VITA SUPRINITY PC®

Recommodation for CNC machine

Machining mode : Grinding - Block

- Information and tips
- Tools
- Machining strategy
- Parameters

VITA

Version: 12.12.17

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:

- imes-icore CORiTEC350i
- CAM Software: Hyperdent 8.2 Beta

According to this recommendation, a fully anatomical posterior tooth crown (tooth 26) can be finished in 00:25:30 min, with a good surface and fit.

We recommend Tools from:

FRANKEN GmbH & Co. KG, Fabrik für Präzisionswerkzeuge
Tools for the Dental Industry
www.franken-dental.com

Tips for VITA SUPRINITY PC®

Avoid vertically or fast plunge movements. It is important that the tool always plunge slow and soft into the material.

- Plunge into the material with a ramp (5 degree) or helically and use a reduced plunge feed (feed Z)
- We recommend to grind VITA SUPRINITY wet
- The diameter of the restoration holding pin should be 3,0 - 3,5 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). In that way, a special finishing of the fissures isn`t necessary.
- If a smaller tool is used after a bigger one, it can be necessary to use a roughing strategy to remove remaining material.
  Tool life and process reliability are increased this way.
- To process cavities or pockets, the tool should be tilted 4-7 degrees (5 axis strategy). This will decrease the wear of the tool tip.
- When using grinding tools, the whole grinding body should be used.

Recommended Tools

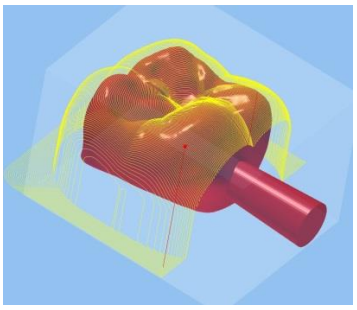
Diameter	Grain size	Description	Manufacturer	Order-Code
Ø 3 mm	D126	Diamond ball nose grinding burr	Emuge-Franken	1716.300613 (6mm shaft)
Ø 2 mm	D126	Diamond ball nose grinding burr	Emuge-Franken	1716.200611 (6mm shaft)
Ø 1 mm	D76	Diamond ball nose grinding burr	Emuge-Franken	1716.100609 (6mm shaft)

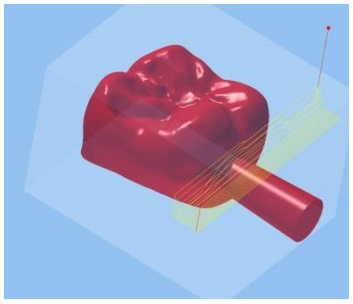
Tool Life

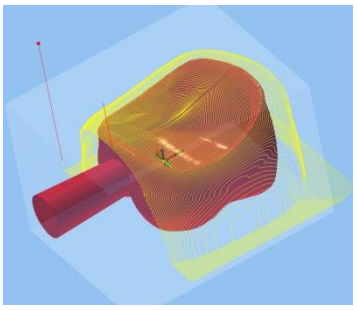
Tool	Units	Restoration
Ø 3 mm Diamond ball nose grinding burr	90	Fully anatomical crown tooth 26
Ø 2 mm Diamond ball nose grinding burr	150+	Fully anatomical crown tooth 26
Ø 1 mm Diamond ball nose grinding burr	65	Fully anatomical crown tooth 26

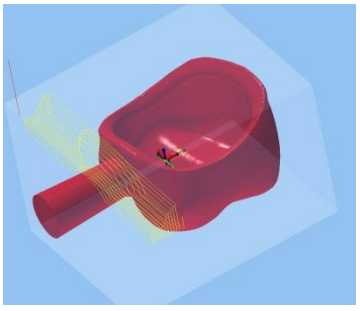
Bearbeitungsreihenfolge

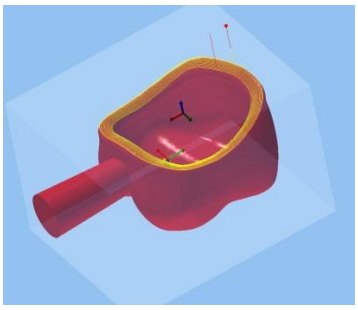
Schritt	Bearbeitungsseite	Bearbeitung	Werkzeug
1	Occlusal side	Roughing 1	Ø 3mm
2	Occlusal side	Roughing 2	Ø 3mm
3	Cavity side	Roughing 1	Ø 3mm
4	Cavity side	Roughing 2	Ø 3mm
5	Preperation margin inside	Pre-Finishing	Ø 2mm
6	Preperation margin outside	Pre-Finishing	Ø 2mm
7	Cavity, inside	Roughing	Ø 2mm
8	Cavity, outside	Finishing	Ø 2mm
9	Occlusal side	Pre-Finishing	Ø 2mm
10	Preperation margin inside	Finishing	Ø 1mm
11	Preperation margin outside	Finishing	Ø 1mm
12	Cavity, inside	Finishing	Ø 1mm
13	Cavity, inside	Remaining material	Ø 1mm
14	Occlusal side, fissures	Finishing	Ø 1mm

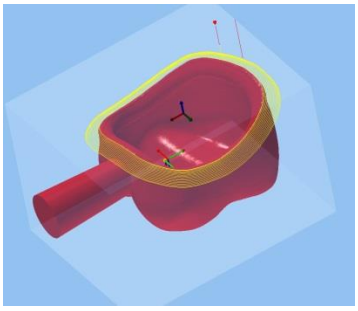
Step 1	Occlusal side - roughing 1				3 axis
	Tool	Ø 3mm			
	Tolerance		0,01		
	Spindel speed	[n]	50000	rpm	
	Feed speed XY	[Vf]	1800	mm/min	
	Feed speed Z	[Vf]	500	mm/min	
	Width of cut XY	[ae]	0,15	mm	
	Depth of cut Z	[ap]	Full Tool	mm	
	Oversize		0,15	mm	

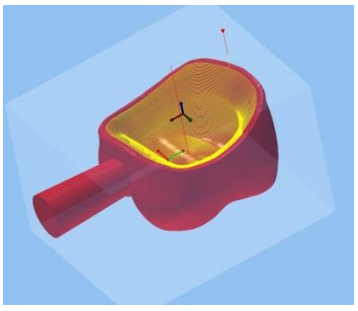
Step 2	Occlusal side - roughing 2				3 axis
	Tool	Ø 3mm			
	Tolerance		0,01		
	Spindel speed	[n]	50000	rpm	
	Feed speed XY	[Vf]	1500	mm/min	
	Feed speed Z	[Vf]	500	mm/min	
	Width of cut XY	[ae]	0,12	mm	
	Depth of cut Z	[ap]	1/3 Block height	mm	
	Oversize		0,15	mm	

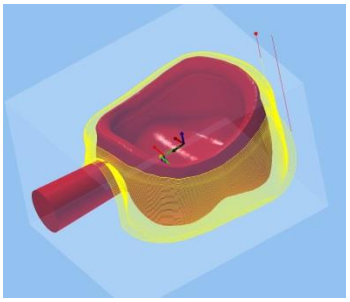
Step 3	Cavity side - roughing 1				3 axis
	Tool	Ø 3mm			
	Tolerance		0,01		
	Spindel speed	[n]	50000	rpm	
	Feed speed XY	[Vf]	1800	mm/min	
	Feed speed Z	[Vf]	500	mm/min	
	Width of cut XY	[ae]	0,15	mm	
	Depth of cut Z	[ap]	Full Tool	mm	
	Oversize		0,15	mm	

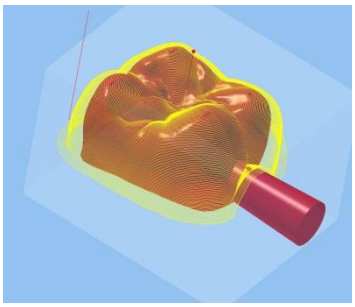
Step 4	Cavity side - roughing 2				3 axis
	Tool	Ø 3mm			
	Tolerance		0,01		
	Spindel speed	[n]	50000	rpm	
	Feed speed XY	[Vf]	1500	mm/min	
	Feed speed Z	[Vf]	500	mm/min	
	Width of cut XY	[ae]	0,12	mm	
	Depth of cut Z	[ap]	1/3 Block height	mm	
	Oversize		0,07	mm	

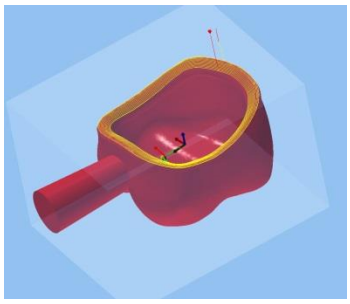
Step 5	Preperation margin inside - Pre-Finishing			3+2 axis
	Tool	Ø 2mm		
	Tolerance	0,01		
	Spindel speed	[n]	50000	rpm
	Feed speed XY	[Vf]	1300	mm/min
	Feed speed Z	[Vf]	1000	mm/min
	Width of cut XY	[ae]	0,1	mm
	Depth of cut Z	[ap]	-	mm
	Oversize		0,07	mm

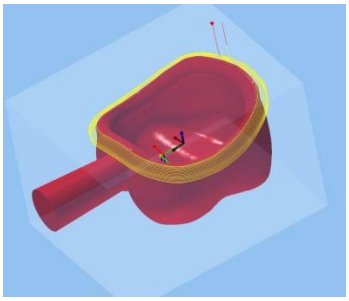
Step 6	Preperation margin outside - pre-finishing			3+2 axis
	Tool	Ø 2mm		
	Tolerance	0,01		
	Spindel speed	[n]	50000	rpm
	Feed speed XY	[Vf]	1300	mm/min
	Feed speed Z	[Vf]	1000	mm/min
	Width of cut XY	[ae]	0,1	mm
	Depth of cut Z	[ap]	-	mm
	Oversize		0.07	mm

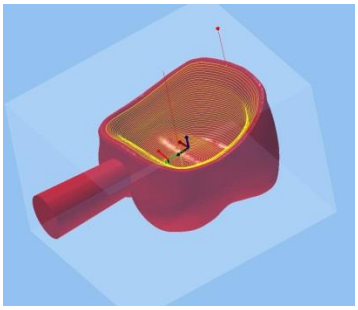
Step 7	Cavity, inside - roughing			3+2 axis
	Tool	Ø 2mm		
	Tolerance	0,01		
	Spindel speed	[n]	50000	rpm
	Feed speed XY	[Vf]	1200	mm/min
	Feed speed Z	[Vf]	1000	mm/min
	Width of cut XY	[ae]	0,1	mm
	Depth of cut Z	[ap]	-	mm
	Oversize		0	mm

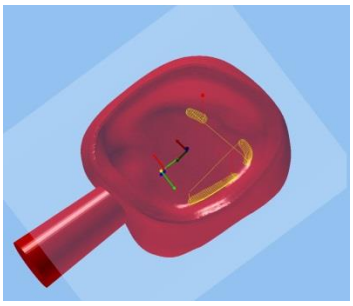
Step 8	Cavity, outside - finishing			3+2 axis
	Tool	Ø 2mm		
	Tolerance	0,01		
	Spindel speed	[n]	50000	rpm
	Feed speed XY	[Vf]	1300	mm/min
	Feed speed Z	[Vf]	1000	mm/min
	Width of cut XY	[ae]	0,1	mm
	Depth of cut Z	[ap]	-	mm
	Oversize		0	mm

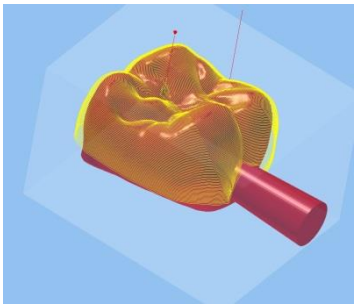
Step 9	Occlusal side - pre-finishing				3+2 axis
	Tool	Ø 2mm			
	Tolerance		0,01		
	Spindel speed	[n]	50000	rpm	
	Feed speed XY	[Vf]	1300	mm/min	
	Feed speed Z	[Vf]	1000	mm/min	
	Width of cut XY	[ae]	0,12	mm	
	Depth of cut Z	[ap]	-	mm	
	Oversize		0	mm	

Step 10	Preperation margin inside - finishing				5 axis
	Tool	Ø 1mm			
	Tolerance		0,01		
	Spindel speed	[n]	50000	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	mm	

Step 11	Preperation margin outside - finishing				5 axis
	Tool	Ø 1mm			
	Tolerance		0,01		
	Spindel speed	[n]	50000	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	mm	

Step 12	Cavity inside - finishing				5 axis
	Tool	Ø 1mm			
	Tolerance		0,01		
	Spindel speed	[n]	50000	rpm	
	Feed speed XY	[Vf]	1200	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	mm	

Step 13	Cavity - remaining material				5 axis
	Tool	Ø 1mm			
	Tolerance		0,01		
	Spindel speed	[n]	50000	rpm	
	Feed speed XY	[Vf]	500	mm/min	
	Feed speed Z	[Vf]	250	mm/min	
	Width of cut XY	[ae]	0,1	mm	
	Depth of cut Z	[ap]	0,05	mm	
	Oversize		0	mm	

Step 14	Occlusalside, fissures - finishing				3+2 axis
	Tool	Ø 1mm			
	Tolerance		0,01		
	Spindel speed	[n]	50000	rpm	
	Feed speed XY	[Vf]	1500	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	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 [U/min]	$n = \frac{Vc * 1000}{\pi * d}$
Width of cut XY	*Width of cut*	ae [mm]	
Depth of cut Z	*Depth of cut*	ap [mm]	
		fz [mm]	$fz = \frac{Vf}{n * z}$
		Vc [m/min]	$Vc = \frac{\pi * d * n}{1000}$

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