VITA YZ® T / HT / ST / XT

Processing recommendation for CAD/CAM systems

VITA shade determination › VITA shade communication › VITA shade reproduction › VITA shade control

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 ø1.2mm 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.
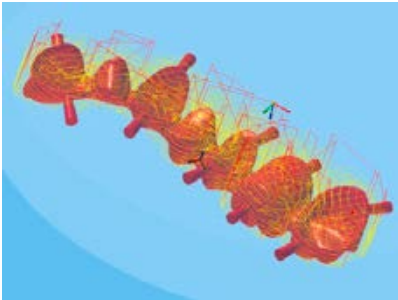
Recommended tools

Diameter	Description	Manufacturer	Order-code
Ø 2 mm	Ball nose end mill, Diamond coated	Zecha	421.B2.200.100.200
Ø 1 mm	Ball nose end mill, Diamond coated	Zecha	421.B2.100.050.100
Ø 2 mm	Ball nose end mill, Diamond coated	Franken	2600E.200616
Ø 1 mm	Ball nose end mill, Diamond coated	Franken	2600E.100612
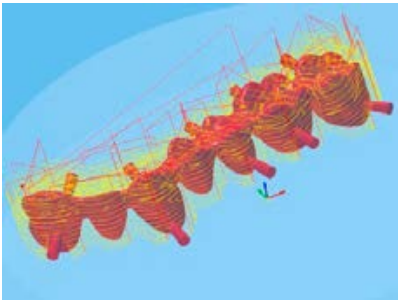
Tool life

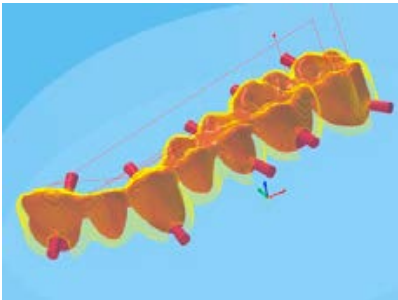| Tool	Units	Restoration
Zecha - 2 mm Ball nose end mill	>150	Fully anatomical crown tooth 26
Zecha - 1 mm Ball nose end mill	>150	Fully anatomical crown tooth 26
Franken - 2 mm Ball nose end mill	>150	Fully anatomical crown tooth 26
Franken - 1 mm Ball nose end mill	>150	Fully anatomical crown tooth 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
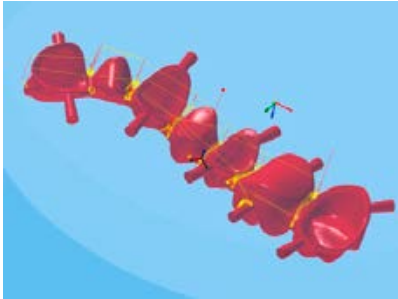
Step 2	Occlusal side - Roughing			3+2 axis
	Tool	Ø 2mm		notes:
	Tolerance		0,01	
	Spindel speed	[n]	36000	rpm
	Feed speed XY	[Vf]	2000	mm/min
	Feed speed Z	[Vf]	1000	mm/min
	Width of cut XY	[ae]	1,4	mm
	Depth of cut Z	[ap]	1,0	mm
	Oversize		0,4	mm
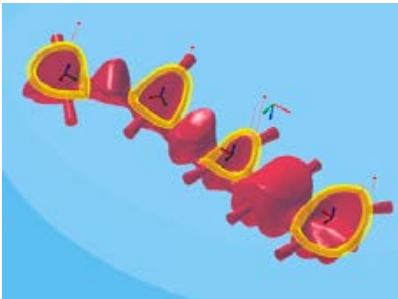
Step 3	Cavity side - Finishing in cavity			3+2 axis
	Tool	Ø 2mm		notes:
	Tolerance		0,01	
	Spindel speed	[n]	36000	rpm
	Feed speed XY	[Vf]	1300	mm/min
	Feed speed Z	[Vf]	1000	mm/min
	Width of cut XY	[ae]	0,2	mm
	Depth of cut Z	[ap]	-	mm
	Oversize		0,1	mm

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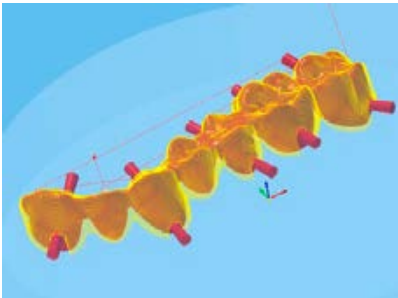
Step 5	Occlusal side - Finishing			3+2 axis
	Tool	Ø 2mm		notes:
	Tolerance		0,01	
	Spindel speed	[n]	36000	rpm
	Feed speed XY	[Vf]	1300	mm/min
	Feed speed Z	[Vf]	1000	mm/min
	Width of cut XY	[ae]	0,2	mm
	Depth of cut Z	[ap]	-	mm
	Oversize		0,1	mm

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]	$n = \dfrac{Vc * 1000}{\pi * d}$
Width of cut XY	Width of cut	ae [mm]	
Depth of cut Z	Depth of cut	ap [mm]	
	Feed per cutting edge	fz [mm]	$fz = \dfrac{Vf}{n * z}$
	Cutting speed	Vc [m/min]	$Vc = \dfrac{\pi * d * n}{1000}$

You can find additional information on VITA YZ at:
www.vita-zahnfabrik.com
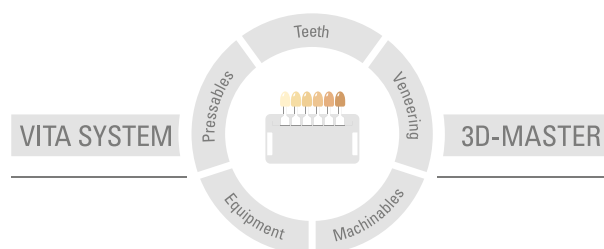
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