via software extension.

CAM/CNC software

✓ fits like a glove...

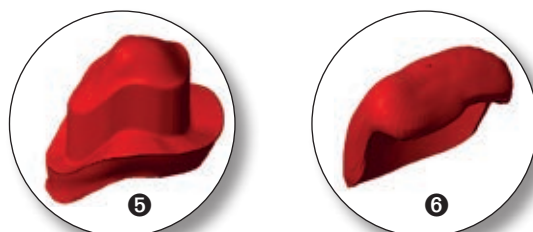
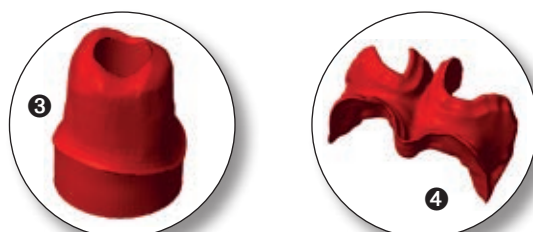
This CAM software for the dental technology is especially adapted to the machines of the Impression line.



✓ special machining strategies for each object type

Machining strategies are adapted to any kind of object: ❶ crowns/bridges, ❷ fully anatomical crowns/bridges, ❸ abutments, ❹ inlays, ❺ telescope crowns, ❻ veneers, ❼ implant based bridge with divergent drillings etc.

Divergencies of fits, drillings, prepline and undercuts are automatically recognized. On top of that angulated screw channels for implants are supported; cavities and drillings can be checked in advance and manually reworked if necessary.

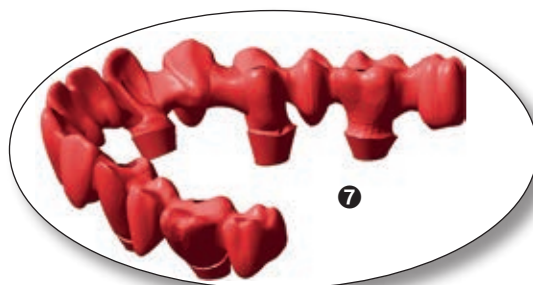


✓ comfortable choice of materials

Easily creating new blanks, respectively selecting of a suitable used blank via the material archive with search and filter functions and preview images.

✓ blank height optimization

The automatic blank height optimization can rotate the object within the blank in such a way that the blank height will be optimally utilised by an appropriate rotation of the rotary axis – so you can use thinner blanks.



DentalCAM

At first, DentalCAM lets you choose the required blank of different materials. Then you can import your earlier modelled CAD data via the standardized **STL format** into this open program and place the objects on the blank.

There are just a few mouse clicks necessary until you can mill your bridgework. You place the **bars** which connect the framework to the blank. If necessary, you can also place **drops** for the sintering process. It is also possible to **machine a blank in several stages**; the teeth which have already been milled in a previous pass will be displayed in a different colour and establish a protected area.

The **user workflow** is **speed-optimised** to such an extent that the whole preparation for a regular crown takes less than one minute from switching on the machine up to the start of the machining process.



Start screen: easy definition of the characteristics of a new blank at the left side of the window as well as overview of the archive of already existing blanks with various filter functions on the right side.

blank archive
import window (active)
nesting
starting calculation

← You can comfortably switch between the different program windows by clicking the icons.

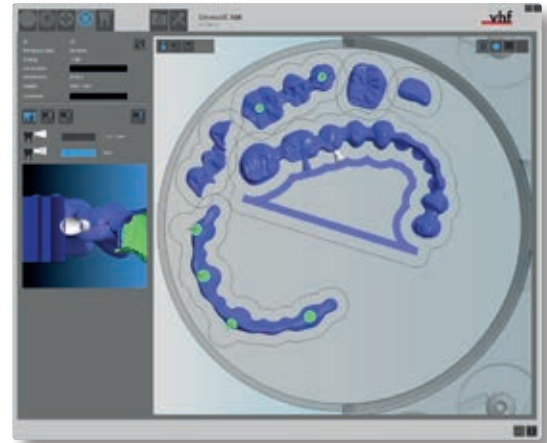


After four simple steps your object is ready for milling:

1. Choose the object in the file browser.
2. Preview of the object and possibility to view the file from all sides using the STL viewer.
3. Determine the machining strategies by choosing the type of object and the quality, by (de-)activating the blank height optimization as well as the possibility to disable the automatic search for divergent insertion angles and drillings in the objects.
4. Finally check the objects in the import list and import the complete list to the nesting window.

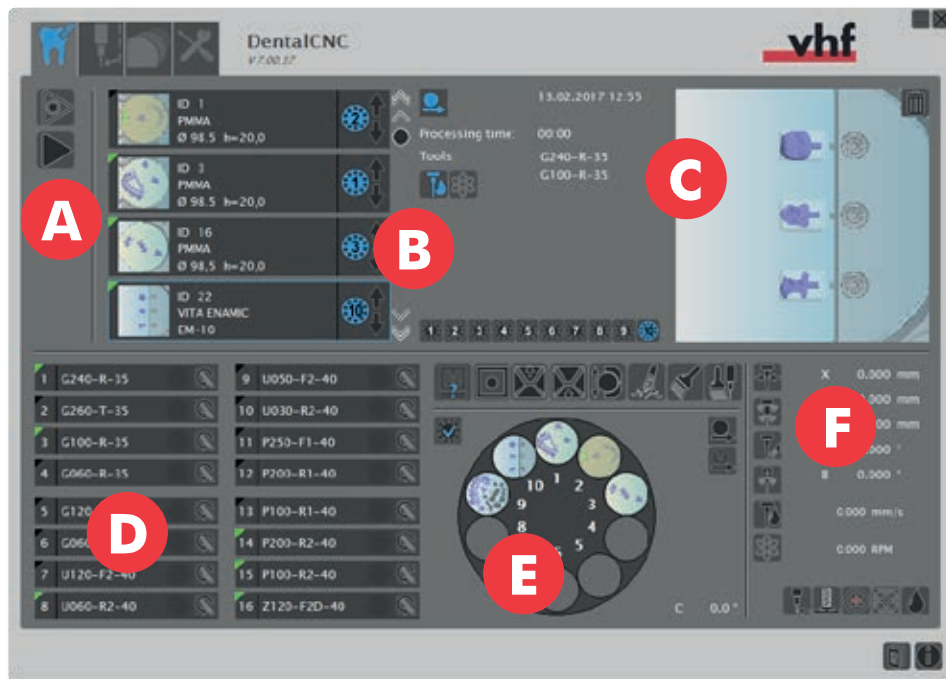
CAM/CNC software

Perfect overview: While placing the bars, you do not only have a top view (big window on the right), thanks to the 3D preview you can also exactly adjust them in space (small window on the left). Afterwards you can start the calculation.

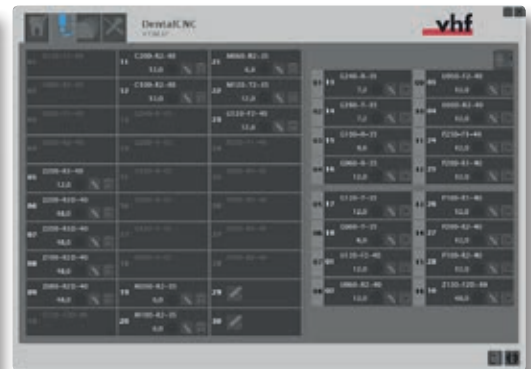


The CNC window appears and shows the following information:

- A: icons for job execution
- B: job list
- C: details/icons for the currently selected job
- D: current tool magazine
- E: blank changer illustration
- F: icons for individual machine functions



You ideally use the administrated tool board (ATB) for storing tools which are not directly inserted into the tool changer of the machine. All 30 positions are accordingly numbered and will be administrated in this tool administration window (left side of the window ATB, right side tool changer). Hence, all information concerning geometry, endurance, etc. remains linked with each tool and you can dispose in total of a much larger active pool of tools.



Dental Tools



Inhouse production

Our tool experts have developed **sophisticated cutting edge geometries** for machining the different dental materials from wax to cobalt-chrome. Thus the optimum balance between a **best possible surface quality** of the machined material and a **preferably long endurance** of the tool is ensured. All dental milling cutters are manufactured by vhf on modern six- and seven axis precision grinding centres.

Dental milling cutters from vhf consist of a super finest grain carbide mixture of German origin. It is characterized by its **high edge strength** with **high resistance to wear and ductility** at the same time. This additionally improves the workpiece quality and the endurance.

We make it **easy for you**

In the **DentalCAM software** developed by vhf, **all machining and tool parameters** for different materials and objects are already set – the users do not have to bother about such technical details. The machine only has to be equipped with the material and the tools required for the respective job and there you go...



Radius cutters

PMMA

ZrO₂

Composites

CoCr

Ti

This special dental radius cutter has a semi-circular rounded tip. It is available with **cutting edge diameters of 0.3 mm to 2.0 mm**. As the 2.0 mm tool is mainly used for **efficiently roughing**, tools with the small diameter of 0.3 respectively 0.6 mm are mainly used for **finely finishing** or carving out **fissures**. Due to the **especially long free grinding** of these tools, also undercuts can 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 zirconium oxide have three cutting edges and the CoCr cutters even have four in order to reduce the wear for each cutting edge and to ensure a greater process reliability.

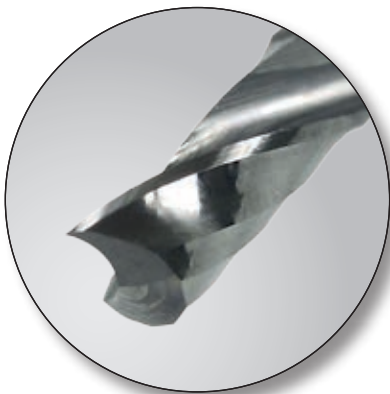
milling | grinding

Cylindric double tooth cutters



A double tooth cutter with **flat face grinding** and a **cutting edge diameter of 1.2 mm**. It is used when 90° angles have to be milled, e. g. in drillings and abutments.

For machining non-precious alloys on 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 a higher endurance is guaranteed.



Cylindric single tooth cutter

PMMA

The cutting edge of this cutter with **flat face grinding** is **extremely sharp and faceted**. Thus the milled edges are very smooth even at high feed rates and the risk of clogging is very low – even for plastics which tend to smear.

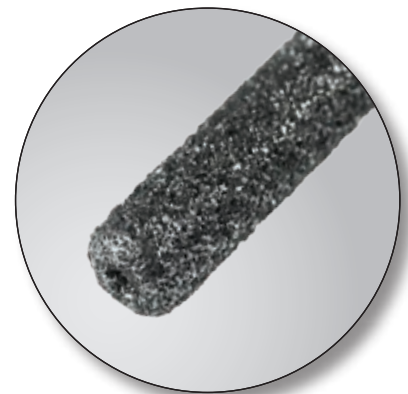
This tool is available with a cutting edge diameter of 2.5 mm; it is **exclusively** used for **roughing PMMA and wax**. Roughing with a flat ground cutter reduces the milling time.

Grinding tools



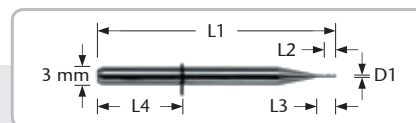
For machining glass ceramics and composites, vhf offers torus and radius grinding tools with a **diamond grit** in different grain sizes. The two smaller **torus grinding tools** with their fine grain size are mainly used for drillings and abutments. The 2.4 mm grinding tools with their coarser grain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

All tools distinguish themselves by a **good abrasion and break resistance**, and their endurance is very long. The diamond grit with its especially good binding to the shank avoids microcracks and reduces the sensitivity for thermal impact.



Dental Tools

Universal cutters*



Article no.

K4

Article no.

S1 | S2 and K5

Type of tool

Cutting edge Ø

D1**L1, L2, L3, L4**► shop.vhf.de

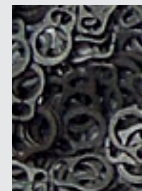
Milling cutters without coating, stop ring black

U030-R2-35	U030-R2-40	double tooth radius cutter	0.30 mm
U050-F2-35	U050-F2-40	cylindric double tooth cutter	0.50 mm

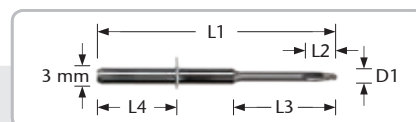
Milling cutters with coating, stop ring black

U060-R2-35	U060-R2-40	double tooth radius cutter	0.60 mm
U120-F2-35	U120-F2-40	cylindric double tooth cutter	1.20 mm

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



Wax and plastics (PMMA)



Article no.

K4

Article no.

S1 | S2 and K5

Type of tool

Cutting edge Ø

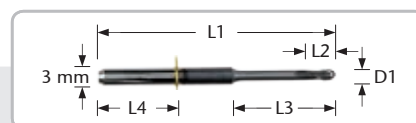
D1**L1, L2, L3, L4**► shop.vhf.de

Milling cutters without coating, stop ring silver

P100-R1-35	P100-R1-40	single tooth radius cutter	1.00 mm
P200-R1-35	P200-R1-40	single tooth radius cutter	2.00 mm
P100-R2-35	P100-R2-40	double tooth radius cutter	1.00 mm
P200-R2-35	P200-R2-40	double tooth radius cutter	2.00 mm
P250-F1-35	P250-F1-40	cylindric single tooth cutter	2.50 mm



Composites



Article no.

K4

Article no.

S1 | S2 and K5

Type of tool

Cutting edge Ø

D1**L1, L2, L3, L4**► shop.vhf.de

Milling cutters with coating, stop ring yellow

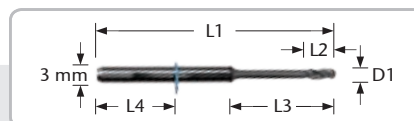
C100-R2-35	C100-R2-40	double tooth radius cutter	1.00 mm
C200-R2-35	C200-R2-40	double tooth radius cutter	2.00 mm



Order directly with your reseller
discounts at shop.vhf.de

milling | grinding

Zirconium oxide (ZrO_2)



Article no.
K4

Article no.
S1 | S2 and K5

Type of tool

Cutting edge Ø
D1

L1, L2, L3, L4
➔ shop.vhf.de

Milling cutters with coating, stop ring light blue

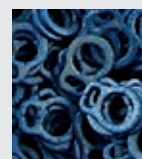
Z100-R2-35	Z100-R2-40	double tooth radius cutter	1.00 mm
Z200-R3-35	Z200-R3-40	triple tooth radius cutter	2.00 mm

Milling cutters with diamond coating, stop ring dark blue

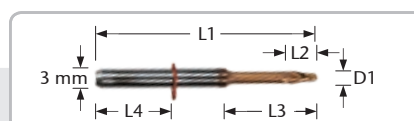
N4 K4 edition	S1 S2 and K5	Type of tool	Cutting edge Ø
Z060-R2D-35*	Z060-R2D-40	double tooth radius cutter	0.60 mm
Z100-R2D-35*	Z100-R2D-40	double tooth radius cutter	1.00 mm
Z200-R3D-35*	Z200-R3D-40	triple tooth radius cutter	2.00 mm
Z120-F2D-35*	Z120-F2D-40	cylindric double tooth cutter	1.20 mm

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

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



Non-precious alloys (CoCr) & titanium*



Article no.
K4 and N4

Article no.
S1 | S2 and K5

Type of tool

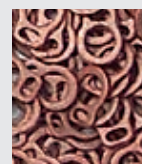
Cutting edge Ø
D1

L1, L2, L3, L4
➔ shop.vhf.de

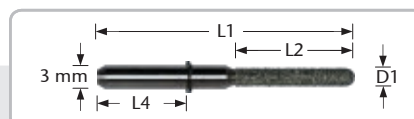
Milling cutters with coating, stop ring red

M060-R2-32	M060-R2-35	double tooth radius cutter with cone	0.60 mm
M100-R2-32	M100-R2-35	double tooth radius cutter	1.00 mm
M200-R2-32	M200-R2-35	double tooth radius cutter	2.00 mm
M200-R4-32	M200-R4-35	four tooth radius cutter	2.00 mm
M120-T2-32	M120-T2-35	double tooth cutter with torus	1.20 mm

* Titanium may only be wet milled – only possible with N4 and S1 | S2.



Glass ceramics (LiSi_2)



Article no.
N4 and S1 | S2

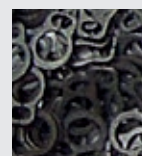
Type of tool

Cutting edge Ø
D1

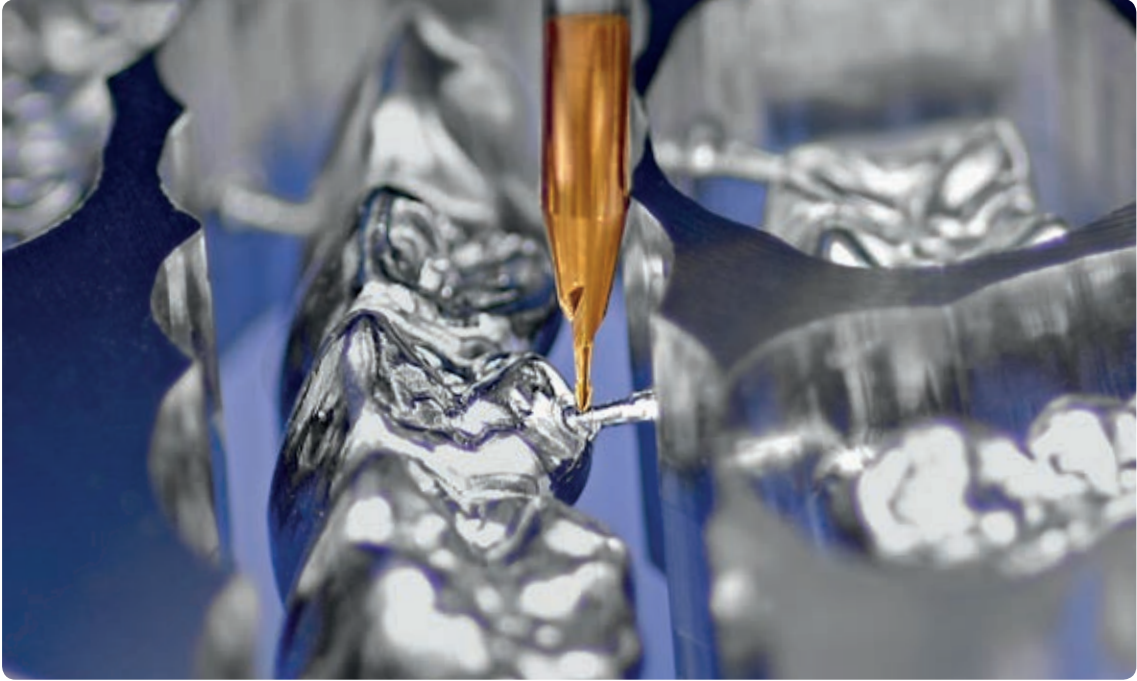
L1, L2, L4
➔ shop.vhf.de

Diamond grinding tools, stop ring black

G060-R-35	radius grinding tool	0.60 mm
G100-R-35	radius grinding tool	1.00 mm
G240-R-35	radius grinding tool	2.40 mm
G060-T-35	torus grinding tool	0.60 mm
G120-T-35	torus grinding tool	1.20 mm



The Right Choice



Whether dry milling or wet grinding...





... whether blanks or blocks...



vhf offers the proper machine for each application.

Made in Germany

vhf.de