

VITA YZ® T/HT/ST/XT

Processing recommendation for CAD/CAM systems



VITA shade determination

VITA shade communication

VITA shade reproduction

VITA shade control

Stand 2022-11

VITA – perfect match.

VITA

Machining mode: Milling – Block & Disc

- Information and tips
- Tools
- Machining strategy
- Parameters

Information

The information presented here, are intended as a recommendation.
Depending on the available CNC machines, CAM software, tools, etc. the information have to be adapted to your own production situation.
As a result, different results may obtained.

The development of the strategies and parameter was done with following system:

- DMG MORI Ultrasonic 20 und Imesslcore CoriTech 350i
- CAM Software: Hyperdent V8.2 Beta

According to this recommendation, a coping bridge (tooth 11-17) can be finished in 01:10:00 h (14mm Disk), with a good surface and fit.

We recommend Tools from:

ZECHA Hartmetall - Werkzeugfabrikation GmbH

www.zecha.de

FRANKEN GmbH & Co. KG - Fabrik für Präzisionswerkzeuge

www.emuge-franken.de

Tips for YZ

- Plunge into the material with a ramp (5-10 degree) or helically and use a reduced plunge feed (feed Z)
- YZ should always be milled dry with air cooling
- The diameter of the restoration holding pin should range from 1,5 - 2 mm

Strategy

- A two side machining and 3+2 strategies are sufficient in most cases.
- In order to maintain a good fit, even by restoration with undercuts, the last finishing of the cavity should be done with a 5 axis strategy.
- In order to maintain a good occlusal fit, the complete occlusal side should be finished with max. a $\varnothing 1.2\text{mm}$ tool (or less). A special finishing of the fissures isn't necessary.
- If chipping occurs, the feed speed and step should be lowered. Also the Oversize should be checked. Too much or too less oversize will also lead to chipping.

Recommended tools

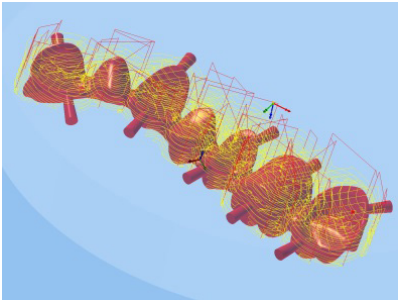
Diameter	Description	Manufacturer	Order-code
$\varnothing 2\text{ mm}$	Ball nose end mill, Diamond coated	Zecha	421.B2.200.100.200
$\varnothing 1\text{ mm}$	Ball nose end mill, Diamond coated	Zecha	421.B2.100.050.100
$\varnothing 2\text{ mm}$	Ball nose end mill, Diamond coated	Franken	2600E.200616
$\varnothing 1\text{ mm}$	Ball nose end mill, Diamond coated	Franken	2600E.100612

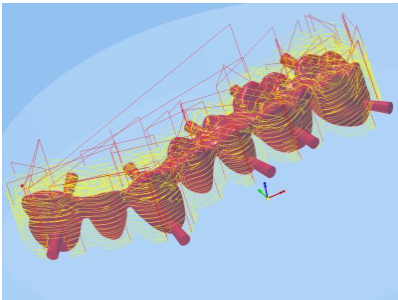
Tool life

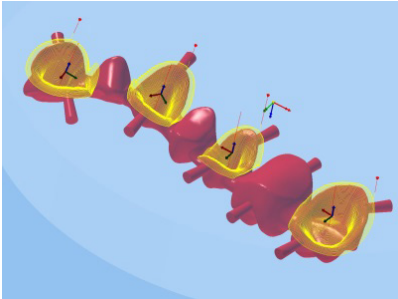
Tool	Units	Restoration
Zecha - 2 mm Ball nose end mill	>150	Fully anatomical crown tooth 26
Zecha - 1 mm Ball nose end mill	>150	Fully anatomical crown tooth 26
Franken - 2 mm Ball nose end mill	>150	Fully anatomical crown tooth 26
Franken - 1 mm Ball nose end mill	>150	Fully anatomical crown tooth 26

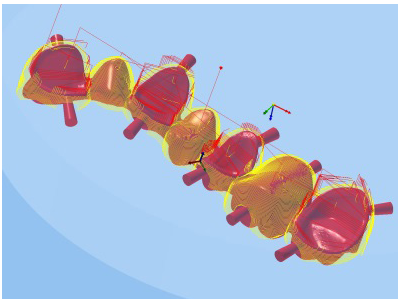
Order of machining

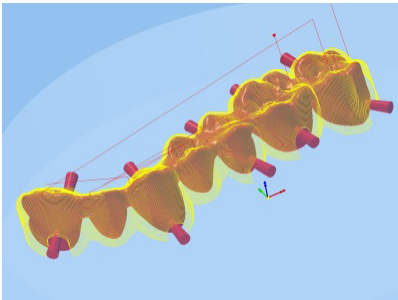
Step	Machining side	Machining	Tool
1	Cavity side	Roughing	Ø 2mm
2	Occlusal side	Roughing	Ø 2mm
3	Cavity side	Finishing in cavity	Ø 2mm
4	Cavity side	Finishing outside cavity	Ø 2mm
5	Occlusal side	Finishing	Ø 2mm
6	Cavity side	Residual material in cavity	Ø 1mm
7	Cavity side	Residual material outside cavity	Ø 1mm
8	Margin line	Finishing	Ø 1mm
9	Cavity side	Finishing in cavity	Ø 1mm
10	Occlusal side	Finishing, Fissures	Ø 1mm

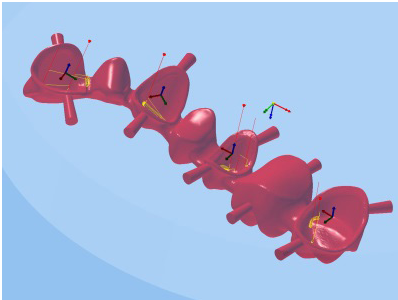
Step 1	Cavity side - Roughing			3+2 axis	
	Tool	Ø 2mm		notes:	
	Tolerance	0,01			
	Spindel speed	[n]	36000		rpm
	Feed speed XY	[Vf]	2000		mm/min
	Feed speed Z	[Vf]	1000		mm/min
	Width of cut XY	[ae]	1,4		mm
	Depth of cut Z	[ap]	1,0		mm
	Oversize		0,4		mm

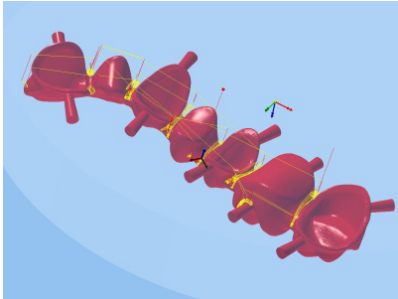
Step 2	Occlusal side - Roughing			3+2 axis	
	Tool	Ø 2mm		notes:	
	Tolerance	0,01			
	Spindel speed	[n]	36000		rpm
	Feed speed XY	[Vf]	2000		mm/min
	Feed speed Z	[Vf]	1000		mm/min
	Width of cut XY	[ae]	1,4		mm
	Depth of cut Z	[ap]	1,0		mm
	Oversize		0,4		mm

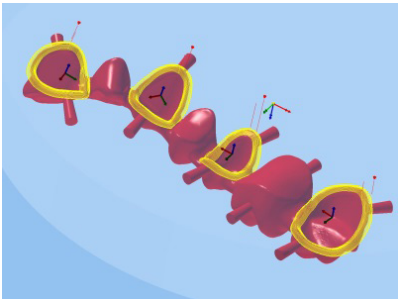
Step 3	Cavity side - Finishing in cavity			3+2 axis	
	Tool	Ø 2mm		notes:	
	Tolerance	0,01			
	Spindel speed	[n]	36000		rpm
	Feed speed XY	[Vf]	1300		mm/min
	Feed speed Z	[Vf]	1000		mm/min
	Width of cut XY	[ae]	0,2		mm
	Depth of cut Z	[ap]	-		mm
	Oversize		0,1		mm

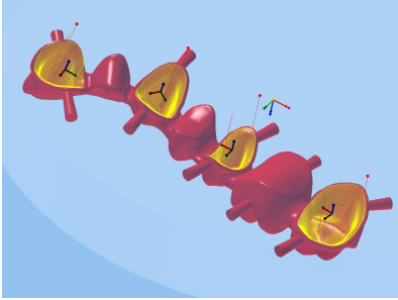
Step 4	Cavity side - Finishing outside cavity			3+2 axis	
	Tool	Ø 2mm		notes:	
	Tolerance	0,01			
	Spindel speed	[n]	36000		rpm
	Feed speed XY	[Vf]	1500		mm/min
	Feed speed Z	[Vf]	1000		mm/min
	Width of cut XY	[ae]	0,2		mm
	Depth of cut Z	[ap]	-		mm
	Oversize		0,0		mm

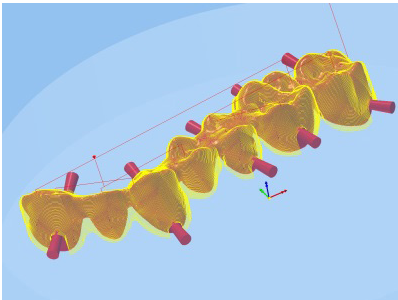
Step 5	Occlusal side - Finishing			3+2 axis	
	Tool	Ø 2mm		notes:	
	Tolerance	0,01			
	Spindel speed	[n]	36000		rpm
	Feed speed XY	[Vf]	1300		mm/min
	Feed speed Z	[Vf]	1000		mm/min
	Width of cut XY	[ae]	0,2		mm
	Depth of cut Z	[ap]	-		mm
	Oversize		0,1		mm

Step 6	Cavity side - Residual material in cavity			5 axis	
	Tool	Ø 1mm		notes:	
	Tolerance	0,01			
	Spindel speed	[n]	45000		rpm
	Feed speed XY	[Vf]	600		mm/min
	Feed speed Z	[Vf]	300		mm/min
	Width of cut XY	[ae]	0,2		mm
	Depth of cut Z	[ap]	0,1		mm
	Oversize		0,1		mm

Step 7	Cavity side - Residual mat. outside cavity			5 axis	
	Tool	Ø 1mm		notes:	
	Tolerance	0,01			
	Spindel speed	[n]	45000		rpm
	Feed speed XY	[Vf]	600		mm/min
	Feed speed Z	[Vf]	300		mm/min
	Width of cut XY	[ae]	0,2		mm
	Depth of cut Z	[ap]	0,1		mm
	Oversize		0,0		mm

Step 8	Margin Line - Finishing			5 axis	
	Tool	Ø 1mm		notes:	
	Tolerance	0,01			
	Spindel speed	[n]	45000		rpm
	Feed speed XY	[Vf]	1000		mm/min
	Feed speed Z	[Vf]	1000		mm/min
	Width of cut XY	[ae]	0,1		mm
	Depth of cut Z	[ap]	-		mm
	Oversize		0,0		mm

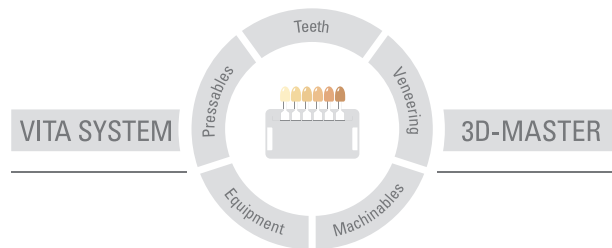
Step 9	Cavity side - Finishing in cavity			5 axis	
	Tool	Ø 1mm		notes:	
	Tolerance	0,01			
	Spindel speed	[n]	45000		rpm
	Feed speed XY	[Vf]	1300		mm/min
	Feed speed Z	[Vf]	1000		mm/min
	Width of cut XY	[ae]	0,2		mm
	Depth of cut Z	[ap]	-		mm
	Oversize		0,0		mm

Step 10	Occlusal side - Finishing, Fissures			3+2 axis	
	Tool	Ø 1mm		notes:	
	Tolerance	0,01			
	Spindel speed	[n]	45000		rpm
	Feed speed XY	[Vf]	1300		mm/min
	Feed speed Z	[Vf]	1000		mm/min
	Width of cut XY	[ae]	0,15		mm
	Depth of cut Z	[ap]	-		mm
	Oversize		0,0		mm

Formulas for cutting data calculation

Expression used in text	Term	Symbol	Formula
Feed speed XY Feed speed Z	Feed speed	Vf [mm/min]	$Vf = fz * z * n$
Spindle speed	Spindle speed	n [rpm]	$n = \frac{Vc * 1000}{\pi * d}$
Width of cut XY	Width of cut	ae [mm]	
Depth of cut Z	Depth of cut	ap [mm]	
	Feed per cutting edge	fz [mm]	$fz = \frac{Vf}{n * z}$
	Cutting speed	Vc [m/min]	$Vc = \frac{\pi * d * n}{1000}$

More information about **VITA CAD/CAM MATERIALS** is available at: www.vita-zahnfabrik.com/cadcam



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After the publication of this information for use any previous versions become obsolete. The current version can be found at www.vita-zahnfabrik.com

VITA Zahnfabrik has been certified and the following products bear the CE mark:
CE 0124

VITA

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