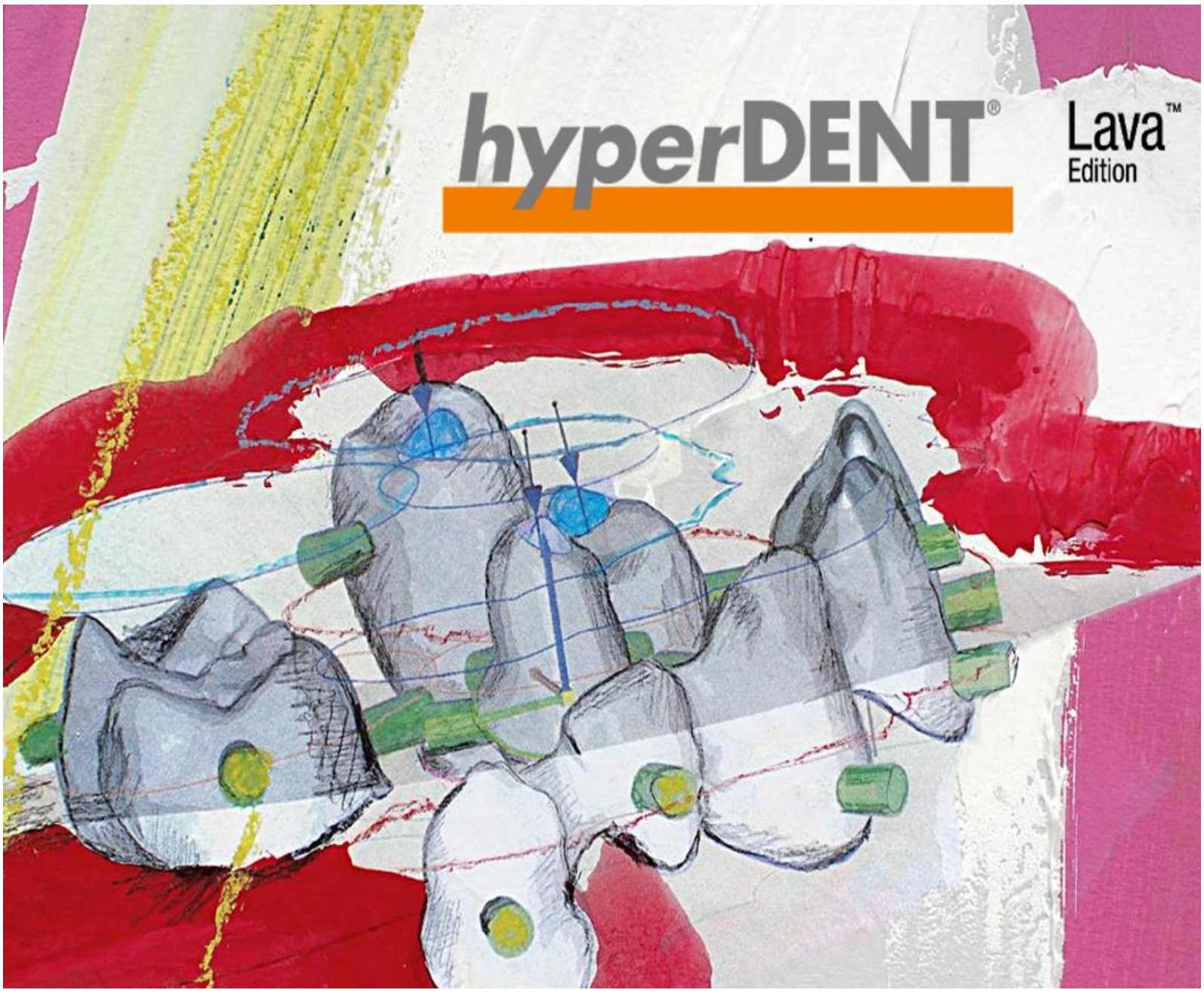


1. Instuction manual

*hyper*DENT Lava Edition

FOLLOW-ME!
TECHNOLOGY GROUP

Copyright

Address

FOLLOW-ME! Technology Systems GmbH
Regerstr. 27
81541 Munich, Germany

Contact

Tel. + 49 (89) 45 21 70 60
Fax: + 49 (89) 45 21 70 69

E-mail info@follow-me-tech.com

Version

2016-05 Lava Edition

1. General

Items delivered

Before you start the installation operation, please check that all necessary items were delivered

- *hyper*DENT LAVA Edition
- Copy protection (Dongle)
- Ticket ID (per e-mail)

1.1 Softare download

The software download contains all data for the installation of the *hyper*DENT LAVA Edition including postprocessors.

1.2 Copy protection (Dongle)

The dongle (= hardlock) provides copy protection for the FOLLOW-ME! / OPEN MIND software. It is inserted in a USB interface.

1.3 Licenses

You will receive a Ticket ID from your dealer. With this you can activate your licenses at any “Codemeter-Stick”.

1.4 Documentation

The operating manual for the main product is installed automatically during the installation process (Start > Programs > FOLLOW ME > *hyper*DENT [Version] > hyperDENT Manual).

1.5 Program Execution

The operability of all FOLLOW-ME! / OPEN MIND products can only be guaranteed if the following conditions are satisfied:

- the dongle is inserted (USB)
- the license is activated

A separate dongle and a corresponding license file are required for each PC in the case of individual installation of software components at different PCs

2. Hardware and Software Requirements

2.1 PC configuration

CD-drive	x
Processor (at least):	Intel 805
Processor (recommended):	Intel Core 2 Quad
RAM memory (at least):	2 GB
Graphics card:	OpenGL-compliant graphics card, Recommendation: Nvidia with 256 MB, such as Quadro FX Error-free operation cannot be guaranteed when using other graphics cards.

2.2 Operating Systems

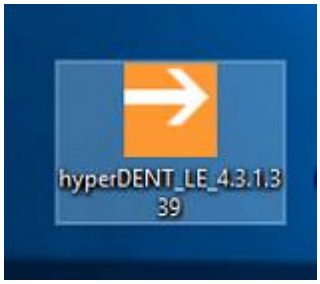
- Windows® Vista
- Windows® 7

  To ensure an error-free data exchange within *hyper*DENT® and *hyper*VIEW, the **User Account Control has to be deactivated in Windows Vista and Windows 7.**
  To this purpose, proceed as follows: Click Start > Control panel and enter the string User Account Control in the search field. Deactivate the option in the dialog displayed. Then close the dialog.

3. Installation

Important: Administration rights are required for installation.

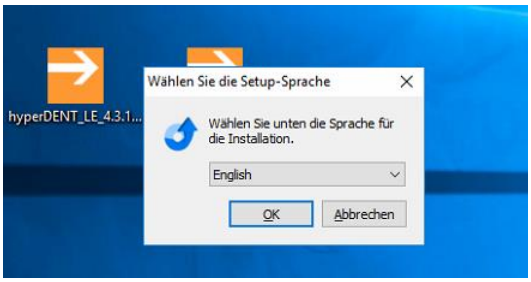
For the installation please double click the hyperDENT LAVA Edition download file.

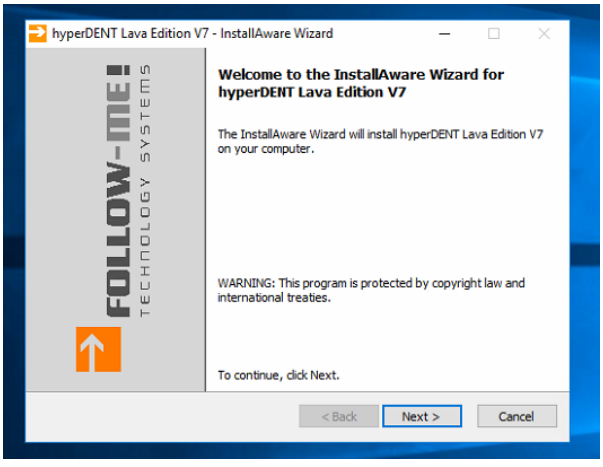


Important:
The *hyper*DENT - Configuration database is per default installed in the folder "C:\Users\Public\Documents\hyperDENTLavaDB".

1. Setup-Language

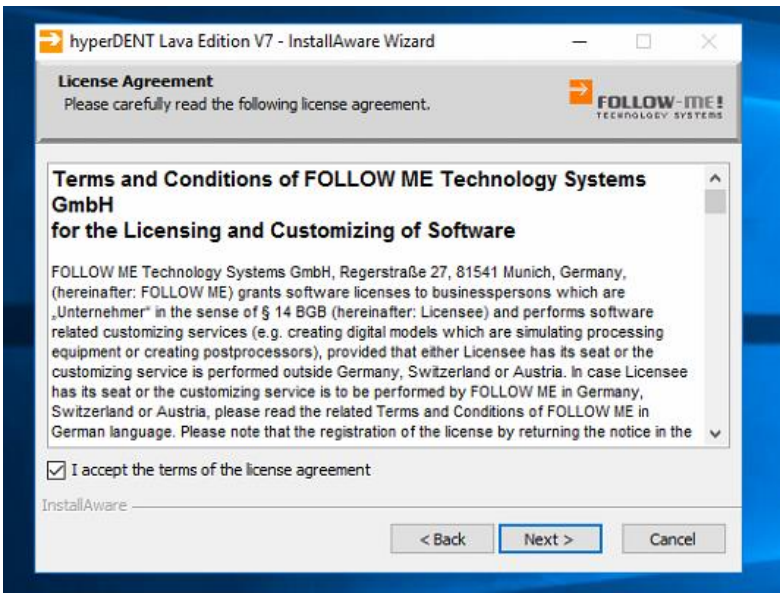
You can select German, English, French, Italian, Dutch, Chinese, Japanese, and Spanish





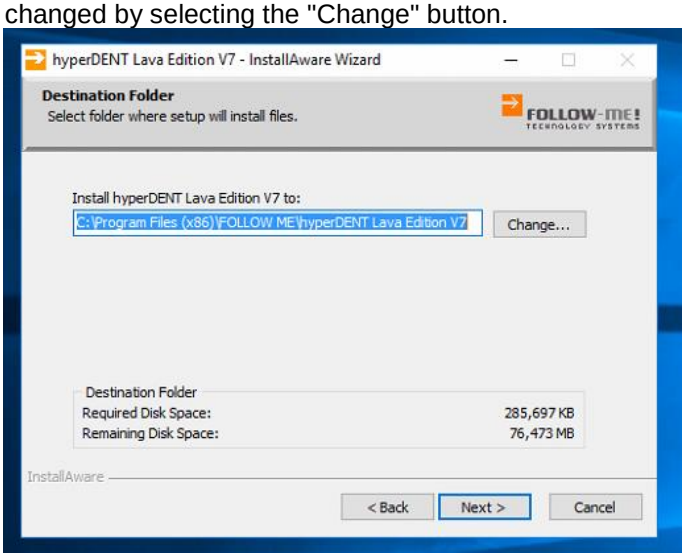
2. License terms

Please check the field "I accept the terms of the license agreement" to be able to access the "Next" button.



3. Destination folder

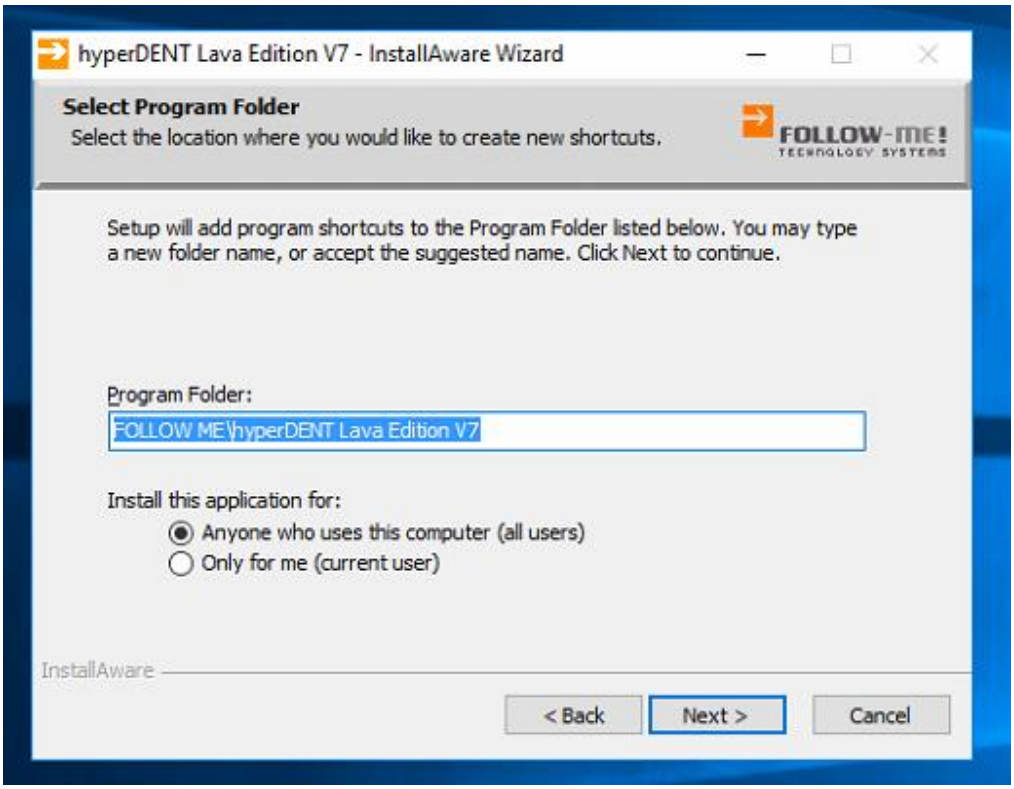
Set the directory in which the selected components will be installed.
The default path set (c:\Program Files\FOLLOW ME\hyperDENTLava Edition V7) can be changed by selecting the "Change" button.



4. Program Folder

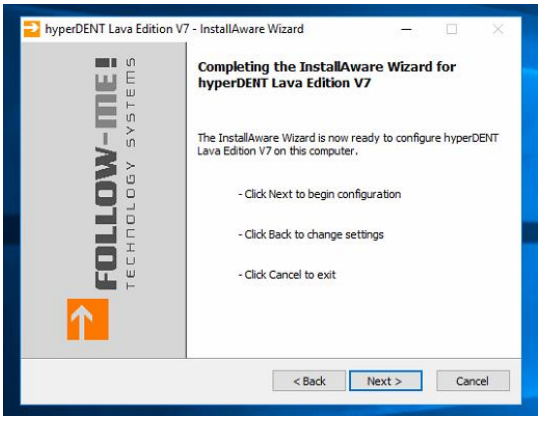
Set the entry within the Windows - Start menu, in which all links to start *hyper*DENT and its additional components can be accessed.
Also choose, whether these links should be accessible for all users of the system or only for the

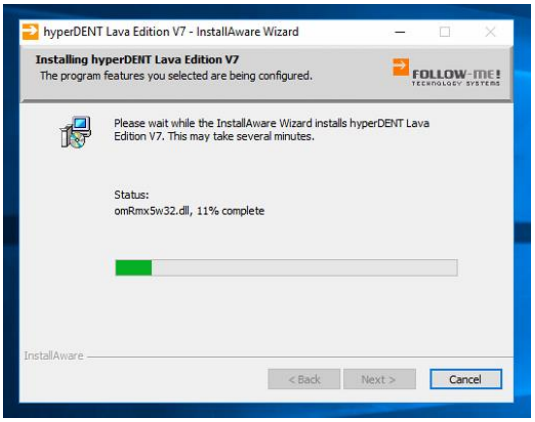
actual user.

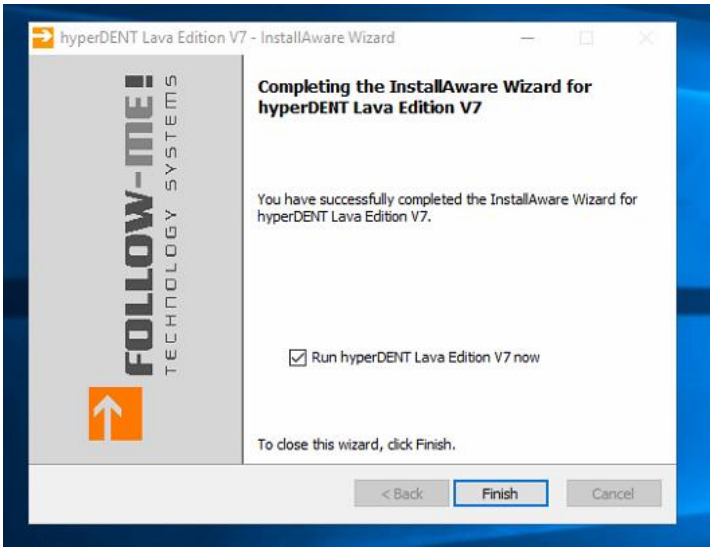


5. Installation

Click on the button "Next" to start copying files on your hard disk.





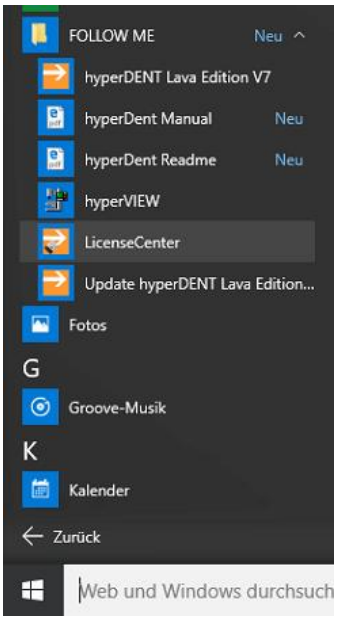


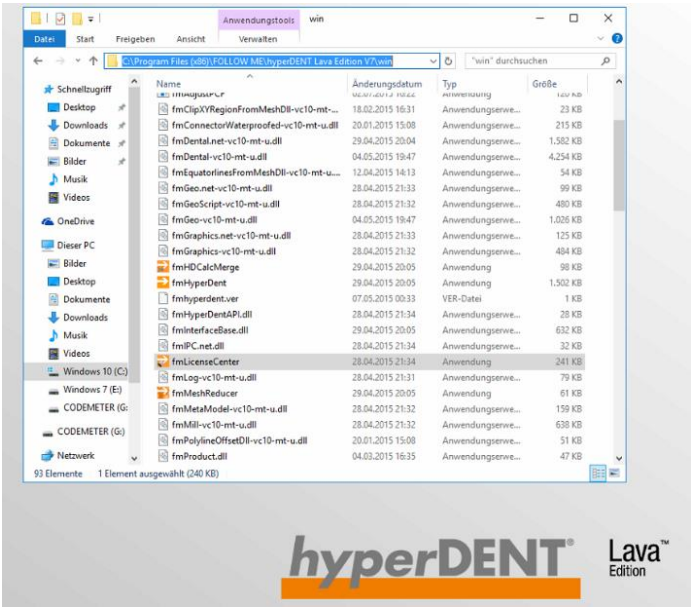
6. Insert Dongle

Insert delivered Dongle in a USB interface on your computer.

7. License Center

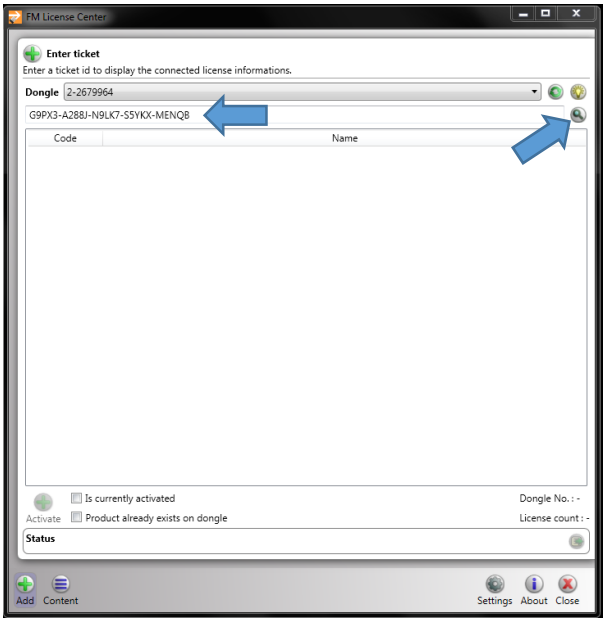
Open FollowME! - LicenseCenter, located in the windows start menu or in the hyperDENT install folder (C:\Program Files (x86)\FOLLOW ME\hyperDENT Lava Edition V7\win)

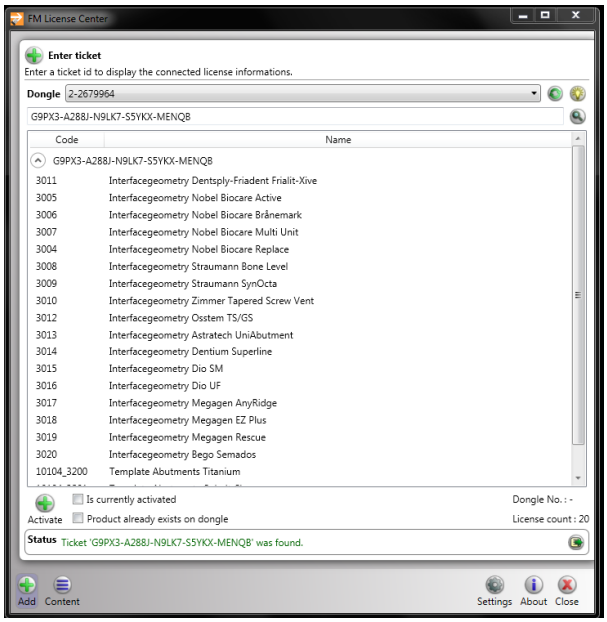




8. Enter Ticket

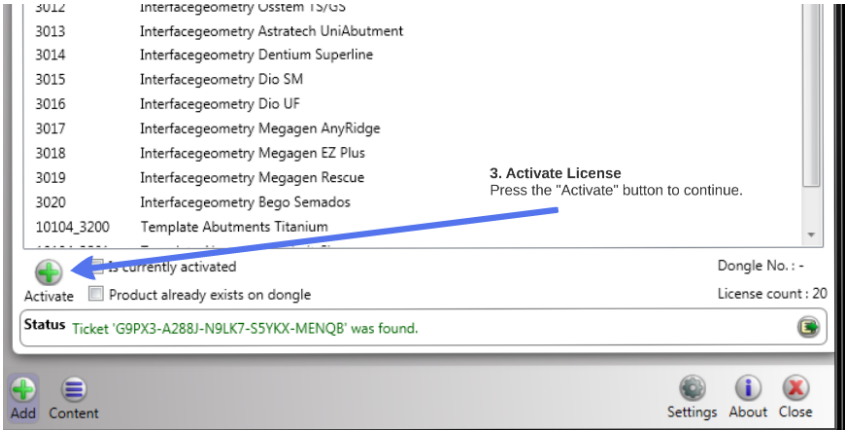
Enter your ticket id, you received before per e-mail, to display the connected license information.
Press the button in the right.





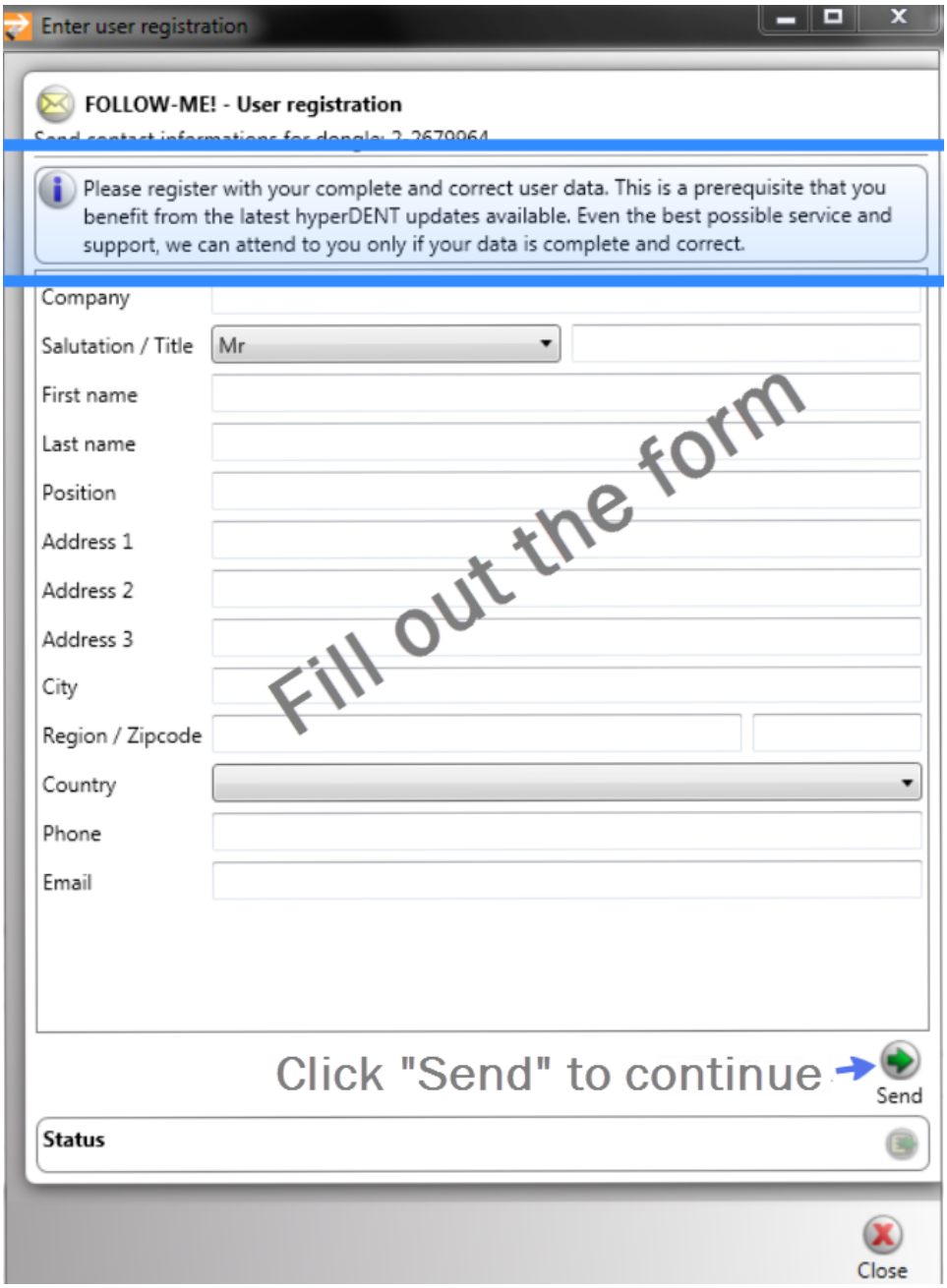
9. Activate License

Press the “Activate” button to continue. Please fill in your user data and press the button “send” to receive an e-mail with the verification code on your entered address.



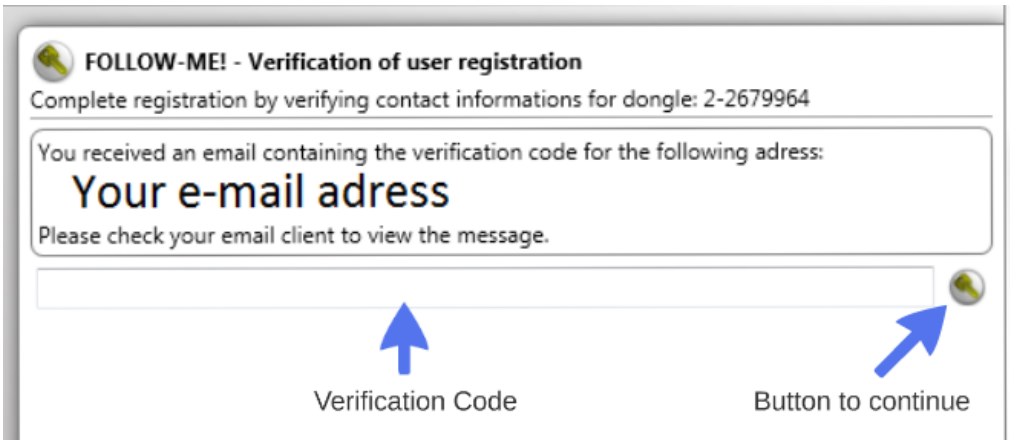
10. Fill out the form

Please fill out the form and click send to continue.



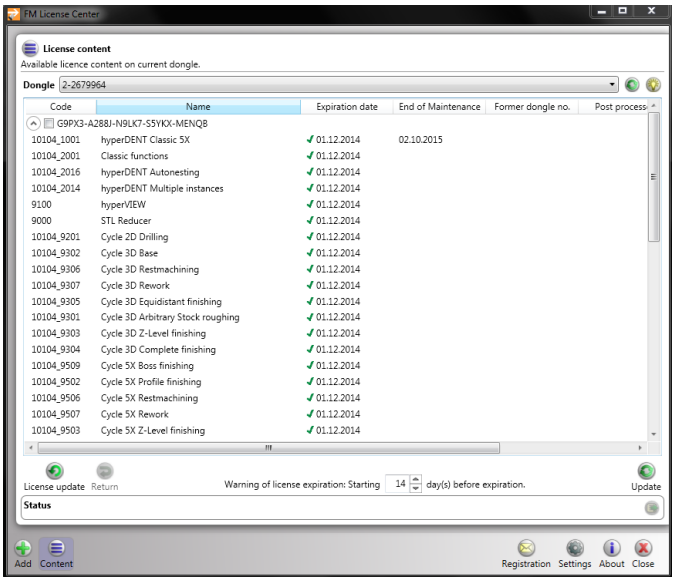
11. Verification of user registration

Please insert your verification code (check your E-Mail account) and press the button in the right.



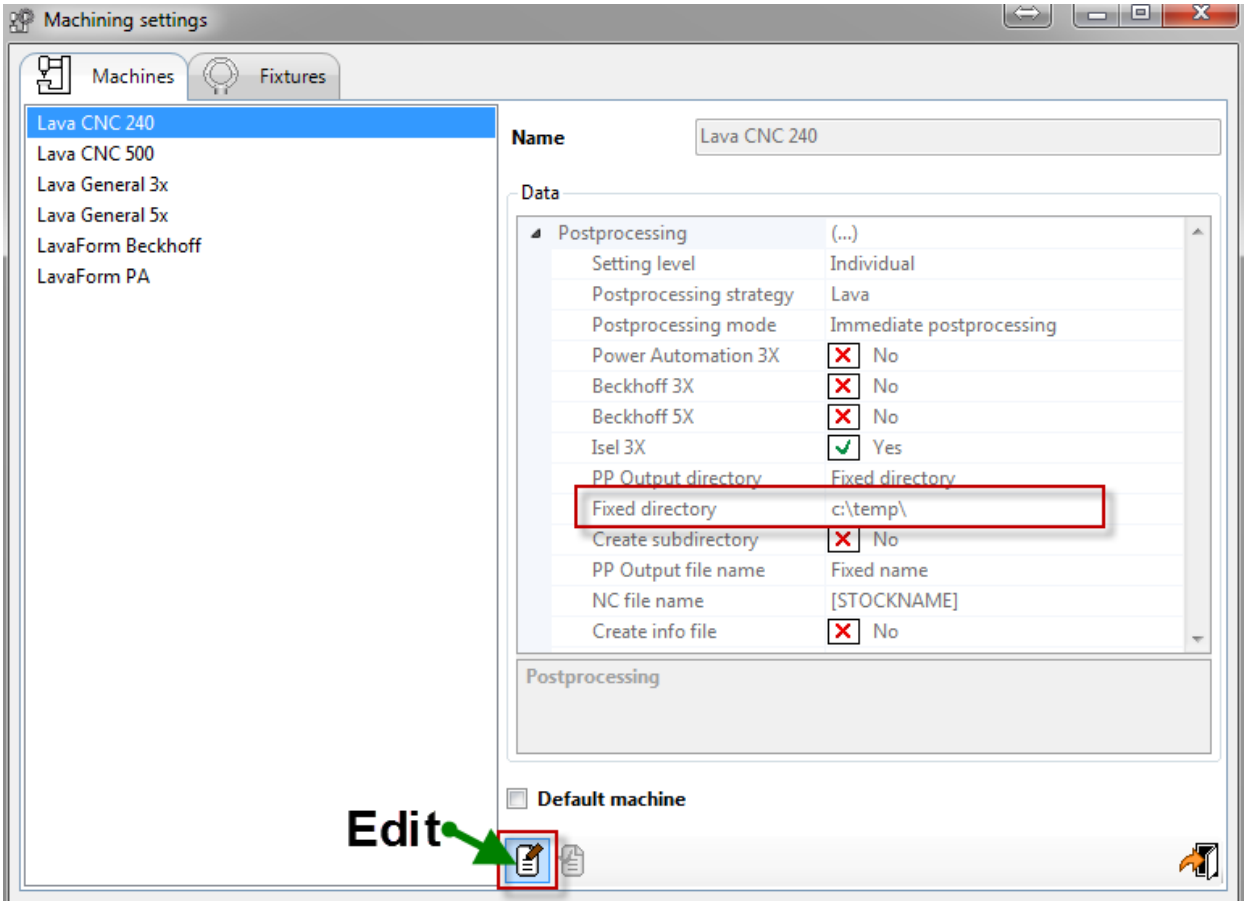
12. Verification was successful

Now you can start *hyper*DENT Lava Edition

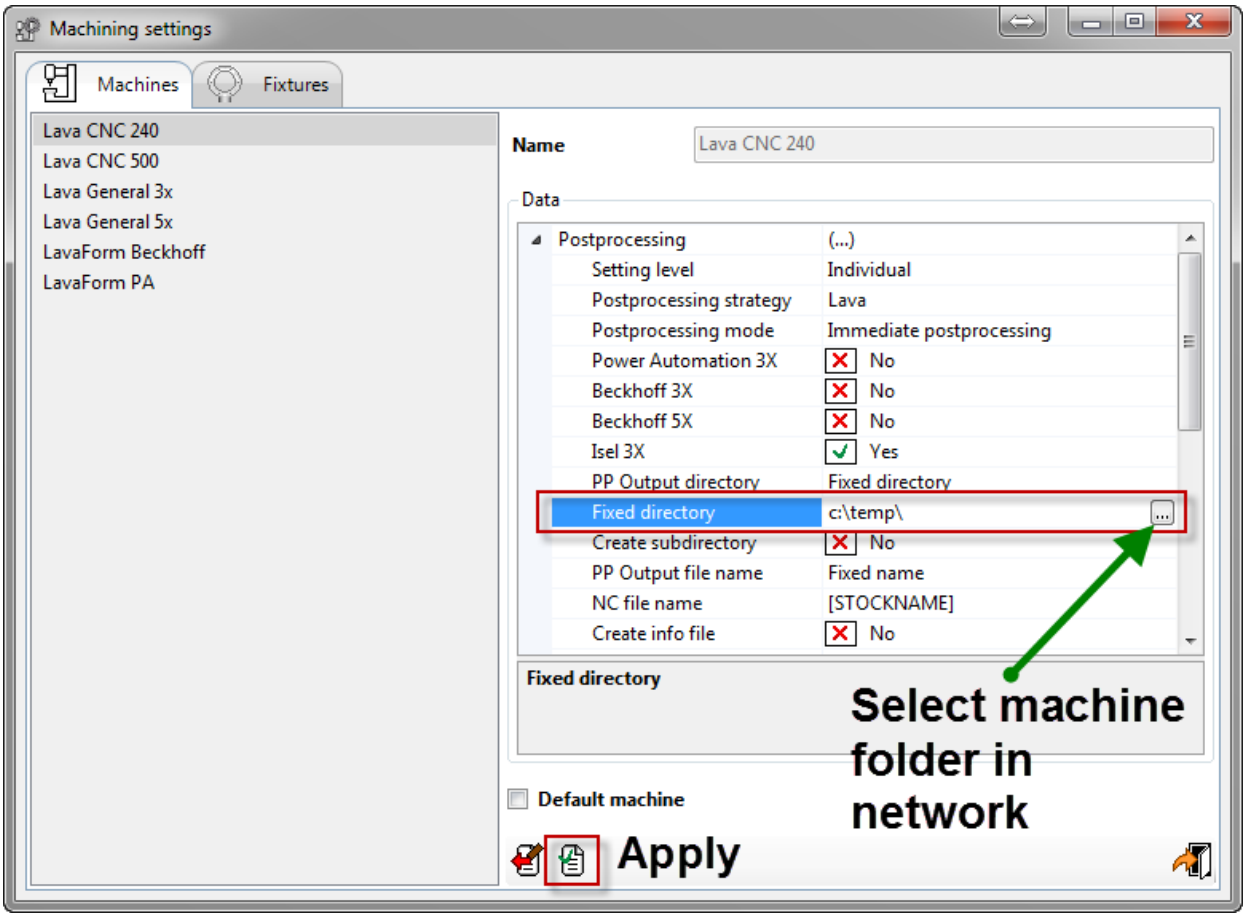


4. Postprocessing and machining settings

Before machining you have to set the postprocessor output directory. The postprocessor (PP) create the machine readable files for your LAVA machine. In the machining settings [Settings > Machining… > Machines] you will find all LAVA machines. Please select your machine and ckick Edit.



Select the machine folder in your network, to be able to send the machining files direct to your machine. Apply to continue.



Click “Default machine” to select your machine as default setting.

5. Operating functions

5.1 Overview of program interface

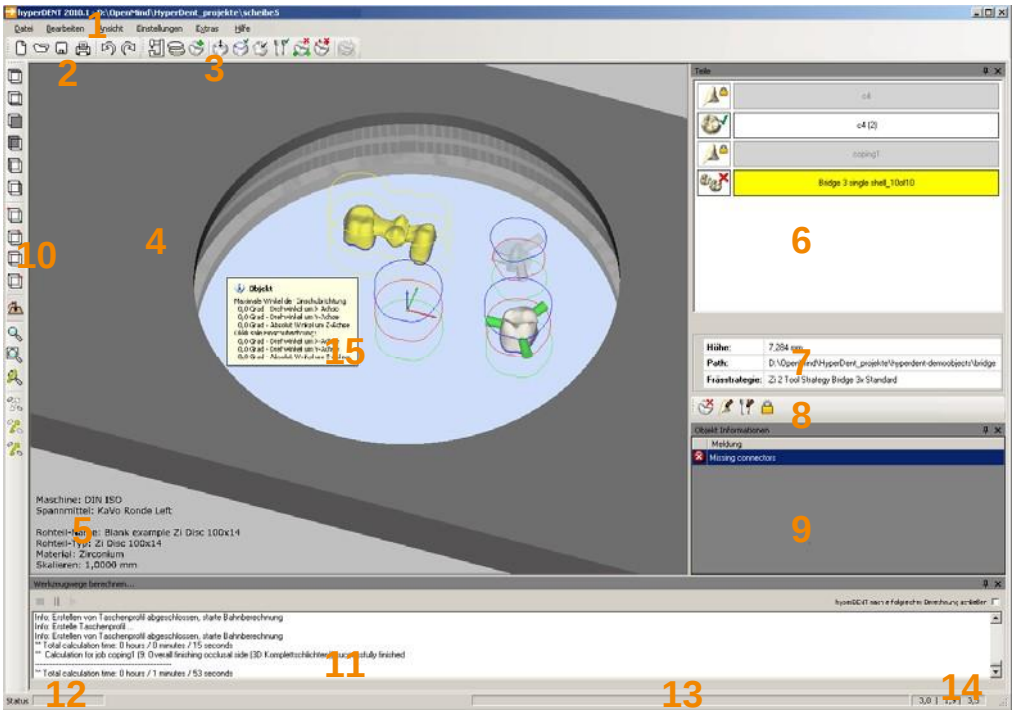


Figure 3-1

1. Menu bar
2. Toolbar – Project management
3. Toolbar – Process steps
4. Workspace
5. Project information
6. Part browser
7. Part data
8. Toolbar – Part functions
9. Message screen
   Pictogram “Cross” = Calculation not possible
   Pictogram “Caution” = Machining is possible but may be faulty
10. Tool bar
11. Calculation of toolpaths
12. Status line with progress bar for the calculation and information display (text)
13. Information line with details of required actions for the currently selected function.
14. Angle information for the viewing position of the blank.
15. Information window, contents depend on the position of the cursor. Dynamic display of angle information for the part, preparation line, or screw channel.

5.2 Toolbar – Process steps

The description of the process steps can be found under the relevant chapter headings.

Select milling unit — Select milling machine and fixture.

Load blank — Select blank and insert into the holder.

	Load part	Load part data/tool data.
	Set milling direction	Set insertion direction, main machining direction (alignment of the part to the tool), and adjust direction.
	Identify part features	Highlight preparation line and pontics, screw channel, and interface geometry, select, set individual machining areas.
	Tilt part in blank	Tilt part to minimize the height in the blank – inclination for optimized position of 3+1-axis machining.
	Select template	Select milling strategy for machining.
	Set connectors	Set support pins for machining.
	Set sintering pins	Set sintering pins for the sintering process.
	Calculate toolpaths	Calculate construction data with the toolpaths.

5.3 Menu bar, menu items, icons

Menu [File], context menu, toolbar

	New project	Create new project.
	Open project	Select and open existing project, close current project.
	Save project	Save current project.
	Save copy of project	Save copy of the current project under a different name or in a different directory.
	Print page setup	Arrange print page, determine page size, alignment, and margins.
	Project print setting selection	Select project settings for printing.
	Print project preview	Create and display print preview with the selected settings.

Print project — Print current project with the selected print setting selection.

Exit — Exit hyperDENT®, close program.

Menu [Edit], toolbar

Undo — Undo last action.

Redo — Redo last action.

Delete selected — Delete highlighted part.

Blank — Call up submenu.

> Rotate blank — Rotate blank in the fixture, e.g. for better use of the space left, greater distance between the part and fixture, adapt the tilt part to the swiveling axis of the fixture.

Part — Call up submenu.

> Edit template parameters

Change template for part. Only available in template generator option.

> Move part — Highlight selected part to be moved.

> Change part name (Objektnamen bearbeiten)

Change the part name, if the system suggestion is to be changed.

> Change part type — e.g. from bridge to crown, if the system suggestion is to be changed.

> Nest part in blank – local (Objekt im Rohteil schachteln – Lokal)

Automatically and optimally place the part near the current position in the blank.

> Nest part in blank – global (Objekt im Rohteil schachteln – Global)

Automatically and optimally place the part in the blank.

> Align part with screw channel axis (Objekt an Schraubenkanalachse ausrichten)

Align part as appropriate in the prefabricated blank.

> Set part sintering pin top plane

Create the top plane for sintering pins.

> Set occlusal insertion direction

Set current view direction to the part as occlusal insertion direction (= stepover direction), rotate if necessary.

> Open output directory (Ausgabeverzeichnis öffnen)

Open output directory for the NC files with the calculated toolpaths in the file system.

> Show toolpaths Show toolpaths after successful calculation.

> Open in hyperDENT® Calculation Merge (Öffnen in hyperDENT® Calculation Merge)

Show toolpaths in additional module hyperDENT® Calculation Merge after successful calculation.

> Lock part Lock selected part.

> Save part Save selected part.

> Export part Export selected part.

Preparation line

> Edit preparation line

> Change type of preparation line

e.g. from coping to inlay/onlay, if the existing setting is to be changed.

> Change undercut property of coping

e.g. from “Coping has no undercuts” to “Coping has undercuts”, if the existing setting is to be changed.

> Insertion direction from view direction

Set current view direction to the part as occlusal insertion direction (= stepover direction), rotate if necessary.

Connector

> Edit connectors Change settings for connectors.

> Move connector Highlight selected connector to be moved.

> Apply parameters from connector profile
Use default for connectors.

Sintering pin

> Edit sintering pins Change settings for sintering pins.

> Move sintering pin Highlight selected sintering pin to be moved.

> Apply parameters from sinter pin profile
Use default for sintering pins.

Menu [View], submenu, tool bar

Top view View according to machining alignment.

Bottom view View according to alignment for the machining of the opposite side.

Left, right view

Front, back view

Front left, front right view

Back left, back right view

Rotate view and align with surface (Ansicht drehen und zur Oberfläche ausrichten)
Rotate view and set the view direction of the part perpendicular to the surface at the selected point; e.g. for primary parts attachment, optimally align the stepover direction of the user-defined areas.

Adjust view to insertion direction
Adjust the view of the part in line with the insertion direction.

Zoom all Center blank or non hidden parts on the workspace.

Draw and zoom to window

Set zoom area and center on the workspace.

Zoom selected — Center selected part on the workspace.

Hide selected — Hide selected part.

Hide all except selected

Show selected part, hide the rest.

Show all — Show all parts.

5.4 General settings

General — Call up submenu, general program settings.

> Miscellaneous — Language, path details for directories, messages, information, accuracy.

> Load wizard — Wizard and wizard functions for loading the part.

> Project management — Settings for project management.

> Part tracking — Settings for part management.

> Consistency checks — Type and scope of the consistency check.

> Calculation — Output directory, settings for calculation and behavior in the event of an error.

> Postprocessing — Output directory, file name for NC file, settings for creation of the NC file.

> Navigation — Assignment of mouse buttons for zoom, rotate, pan.

> Display — Edge smoothing, color assignments for holders, part, preparation lines, workspace building elements.

> Connector behavior Updating and behavior in the event of overlapping.

Menu [Extras]

hyperVIEW® Call up simulation program (optional).

License Center Function for license management and activation.

hyperDENT® Calculation Merge
Call up additional module, show NC file after successful calculation, and merge individual calculations.

STL Reducer Reduce and optimize stl files

Clean up part administration collection
Clean up part group (optional).

Execute command Select command from the selection menu and apply to the activated part.

> Save part
> Export part
> Delete part transformations
> Delete part nesting transformations
> Log settings
> Refresh licenseing

5.5 Part browser

Parts

Displays parts saved in the project.

Context menu

Delete part Delete selected part.

Edit template parameters
Edit/change template for part (template generator

option).

Change part type e.g. from bridge to crown, if the system suggestion is to be changed.

Change part name (Objektnamen bearbeiten)

Change the part name, if the system suggestion is to be changed.

Nest part in blank – local (Objekt im Rohteil schachteln – Lokal)

Automatically and optimally place the part near the current position in the blank.

Nest part in blank – global (Objekt im Rohteil schachteln – Global)

Automatically and optimally place the part in the blank.

Calculate toolpaths Calculate construction data with the toolpaths.

Print selected parts Print parts with current print setting selection.

Lock part Lock selected part

A part can be locked as follows:

- Manual locking
- Locked by the system during the calculation of the toolpaths
- Locked after the toolpaths have been calculated, as identification for used blank material, for simultaneous display of the part as “Outline”

5.6 Part data

Additional part information

Display and entry of additional, customerspecific part information. The information (designation) must first be entered under the menu item [Settings] > [Part information...].

Height Height of the selected part.

Path Path for locating the part file in the file system. Template Assigned template.

5.7 Toolbar – Part functions

Delete part Delete selected part.

Change part type	e.g. from bridge to crown, if the system suggestion is to be changed.

Lock part	Lock selected part A part can be locked as follows: - Manual locking - Locked by the system during the calculation of the toolpaths - Locked after the toolpaths have been calculated, as identification for used blank material, for simultaneous display of the milled area of the part as "Outline"

5.8 General operating instructions

Mouse operation

Click	Click with the left mouse button
Double-click	2x click with the left mouse button
Right-click	Click with the right mouse button
Drag	Drag and drop – select, drag, and drop. Highlight with the left mouse button, hold button down and move to new position with the cursor, release button.
Select part	Click on the part with the left mouse button: The part is highlighted in yellow; the following actions can be performed for the selected part.
Move part	Double-click on the part with the left mouse button: The part is highlighted in orange and can now be rotated or moved using the mouse.
Unlock part	Right-click on the part icon in the part browser: Call up the [Unlock] menu item.
Rotate view	(Dynamic rotation) Press right mouse button and move mouse.
Move view	(Pan) Press Ctrl key and right mouse button or both mouse buttons and move mouse.
Zoom	Move mouse wheel forward or backward.

Select

Select	Highlight selection: Click with the left mouse button on the part, text, display, entry.
Multiple selection	Press Ctrl key and highlight selection: Hold Ctrl key down and click with the left mouse button on the parts, texts, entries.

Multiple selection in part browser

	Press Ctrl key and highlight selection: Hold Ctrl key down, press left mouse button and drag the displayed selection frame over the parts to be highlighted in the part browser.
Selection menu	Menu bar, drop down menu: Open menu: click on the menu bar, Select menu item: click on the menu item.
Context menu	Open menu: right-click on the workspace or part display, Select menu item: click on the menu item.
Selection list	Drop down list, List box: Open menu: click on the arrow icon, Select entry: click on the list entry
Selection box	Mark selection, remove marker: click on the selection. The selection is marked with a checkmark or the checkmark is removed.
Option field	Highlight selection: click on the selection, Remove selection: click on a different selection. The selection is marked with a dot.
Tab	Tab: Click on the tab.

Displays

The displays are dependent on different conditions:

- ☐ General settings that are configured
  Menu [Settings], menu item [General]
- ☐ Blank administration settings that are configured
  Menu [Settings], menu item [Blanks] > [Blank administration…]
- ☐ Selected part
- ☐ Current operational step

5.9 Space mouse

Alternatively, you can also control hyperDENT® with a space mouse.

Configuration of key assignment:

Key	Command	
Fill	Zoom all	Zoom All
T1	Draw and zoom to window	Top View + Zoom All
T2	Top view	Top View
T3	Bottom view	Bottom View
T4	Left view	Left
T5	Right view	Right

T6	Front view	Front
T7	Back view	Back
T8	Front right view	Right Front
T9	Front left view	Left Front
T10	Back right view	Right Back
T11	Back left view	Left Back

6. Quick guide

6.1 Starting the program

1. Double-click on the program icon <hyperDENT Lava Edition>:

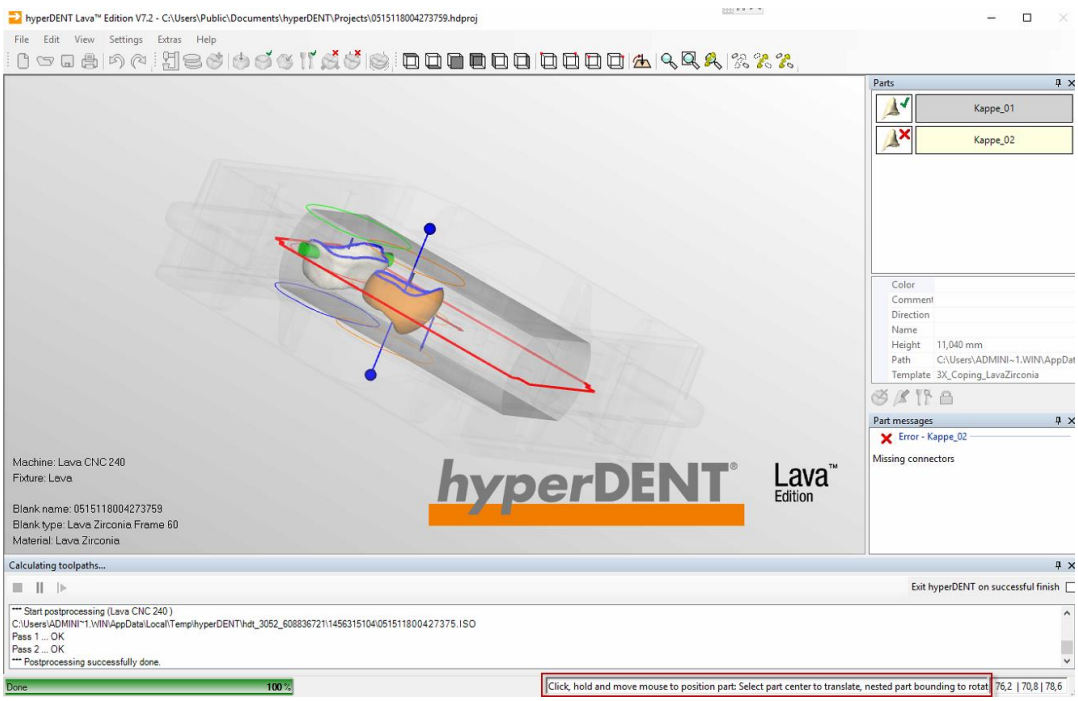
Figure 4-1 – Toolbar

Once the program is running, the toolbar displays the icons for project management and the process steps that are required for machining.

We recommend that you work through the process steps using the icons from left to right.

- Missing process steps are highlighted by a red cross, whilst completed process steps are identified by a green checkmark.
- You can also open other hyperDENT® Lava Edition instances and edit several projects at the same time (Classic version).

For information regarding the user's next required work step for the current workflow there is an info display available located in the bottom right corner of the main screen (see red box in the picture below):



6.2 The process steps in sequence


1. Either create a new project and save.

   Or open an existing project.

   Or start with the next step to construct an individual part and discard the details or save at a later time in a project.

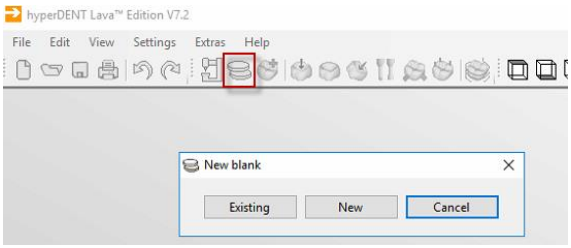
2. Select milling unit.

   Set the milling machine and the associated holder for the machining process. The details are incorporated in the program calculation.

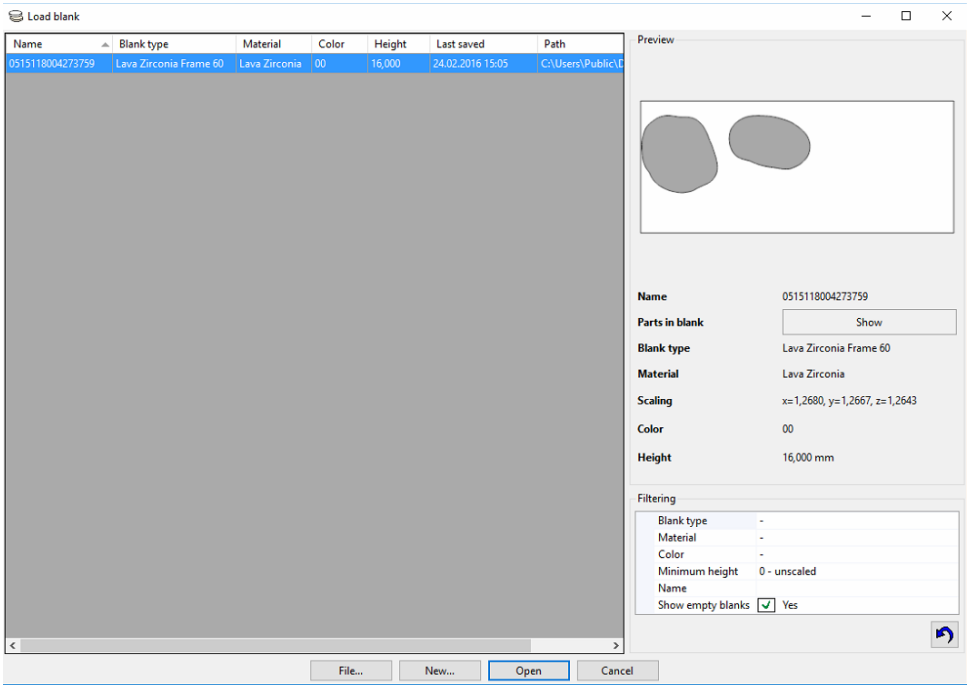
3. Load blank.

   Select the blank from the part administration and load into the project. All parts are placed on the blank.

   Clicking on the „Load blank“ icon will open the following window:



Are there existing projects the following window opens.

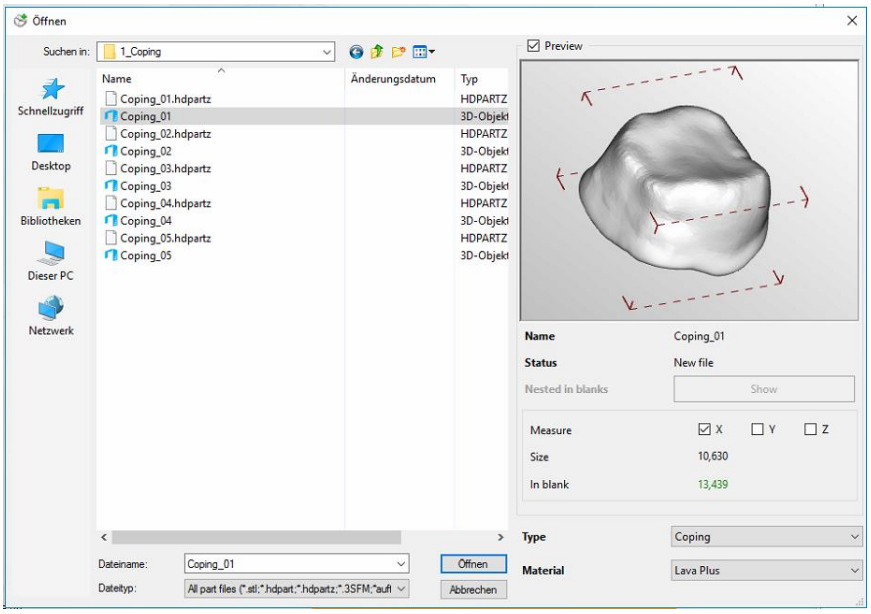


More in formation for load blank you will find in “Project management”.

Click on new for selecting a new blank.

4. Load part.

Select and load the .stl or .luci file with the part data for the workpiece. The file can be in any of the directories, the part selection shows a preview of the workpiece.

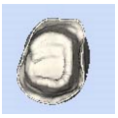


5. Set milling direction, adjust direction.

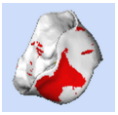
Set the general alignment (= stepover direction) of the part:

Rotate part onto the side on which the undercuts are to be minimized. Then define this side as occlusal or cavity.

Click on [Occlusal] if the occlusal side or chewing surface of the part is visible.



Click on [Cavity] if the inner side of the coping is visible.



Then check undercut if necessary:

Click on [Update].

Established undercuts are identified by a checkmark in the selection window and appear in red on the part.

If necessary, make fine alignment adjustments to the part:

Click on the [Arrow keys] in the selection window. The part is gradually rotated.

Adjust direction again.

Repeat the undercut check and fine alignment, especially for 3-axis machining, until there are either no more undercuts in the coping or they are very small and are in a non-critical area.

6. Identify part features

Highlight the preparation line, other part characteristics and depending on the part type, the pontics, the screw channel, or the interface geometry.

Select the [Preparation line] tab and select Type.

Copings, inlay

Click into the part, for bridges click into the cavity or inside the preparation line:

The crown edge – preparation line – is determined and highlighted in blue.

Abutment base, Emergence profile Click onto the relevant boundary line:

The boundary line is identified and highlighted in color.

The type of preparation line must be compatible with the part type, otherwise the calculation is not possible for safety reasons.

3. Select the [Pontics] tab and click on the center of each pontic or supporter:
   The pontic or supporter is marked with a blue dot.

Select the [Implant interface] tab and click on the edge of the screw channel.

Define interface geometry or load model for interface geometry.

If necessary, determine the coping-specific alignment:
Close the selection window.

Align the coping so that there are no undercuts and then in the context menu, select menu item [Insertion direction from view direction]. The insertion direction is set and highlighted.

Set template correctly.

If necessary, set the undercut machining:

Highlight the preparation line and in the context menu, select the menu item [Change undercut property of coping] > [Coping has undercuts].

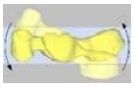
If necessary, set the user-defined machining area:

Select the [Preparation line] tab and select [User-defined area] (Benutzerdefinierter Bereich) as the type. Call up the [Plot outline] (Kontur zeichnen) function and plot the user-defined area. Further details --> “Identify part features” (Objekteigenschaften bestimmen) > “User-defined area” (Benutzerdefinierter Bereich).

Set template correctly.
Set details correctly under “Tilt part in blank”.
7. Tilt part in blank:

Set the tilt angle of the part in the blank.

- ☐ Click on [Center]:
  If the part is at the top or bottom in the blank.
- ☐ 3+1-optimization:
  Align part optimally to the rotation axis of the machine.
- ☐ Rotate 180 degrees around Z:
  Rotate part optimally by 180 degrees to the rotation axis of the machine.



- ☐ Tilt part.

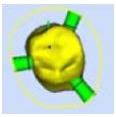
- Minimize height.
  If the part is askew in the blank and is therefore too high.
- Minimize inclination (angle optimization).
  If the part is at a steep angle and if this produces large undercuts with unfavorable tilt angles.
- Enter degree value for maximum tilt angle.
- Select axis.
- Click on [Tilt].
  The part, together with the tool axis is tilted.

When you enter a tilt angle, the part is tilted within the blank, the position to the tool axis remains unchanged. This requires clamping for the machining:
3+2-axes or better
5-axes.

8. Select milling strategy.
   Select and/or change the template for the part.

9. Set connectors.

- [Automatic] mode, use default or select Type, Size, and Count.
- Click on the part:



The connectors are set automatically.

- If necessary, select [Manual] mode and set the additional connector manually.
- If required, close the menu, highlight the pin and move or delete it.

Entering the connectors is the last required process step. The completion of all process steps is indicated in the part browser by a checkmark next to the part icon.

10. Set sintering pins (optional, only if required).
    - Select Angle, Size, and Parameter profile.
    - Click on the place on the part where the pin is to be set:
      The pin is set at the selected place.
    - If required, close the menu, highlight the pin and move or delete it.

11. Save project and save the process setting: optional, if you want to keep

the data.
Click on the icon and the project is saved.

12. Calculate toolpaths.
    Click on the icon:
    The construction data and toolpaths are calculated. The progress is shown in the log.

13. Save project: optional, if you want to keep the data and continue to use the blank.
    Click on the icon and the project is saved.

14. Print project.
    Click on the icon:
    The project data and the current settings are printed, e.g. for documentation.

15. Create NC program.
    The NC program (postprocessing) can be created in different modes.

- Depending on the setting, the file is loaded either after the prompt or automatically, and postprocessing takes place in the background.
- The program for the simulation (hyperVIEW®) starts up automatically once the calculation has finished, depending on the mode selected in the general settings.

16. Simulation (optional).
    The simulation shows the representation of the toolpaths in accordance with the axis movements of the machining device. The simulation takes place based on the calculated NC file.

7. Project management

The project management gives you an overview of the projects and blanks that have been saved and the parts that have been placed and machined. Each project file also corresponds to a blank and can be loaded as a project via the project management or as a blank via the blank administration. hyperDENT® saves all details of a project in project files on the hard drive. You can determine the directories under [Settings] > [General] > [Project management].

The project files contain all information about the parts to be machined. Make sure you back up the project files regularly, preferably onto an external data carrier.

The project management functions can be accessed via the [File] menu or toolbar.

New project — Open a new, empty project.

Open project — With the project management, open the selection window to select and open a project that has already been saved.

Save project — Save the project that is open.
Projects that are saved using the current version of hyperDENT® can no longer be read by older versions of hyperDENT®.

Save copy of project — Save the project that is open under a different name or in a different directory.

Print page setup — Align page, set size, orientation, and margins.

Project print setting selection
Select project data for printing.

Print project preview — Print preview.

Print project — Print project data.

Exit

Exit hyperDENT®: close the project that is open, close the program.

- A project can only be opened by one user. An open project is blocked to other users.
- A user can always only open one project.
- If another project is opened, the current project is closed. Classic version: you can start hyperDENT® several times in order to process several projects at the same time.
- If a project is closed that has already been changed, then a confirmation prompt appears:

Save	Save the changes, close the project.
No	Discard the changes, do not save, close the project.
Cancel	Cancel the process, do not save the changes, do not close the project.

You can save hyperDENT® projects in any directory in the file system. hyperDENT® projects are given the following file name extensions:

- ".hdproj" Project file and relative path to STL file of the part.
- ".hdprojz" Project file and saved STL file.

7.1 New project

The icon is active as soon as the program starts up.

Use this menu item to create a new project and configure the new settings for the milling unit and material for your parts, and the dental restorations.

7.2 Open project

To construct additional parts from a blank, you must load the project and blank again. Then you can add additional parts and machine them.

The icon is active as soon as the program starts up.

7.2.1 Open project

Either

1. Click on the project in the project list or file system:
   The project is selected, preview and data are shown.
2. Click on [Open]:
   The project is loaded and is displayed on the workspace.

Or

1. Double-click on the project in the project list or file system: The project is loaded and is displayed on the workspace.

7.2.2 Adjust table

Order of columns

Change

1. Click on the column heading, hold the mouse button down and drag column to new position.
2. Release mouse button:
   The column is inserted in the new position.

Reset

1. Call up context menu and select menu item [Reset order of columns to default]:
   Right-click on the column heading and click on the menu item.
   The order of columns is reset to the default setting.

Column width

Change

1. Click on the boundary line between the column headings, hold the mouse button down and set the column width.
2. Release mouse button:
   The column is inserted in the new position.

Or

1. Double-click on the boundary line between the column headings: The column width is set to the predefined width or the maximum width of the content or the heading.

Reset

1. Call up context menu and select menu item [Reset width of columns to default]:

Right-click on the column heading and click on the menu item.
The column width is reset to the default setting.

Sorting

1. Click on the column heading:
   The table is sorted by column contents in ascending or descending order – according to the arrow icon for the sort order.

Show/hide columns – Blank administration settings

The columns displayed in the table and the options for filtering the blanks can be set under [Settings] > [Blanks] > [Blank administration...]. Here you can show and hide the columns and filters for the display. Further details --> “Settings” > “Blanks” > “Blank administration settings”.

7.3 Already constructed parts

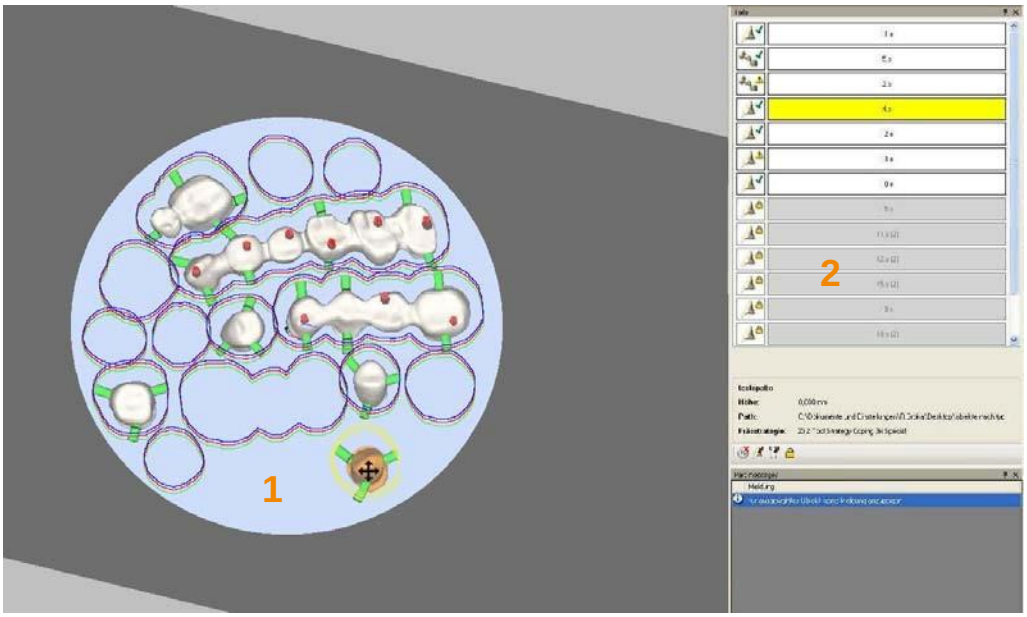


Figure 5-1

Already constructed parts are shown as “Outline” (1). “Constructed” is defined by the software as all parts for which a calculation has already been fully completed and for which you can therefore assume that they have been constructed and that the raw material has been used here.

Already constructed parts are also identified as locked and have a padlock icon (2) in the part browser. Right-click on the part to unlock it and reload it.

Saving the used material in the project means:

- you always have an overview of space that is still available on the blank;
- you can move new parts in such a way that they are securely placed in the full material.

7.4 Print project

7.4.1 Page layout, Print project

Print Page Setup..., Page layout

The selection window shows the functions to use to arrange the print page: Size, Alignment, Margins.

Paper	
Size	Selection menu for the paper format. Take into account the formats of the printer to be used.
Source	Selection menu for the paper feed. The selection depends on the printer selected.
Orientation	Option field for setting the orientation of the print page as “Portrait” or “Landscape”.
Margins	Entry fields for margin width. The minimum width depends on the printable area of the printer to be used.
OK	Accept setting, close window.
Cancel	Cancel process, keep old settings, close window.

Printer

The selection window shows details about the selected printer, the selection menu for the printer, and the printer properties.

Name	Selection menu for the printer.
	Call up printer properties.

Properties	
	Select network printer.
Network	
	Accept setting, close window.
OK	
	Cancel process, keep old settings, close window.
Cancel	

Print project preview, Page view

The window displays the print preview with the selected data and the following icons: Print, Zoom, Page layout, Close, Page number.

Print project

The selection window displays details about the selected printer, the selection menu for the printer, and the printer properties, along with the input options for the pages to be printed (print area) and the number of printouts.

OK	Accept setting, start printout.

7.4.2 Project print setting selection

The selection window shows the selection for the data to be printed, the print preview, and the following icons: Print, Page layout, Zoom, Page display, Page number, Page navigation.

Font size	Default font size.
Print part selection	
	Set print range.
Select all parts in blank	
	Print blank with part data.

Select all parts in blank with toolpaths	Print blank with part data and calculated toolpaths.
Select all parts in project with toolpaths	Print project with parts and calculated toolpaths.

View for the print preview (Ansicht für die Druckvorschau)

	View direction of the part for the printout:
Occlusal side	Display of the occlusal side.
Cavity side	Display of the cavity side.

Display project information

	Activate/deactivate printout of project information.
Display machine	Select project information for the printout.
Display fixture	Select project information for the printout.
Display blanks (Rohteile anzeigen)	Select project information for the printout: Scaling factor, blank type, blank material, blank geometry, blank color.
	Enable/disable printout of part information.

Part information

Display part type

Display part path

7.4.3 Automatically print project after calculation

The data set under “Print project Page Setup” is automatically sent as a printout to the default printer as soon as the calculation is complete and the

NC file has been created. You therefore obtain, for example, the appropriate setup plan for the NC file with blank information, part information, and tool information.

- The settings for the data to be printed are controlled under the [File] menu, [Print project Page Setup] submenu. Further details --> “Print project”, > “Print project Page Setup”.
- The settings for the printer are controlled under the [File] menu, [Print project] submenu. Further details --> “Print project” > “Page layout, Print project”.
- Automatic printout is activated and deactivated under the [Settings] menu, under [General settings] > [Postprocessing] >[Automatically print out project after calculation]

8. Load blank

The blank is the material from which the dental restoration is made. Material and shape can be saved as the blank type in the program database.

As well as the usual blanks, you can also use prefabricated blanks (prefabs) with a prefabricated screw channel, screw fit, and interface geometry. These prefabricated blanks are usually provided by the system supplier to match the corresponding holder.

8.1 Load blank

The icon is active as soon as the program starts up.

Load the blank for the machining from the blanks saved in the blank administration or from the file system.

Once the blank is loaded, it is displayed on the workspace, and details of the blank appear in the project information.

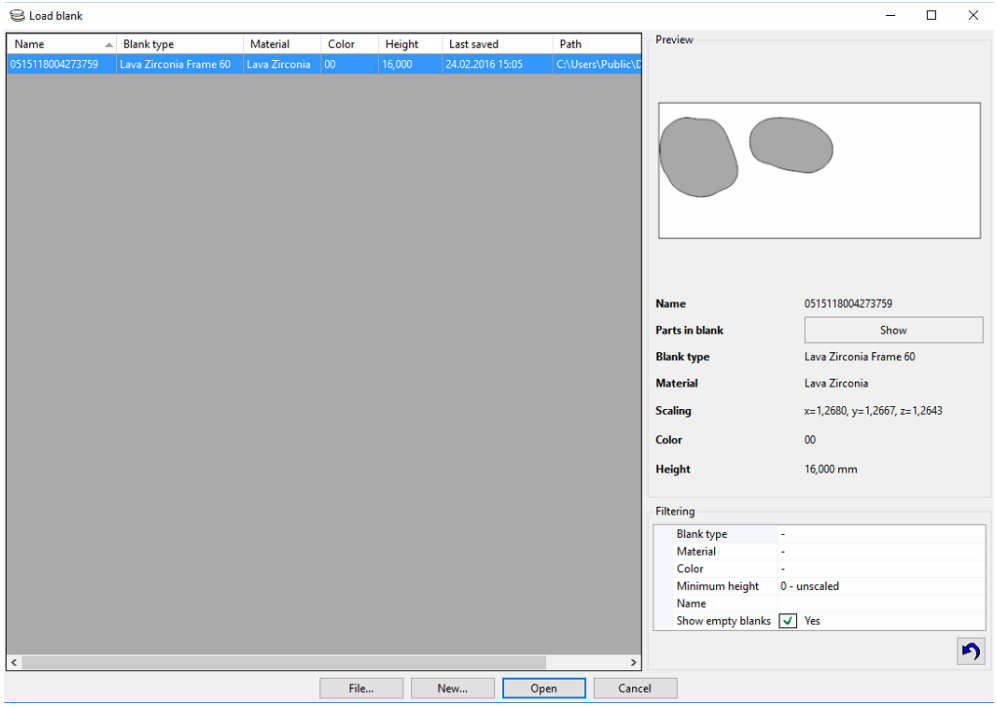
If necessary and for a new project, you can change the selection at a later stage prior to the calculation.

File Selection window for loading blanks from the file system.

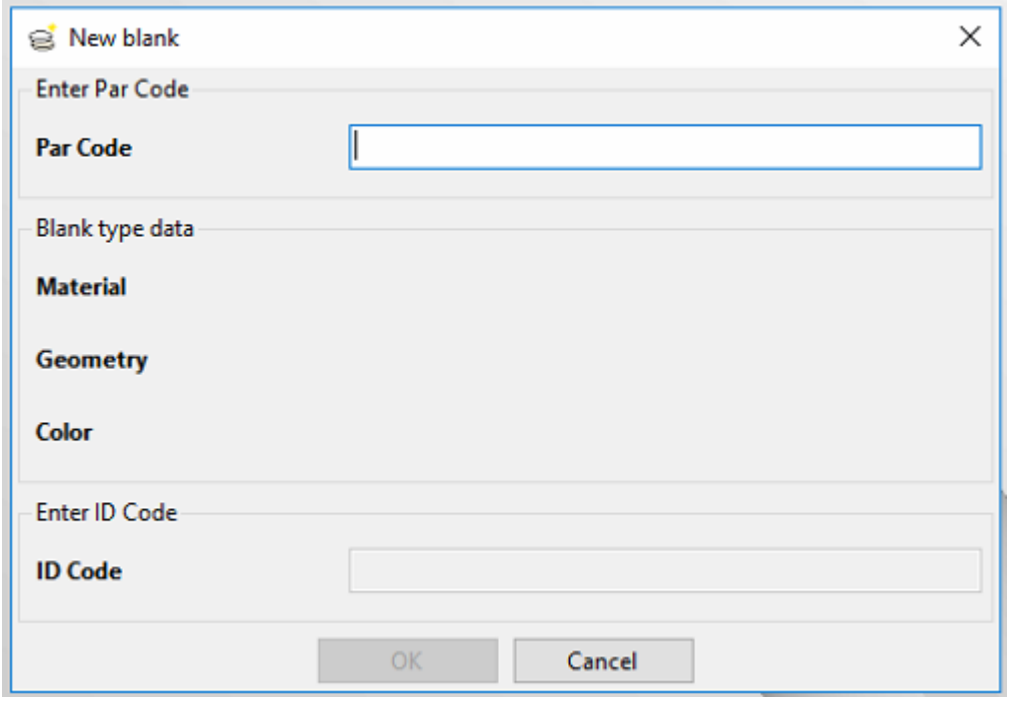
New	Call up selection window for loading new blanks.
Open	Load selected blank.
Cancel	Cancel process, do not load blank.

New blank when no blank is in the database:

Blank selection window for used blanks:



New blank:



Par Code:

Enter the number of the parameter code of the Lava material blank in this field. If you use a barcode reader, the number appears in this field.

After loading the parameter code the material, the geometry and if applicable the color appears in the corresponding boxes.

Note: The material blank type data is only informatory and cannot be changed.

ID Code:

Enter the number of the ID code of the Lava material blank in this field. If you use a barcode reader, the number appears in this field.

Clicking on the button "OK" will load the material blank.

For being able to create new blanks without using a barcode-scanner, you can use the following codes. (Please enter RETURN after entering the code)

Par Code	ID Code	Blanktype
1768066764351631	2976644270786399	Lava Zirconia Frame 20

1068066764389471		Lava Zirconia Frame 20 XL
1868066764358241	5264334494318559	Lava Zirconia Frame 40
1968066764379011	0515118004273759	Lava Zirconia Frame 60
1668066764335491	1365400911586979	Lava Zirconia Frame Multi
1568066764314721	5416416780903459	Lava Zirconia Frame Multi XL
7700000000084282	5416416780903459	Ceramill Sintron Multi 15.3 mm
7800115500074812	4025298096259679	Ceramill Sintron Multi 18 mm
3100000000072981	2976644270786399	Lava Wax Block 60
3200000000023831		Jensen WX Block Multi
6768066764334421		Lava Plus Frame 20
6868066764346011		Lava Plus Frame 40
6468066764354581		Lava Plus Frame Multi L
6568066764309041		Lava Plus Frame Multi XL
5201000000088982		Lava Ultimate Block L A1-HT
5202000000017712		Lava Ultimate Block L A1-LT
5203000000019662		Lava Ultimate Block L A2-HT
5204000000072872		Lava Ultimate Block L A2-LT
5207000000021012		Lava Ultimate Block L A3.5-LT
5205000000017382		Lava Ultimate Block L A3-HT
5206000000093302		Lava Ultimate Block L A3-LT
5208000000002062		Lava Ultimate Block L B1-HT
5209000000012652		Lava Ultimate Block L B1-LT
5200000000093592		Lava Ultimate Block L BL-LT
5210000000072742		Lava Ultimate Block L C2-LT
5211000000037572		Lava Ultimate Block L D2-LT
5101000000005172		Lava Ultimate Block M A1-HT
5102000000091972		Lava Ultimate Block M A1-LT
5103000000040482		Lava Ultimate Block M A2-HT
5104000000002172		Lava Ultimate Block M A2-LT
5107000000099192		Lava Ultimate Block M A3.5-LT
5105000000092922		Lava Ultimate Block M A3-HT
5106000000064532		Lava Ultimate Block M A3-LT
5108000000081292		Lava Ultimate Block M B1-HT
5109000000030832		Lava Ultimate Block M B1-LT
5100000000040182		Lava Ultimate Block M BL-LT

5110000000034362		Lava Ultimate Block M C2-LT
5111000000093512		Lava Ultimate Block M D2-LT
5204000000072872		Lava Ultimate Block S A1-HT
5207000000021012		Lava Ultimate Block S A1-LT
5205000000017382		Lava Ultimate Block S A2-HT
5206000000093302		Lava Ultimate Block S A2-LT
5208000000002062		Lava Ultimate Block S A3.5-LT
5209000000012652		Lava Ultimate Block S A3-HT
5200000000093592		Lava Ultimate Block S A3-LT
5210000000072742		Lava Ultimate Block S B1-HT
5211000000037572		Lava Ultimate Block S B1-LT
5101000000005172		Lava Ultimate Block S BL-LT
5102000000091972		Lava Ultimate Block S C2-LT
5103000000040482		Lava Ultimate Block S D2-LT
7200000000064082	0045737031585259	VITA CAD-Temp Multi 1M2TM
7201000000030102	0045737031585259	VITA CAD-Temp Multi 2M2TM
7202000000004682	0045737031585259	VITA CAD-Temp Multi 3M2TM
4874174365852711		Zirconia Block 40

The selection window shows the blank administration with the list of blanks, preview, and data for the selected blank, along with the filter for selecting the blank.

The display is dependent on the menu [Settings] > [Blanks] > [Blank administration…]. Further details --> “Settings” > “Blanks” > “Blank administration settings”.

8.1.1 Load blank

Either

1. Click on the blank in the blank list or file system: The blank is selected, preview and data are shown.
2. Click on [Open]:

The blank is loaded and is displayed on the workspace.

Or

1. Double-click on the blank in the blank list or file system: The blank is loaded and displayed on the workspace.

8.1.2 Adjust table

Order of columns

Change

1. Click on the column heading, hold the mouse button down and drag column to new position.
2. Release mouse button:
   The column is inserted in the new position.

Reset

1. Call up context menu and select menu item [Reset order of columns to default]:
   Right-click on the column heading and click on the menu item.
   The order of columns is reset to the default setting.

Column width

Change

1. Click on the boundary line between the column headings, hold the mouse button down and set the column width.
2. Release mouse button:
   The column is inserted in the new position.

Or

1. Double-click on the boundary line between the column headings: The column width is set to the predefined width or the maximum width of the content or the heading.

Reset

1. Call up context menu and select menu item [Reset width of columns to default]:
   Right-click on the column heading and click on the menu item.
   The column width is reset to the default setting.

Sorting

1. Click on the column heading:

The table is sorted by column contents in ascending or descending order – according to the arrow icon for the sort order.

Show/hide columns – Blank administration settings

The columns displayed in the table and the options for filtering the blanks can be set under [Settings] > [Blanks] > [Blank administration...]. Here you can show and hide the columns and filters for the display. Further details --> “Settings” > “Blanks” > “Blank administration settings”.

9. Load part

The part represents the dental restoration. The part data is saved in an associated part file.

The icon is active as soon as the program starts up.

You can load the parts from any directory.

Several part files can be simultaneously selected and loaded; the preview is then inactive and placement takes place outside of the blank.

Once you have selected a part file, the part preview is shown. You can then determine the maximum dimensions, along with the type and construction for the dental restoration.

Type and construction control the automatic defaults for the following process steps.

If the CAD information is loaded via a defined interface, then many process parameters have already been determined. To do so, select the correct file type.

Once the part is loaded, it is added to the part browser and displayed in the center of the blank.

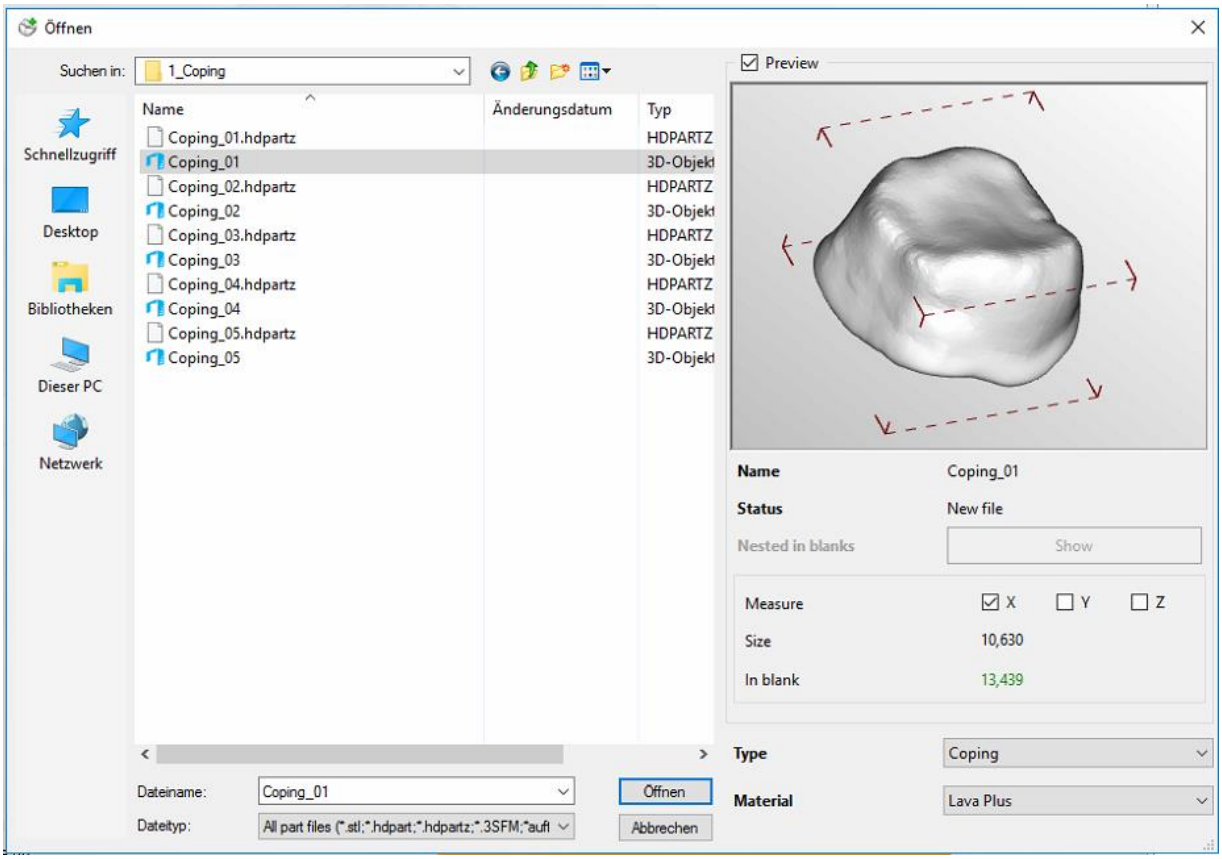
For optimum use of the blank, manually move the part to a suitable place in the blank or use automatic placing.

Part tracing gives you a quick overview of the parts that have already been loaded into a project or have already been calculated.

If you load a part, created in a LAVA scanner, the part type, preparation lines and milling direktion is detected automatically. When you load a part as a raw STL file, make sure to set up the right part type, preparation line and milling direction for a good result.

9.1 Load part

Select and load the part with the part data for the material blank using the “Load part” dialog:



As soon as you have selected a part file, the part preview is shown on the right hand side of the window. You can then determine the max. dimensions along with the material and the part type for the dental restoration.
The following information and functions are available:

Preview Enable/disable preview

Name Name of the selected part

Status

Shows status of the selected part:
New Part
Part has already been loaded in blank e.g. if you export the same part from the CAD system again that you have already loaded.
Part has already been machined e.g. if you export the same part from the CAD system again that you have already calculated.

Nested in blank Name of blank on which the part is already nested

Measure

Select axis (X, Y, Z) for the measurement display.

Size Max. dimension of the part for the selected axis

In blank blank with scaling — Max. dimension in blank of the part for the selected axis, if a factor is already loaded

Type — Selection for the type of dental restoration. Automatic transferred via the CAD interface:

Coping
Coping bridge
Coping fine
Crown
Crown bridge
Abutment
Overpress
Inlay/Onlay
Anatomical Inlay/Onlay
Inlay/Onlay bridge
Inlay/Onlay crown bridge

Notes:
The part type controls the automatic default settings for the following process steps. Changing the part type for a 5X part also changes the template to 3X. Therefore it is necessary to change the template back to 5X.

Definitions:
Coping (bridge) -> Framework
Crown (bridge) -> additional fissure machining
Coping fine (e.g., for DVS framework) -> additional occlusal machining step for the complete outer surface
Overpress -> additional fissure machining (e.g., for DVS veneering)

Material — Material of the selected part

Filtering

Material — Selection filters for the parts by material to quickly find suitable parts. Predefined by the blank material loaded before

Name — Search for part name within the part list

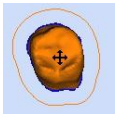
 **Clear**

Delete filter setting and show all parts.

Note:
Keep the CTRL or SHIFT-key depressed to select more parts for loading. The preview is then inactive and placement takes place outside of the blank.

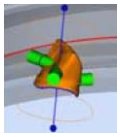
Beside the part list it is also possible to load a part file (e.g., in STL-format) using the “File” button from the load part dialog. Parts can be loaded from any directory.
Clicking on the “File” button will open a selection window that shows the currently selected directory with the list of files along with a preview window for the part preview:

9.2 Place part



1. Double-click on the part with the left mouse button:
The part is highlighted in orange and can now be rotated or moved using the mouse.

This enables you to move the parts to be fully machined into the blank. If the blank is prefabricated, the part must be placed with the utmost accuracy: --> “Load part” > “Place part precisely in prefabricated blank – Align with screw channel”



The axis line of the part is additionally shown in the page view.
The part can be placed in terms of height on the axis line. The part can be tilted by pressing the Ctrl key.

In the main views, the part tilts around the screen view axis. **Fixture boundary**

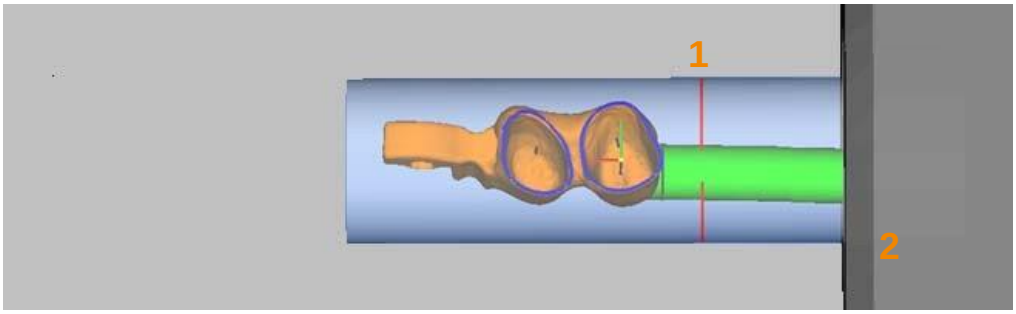


Figure 8-1

If the “Fixture” boundary is selected, the boundary line (1) (the prescribed distance to the holder (2)) is displayed when placing the parts in moving mode. --> “General job parameters” > “Bounding strategy”.

9.4 Place part automatically – autonesting (option)

hyperDENT® can automatically and optimally place the part (1) in the blank when loading.

The settings are separate for each holder (fixture): Menu [Settings] > menu item [Machining] > tab [Fixture].

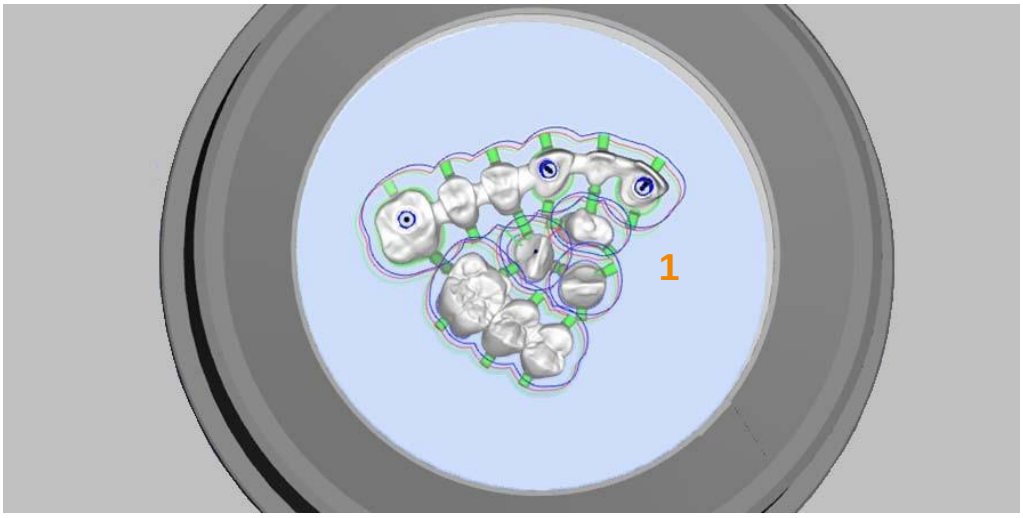


Figure 8-2

9.4.1 Configure automatic placing

1. Call up the machining settings:
   Select the menu [Settings] and call up the menu item [Machining].

2. Call up the [Fixture] tab.

3. Select the fixture (holder):
   Click in the row that contains the required holder.

4. Select the function [Edit]:
   Click on the button.

Activate

5. Configure the parameter for placing:
   Click on parameter [Automatic] and enter “Yes”.

6. Configure the other parameters as required:
   --> “Settings” > “Machining” > “Fixture”, > “Additional settings” > “Placing parameters”.

7. Accept setting and close window.
   Automatic placing is activated for this holder.

Deactivate

8. Configure the parameter for placing:
   Click on parameter [Automatic] and enter “No”.

9. Accept setting and close window.
   Automatic placing is deactivated for this holder.

9.4.2 Automatically place part when loading (nesting)

The function for automatic placing must be activated for the selected holder. The part is then automatically placed in the blank during loading in a way that saves space.

The part can be moved manually afterward.

9.4.3 Place part automatically afterward (nesting)

If automatic placing is activated for the selected holder, you can automatically place the preloaded part (1) in the blank in a way that saves space via the menu or the context menu.

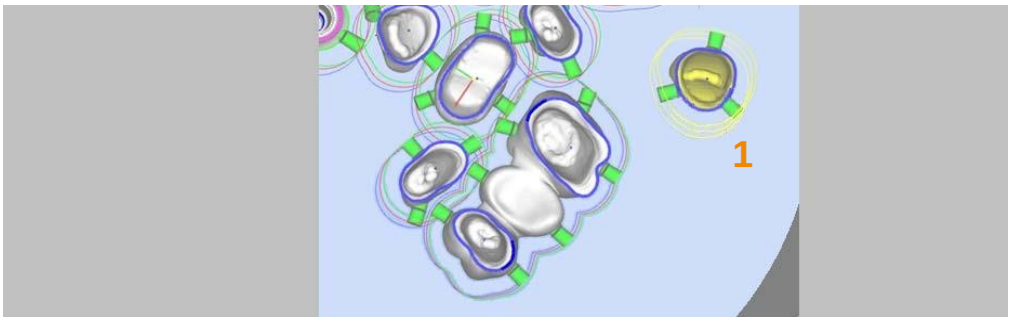


Figure 8-3

1. Select the part (1).
2. Call up the menu [Edit], select the menu item [Part], or call up the context menu.

Either

3. Select the menu item [Nest part in blank – local] (Objekt im Rohteil schachteln – Lokal):

   The part is optimally placed near the current position in the blank (2).

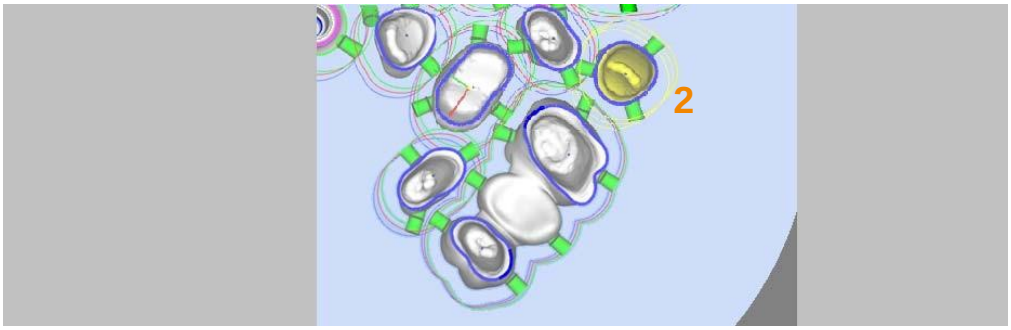


Figure 8-4

Or

4. Select the menu item [Nest part in blank – global] (Objekt im Rohteil schachteln – Global):

   The part is optimally placed in the blank (3).

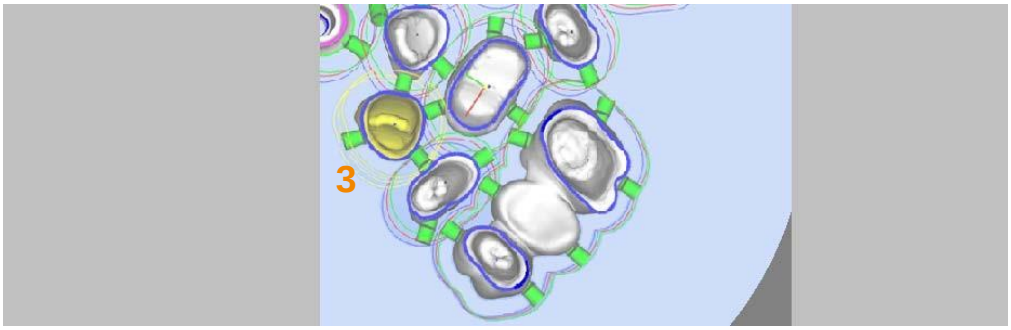


Figure 8-5

9.5 Consistency check

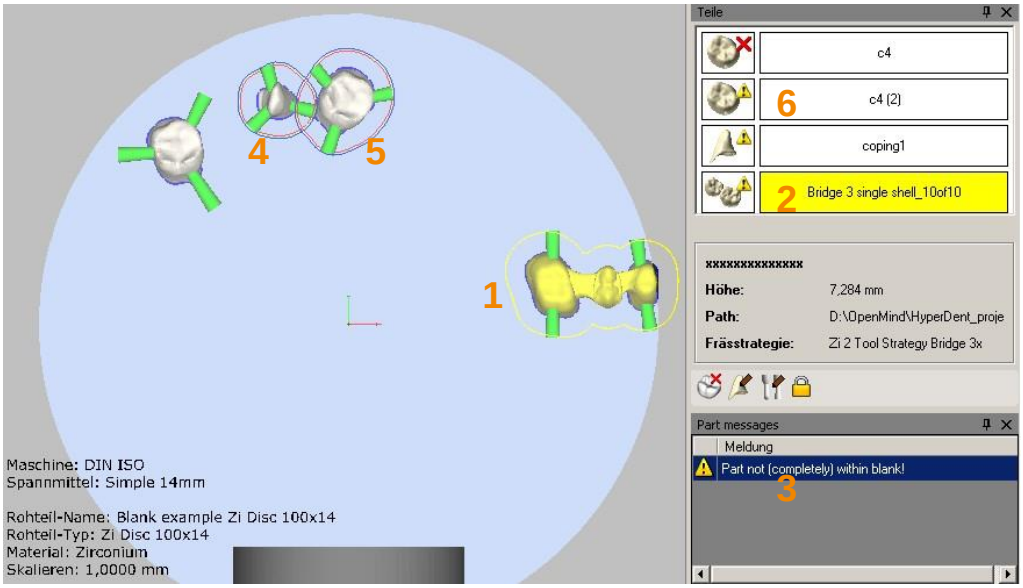


Figure 8-6

If a part is incorrectly placed in the blank, you get a warning message or a stop message, depending on the default under the menu item [Settings] > [General] > [Consistency checks].

The part (1) is outside of the blank, this is shown in the part browser (2) and highlighted by the plain text message (3).

Parts (4) and (5) overlap, this is also shown in the part browser (6).

10. Set milling direction

The saved data not only determines the shape and size but also the alignment of the dental restoration in relation to the insertion direction and tool axis.

 The icon is only active if a part is selected.

Depending on the data that is loaded, you must set the milling direction:

- ③ Insertion direction in Z-axis (tool axis)
- ③ Occlusion top
- ③ If possible no undercuts in the coping

10.1 Set milling direction

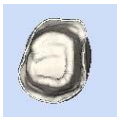
Initialize	General alignment
Occlusal	Set side as occlusal side.
Cavity	Set side as cavity side.
Fine adjustment	Align part accurately.
Degree	0.01 to 10 Degree value for fine adjustment.
Arrow keys	Rotate the part in the direction of arrow by the degree value.
	Calculate undercuts in check direction.

Undercuts

Run undercut check.

Update

The selection window shows the buttons for the basic alignment, fine adjustment and direction adjustment.



Show undercut areas

The undercut areas appear in red on the part.

Repeat the undercut check and fine alignment, especially for 3-axis machining, until there are either no more undercuts in the coping or they are very small and are in a non-critical area.

10.2 Coping-specific stepover direction

For parts with several copings (bridge, blocking), you can set several stepover directions (1, 2). This is necessary if the tooth stumps have significantly different insertion directions.

If the stepover direction is not determined by the CAD, you can set the coping-specific alignment via the context menu.

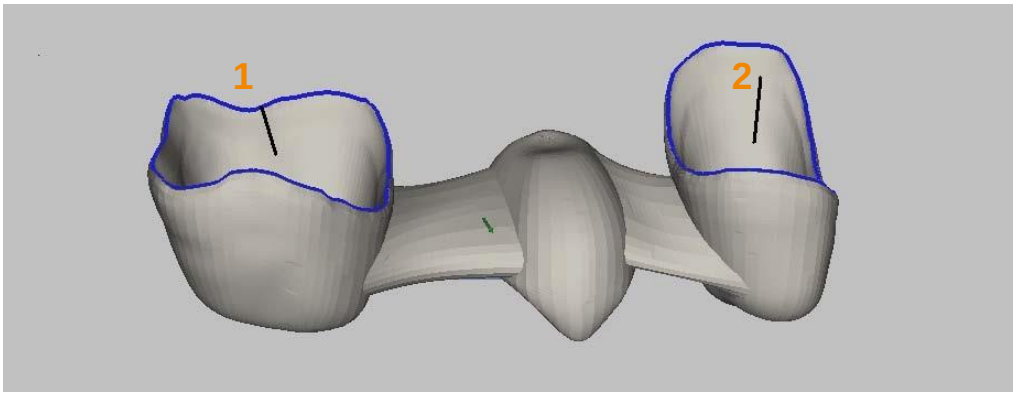


Figure 9-1

The function is only available once the process stage “Identify part features” has been completed.

Setting the specific alignment

1. Select the preparation line of the desired coping (1, 2):
   Click on the preparation line.
   The selected preparation line is displayed in a different color.
2. Set the new stepover direction for the coping (1, 2):
   Using the right mouse button, rotate the part to the new position so that if possible there are no undercuts for this coping.
3. Call up the context menu and select the menu item [Insertion direction from view direction].
   The new stepover direction is shown by a line in the coping.
4. Repeat the process for the other copings of the part.

The correct settings must be configured in the template.

Deleting specific alignment

Select the preparation line and delete it.

10.3 Occlusal stepover direction (insertion direction)

An occlusal stepover direction can be defined for individual copings.

The function is only available once the process stage “Identify part features” has been completed.

Setting occlusal stepover direction

1. Set the new stepover direction for the occlusal side of the coping: Holding the right mouse button down, rotate the part to the new position so that if possible there are no undercuts on this coping.
2. Call up the context menu and select the menu item [Set occlusal insertion direction].
   The new stepover direction is shown by a line on the coping.

Deleting occlusal stepover direction Reload part.

10.4 Undercut machining in coping for 3+1 machines

Function used to machine undercuts in copings on 3+1 or 3+2 machines without simultaneously controlled axes. Machining is performed with two differently set jobs via a rotation axis (for 3+1).
If additional undercut machining is required, you can determine this via the context menu.

If necessary, set the undercut machining:
Highlight the preparation line and in the context menu, select the menu item [Change undercut property of coping] > [Coping has undercuts].

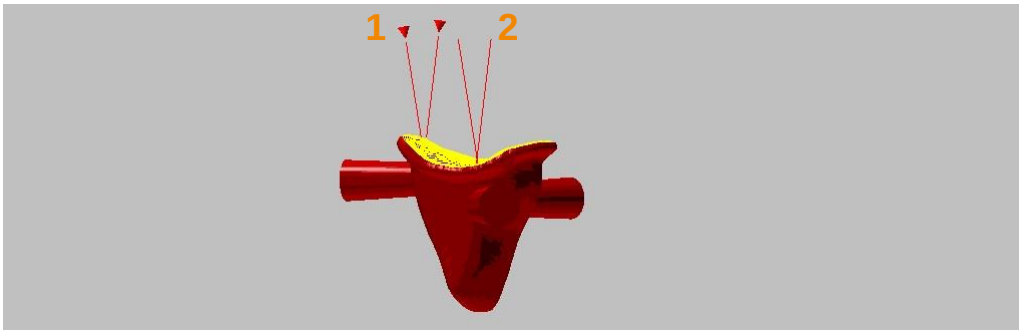


Figure 9-2

The function is only available once the process stage “Identify part features” has been completed.

Selecting undercut machining

1. Select the preparation line of the coping:
   Click on the preparation line.
   The selected preparation line is displayed in a different color.
2. Align the part to the rotation axis --> “Tilt part in blank” > “3+1-rotation optimization”.
   The part must be aligned to the rotation axis in such a way to allow the necessary tilting via the rotation axis.
3. Call up the context menu and select the menu item [Change undercut property of coping] > [Coping has undercuts]:

Undercut machining is displayed by a checkmark in the menu item and an icon in the coping.

The correct settings must be configured in the template.
The correct settings must be configured in the process step “Tilt part in blank”.

Deleting undercut machining

1. Select the preparation line of the coping.
2. Call up the context menu and select the menu item [Change undercut property of coping] > [Coping has no undercuts]:
   The undercut machining is deselected and the icon on the coping is deleted.

11. Identifying part features

The part features include the edge of the crown (= preparation line), pontics, screw channel, and the interface elements of the implants. For subsequent calculations and automated machining, it is important that these areas are identified.

The icon is only active if a part is selected.

If the CAD information is loaded via a defined interface, then the part features have usually already been defined.

Failing that, you can identify parts using the program function, at least one preparation line per coping.

11.1 Preparation line

1. Select the [Preparation lines] tab:

The selection window shows the settings for labeling the preparation line.

Parameters	
	Set type of preparation line and type of creation.
Type	Select the preparation line. The preparation line type must match the part type, otherwise the calculation is not possible.

- ☐ Coping
- ☐ Inlay/onlay
- ☐ Abutment base
- ☐ Emergence

Mode

Manual	Manually label the area.
Automatic	Automatically determine the preparation line.

Angle	Angle range of coping edge.
Preparation line	Preparation line details
Selection	Display and selection for preparation line count and number.
Offset	Default value (width of coping edge) to move the preparation line to the other edge of the coping edge.
Positive value	Move inwards.
Negative value	Move outwards.

Undercuts present (Hinterschnitte vorhanden)

Select undercuts for multiple machining with fixed tilt.
The correct settings must be configured in the template.

Category	Number of the corresponding machining template.
 Move	Move preparation line by the offset value.
 Back	Undo last move.
Insertion direction	Display, determine insertion direction.

Alignment	Set coping-specific insertion direction (stepover direction): --> “Set milling direction” > “Copingspecific stepover direction”.
From view (Aus Ansicht)	Set current view direction to the part as occlusal insertion direction (= stepover direction).

Fine-adjust direction	Adjust the part with precision.
Degree	0.01 to 10 Degree value for fine adjustment.

Arrow keys	Rotate the part in the direction of arrow by the degree value.
X, Y	Rotation around the respective axis.
Z angle	Deviation of the insertion direction from the hyperDENT®- coordinate system.

The tilting of the part for height minimization is already factored in here.
Other angle deviations from the machining (template) still need to be added.

Calculate undercuts in check direction.

Update	Run undercut check.

Adjust view to insertion direction (Ansicht auf Einschubrichtung einstellen)
Rotate view and adjust the view direction to the insertion direction.

Angle

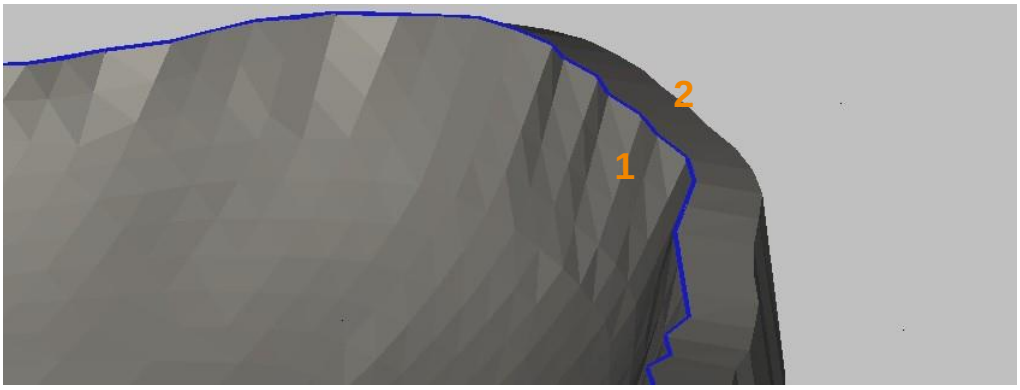


Figure 10-1

Angle range of coping edge = angle in which the system looks for a continuous edge, the preparation line.

If, for example an angle of 30° is entered, then a continuous area between cavity (1) and coping edge (2) is looked for where the angle is ≥ 30°.

This ensures, amongst other things, that the preparation line is on the inside of the coping edge.

If there is a malfunction, it may be useful to reduce the angle range to 20°.

11.1.1 Automatically determining the preparation line

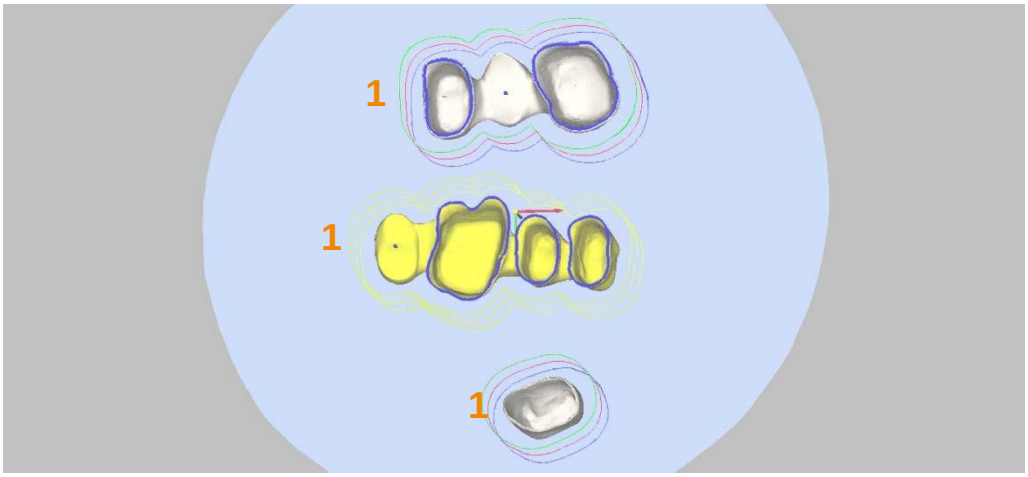


Figure 10-2

1. Select the [Preparation lines] tab.
2. Select “Automatic” mode.
3. Select type.

4. Determine the preparation line:
   Click into the part (1), for bridges click into the cavities:
   The crown edge – preparation line – is determined and highlighted in blue.

11.1.2 Manually determining preparation line

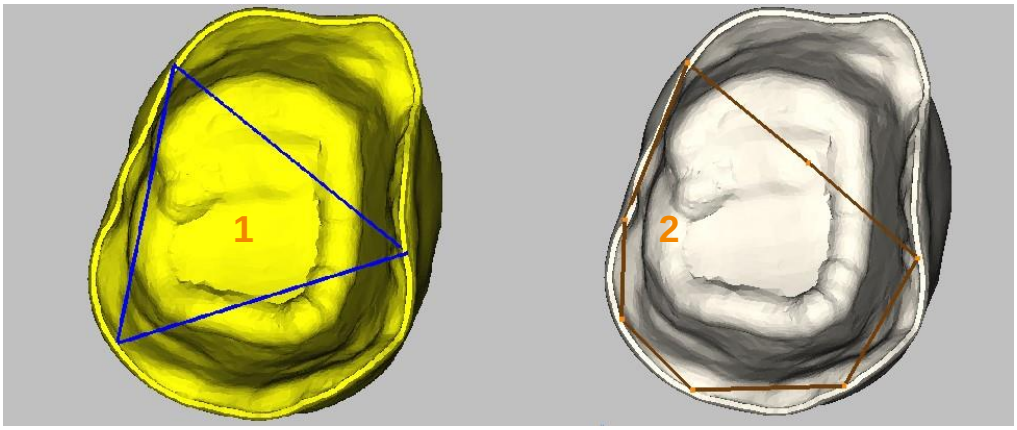


Figure 10-3

1. Select the [Preparation lines] tab.

2. Select “Manual” mode.
3. Select type.
4. Click 3 times on the coping edge to create a triangle (1).
5. Click on the sides of the triangle to create new anchor points and keeping your finger on the mouse button, drag them to the coping edge in place of the preparation line (2).
6. Manually and accurately recreate the preparation line using other anchor points.

For a fine adjustment of the anchor points, use the zoom function and 3D view.

---

7. Delete anchor point:
   Click with the scroll wheel of the mouse onto the anchor point or drag the anchor point to a free area next to the part.

11.1.3 Determining abutment base

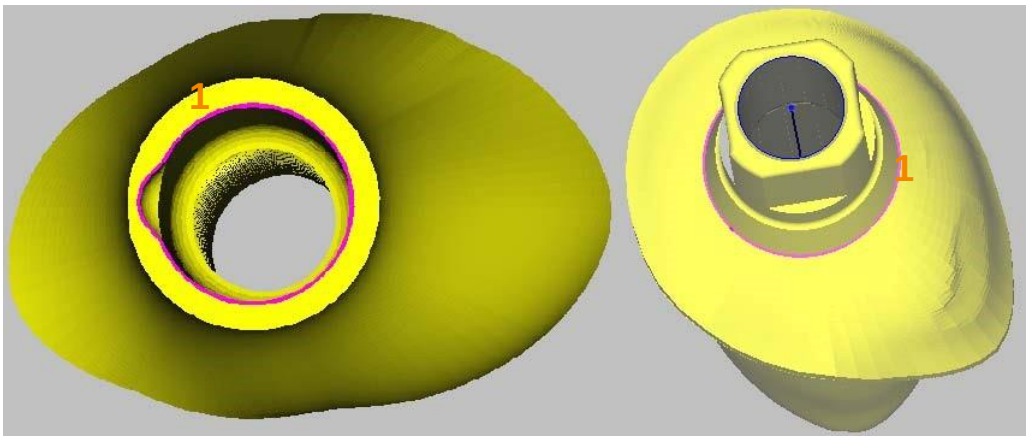


Figure 10-4

1. Select the [Preparation lines] tab.
2. Select mode.
3. Select type “Abutment base”.
4. “Automatic” mode:
5. Click on the boundary of the abutment base (1):
   The boundary line is identified and highlighted in color.
6. “Manual” mode:
7. Proceed in the same way as for “Manually determining preparation line” and place the anchor points onto the boundary line of the abutment base.

You can determine a separate stepover direction for the machining area of the abutment base: --> “Coping-specific machining”.

11.1.4 Determining emergence profile

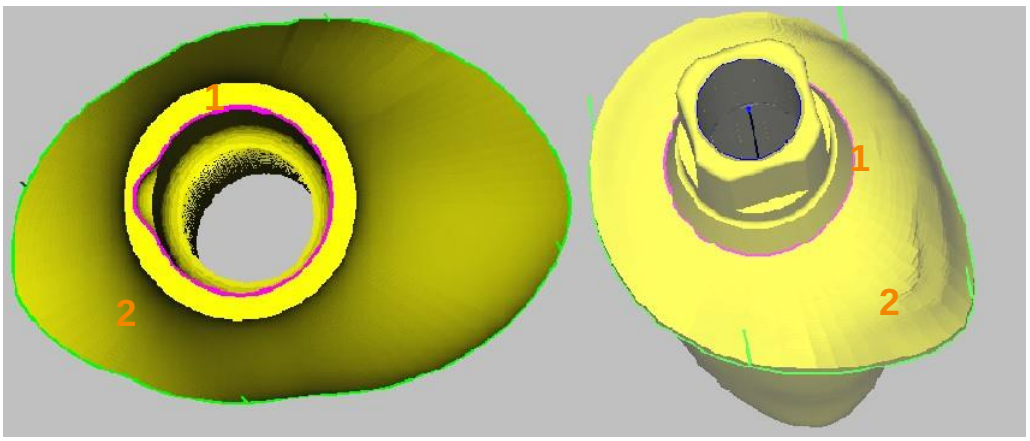


Figure 10-5

1. Select the [Preparation lines] tab.
2. Select mode.
3. Select type “Emergence”.
4. “Automatic” mode:
5. Click on the boundary of the emergence profile (2): The boundary line is identified and highlighted in color.
6. “Manual” mode:
7. Proceed in the same way as for “Manually determining preparation line” and place the anchor points onto the boundary line of the emergence profile.

You can determine a separate stepover direction for the machining area emergence: --> “Coping-specific machining”.

If, for example the abutment is steeply angled, you can also set an occlusal stepover direction: --> “Set occlusal insertion direction”.

11.3 Pontics

1. Select the [Pontics] tab:

The selection window shows the settings to label the pontics.

Count	Number of markings for the pontics.

Marking the pontics

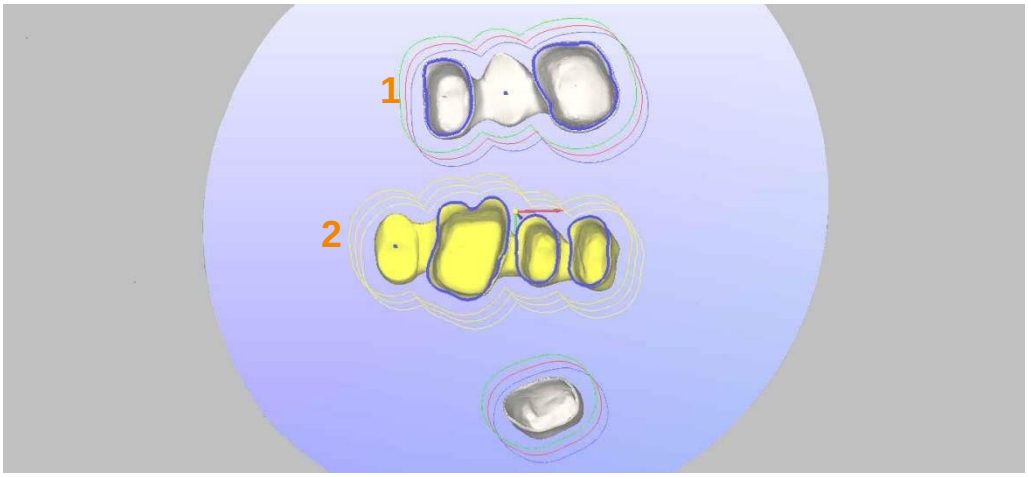


Figure 10-7

1. Select the [Pontics] tab.

2. Mark all pontics (1) and supporters (2) by clicking in the center: The pontic or supporter is marked with a blue dot.

11.4 Edit inlay/onlay bridges

For bridges with different preparation methods for the abutment teeth, you can set the machining strategy separately for each coping (1) and inlay cementing area (2) within the preparation line. This is necessary if for instance there is a coping preparation (1) and an inlay preparation (2).

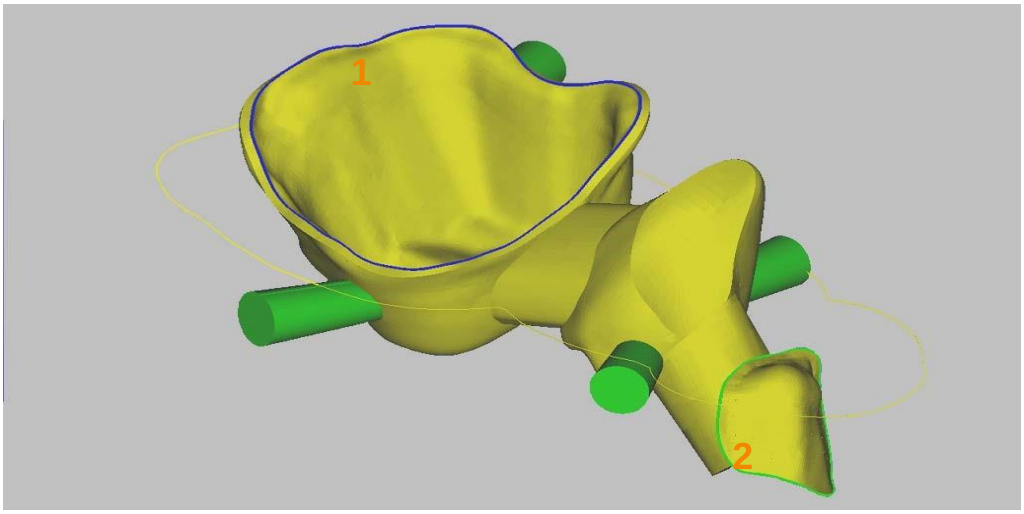


Figure 10-8

The function is only available once the process stage “Identify part features” has been completed.

Changing preparation line type

1. Select the preparation line of the desired coping (2):
   Click on the preparation line.
   The selected preparation line is displayed in a different color.
2. Call up the context menu and select the function “Change type of preparation line”:
   Coping (1) Cavity of coping.
   Inlay/onlay (2) Inlay/onlay cementing area.
   A type that has been changed is shown in a different color.
3. Repeat the process for the other copings, inlays, or onlays of the part.

The correct settings must be configured in the template (template generator option).

Deleting a type that has been changed

1. Select the preparation line and delete it.

11.5 Determining screw channel

The screw channel is determined from the view of the cavity side.

The screw channel is closed automatically for all machining outside of the screw channel. Faulty STL facets around the screw channel are removed automatically.

For abutments with a full interface geometry, the screw fit and the different screw channel diameters are automatically identified.

Screw channel identification also works with parts for which the channels are not completely modeled or even closed. However, the base geometry must exist on each part.

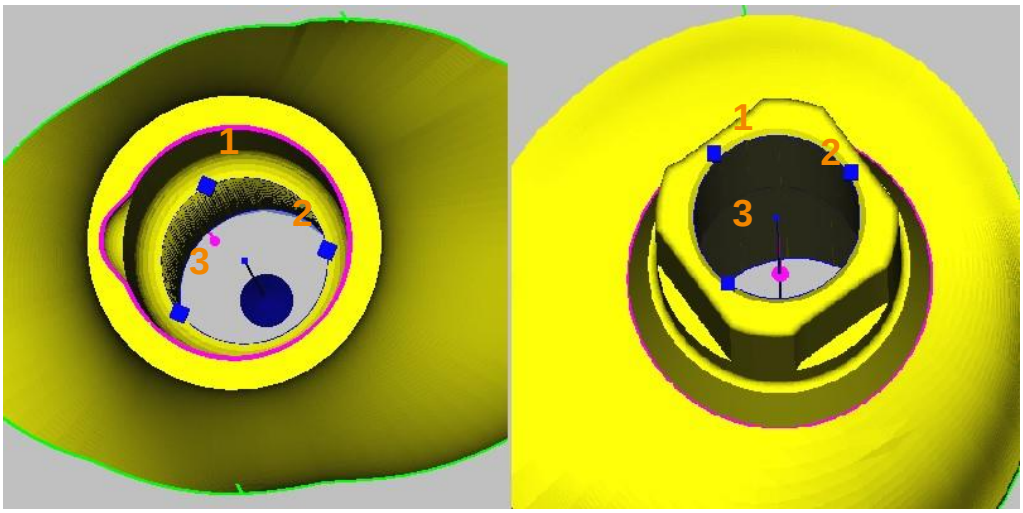


Figure 10-9

1. Select the [Implant interface] tab.
2. Set resolution to fine/rough:

Set slider [Mesh roughness] according to the quality of the current STL data within the range of “Fine – Rough”.

3. 3 clicks on the section at the start of the screw channel (1, 2, 3): The screw channel is identified and highlighted in color, the center (rotational axis) is also highlighted in color.

The screw channel forms its own machining area.

12. Tilt part in blank

The insertion direction (= stepover direction) of the aligned part is parallel to the tool axis, which prevents undercuts in the coping. However, this alignment may mean that the dental restoration is heavily tilted and therefore protrudes from the surface of the blank.


The icon is only active if a part is selected.

Minimize height

You can change the tilt angle and thereby reduce the height.

The alignment of the insertion direction to the tool axis and undercut areas remains unchanged.

For machining purposes, the blank, together with the holder must be set at an angle (tilted machining). This requires at least a 3+1-machine.

③ Risk of collision!
The tilt can cause a collision between the blank, fixture, and tool holder.
Follow the program instructions when performing the calculation. The milling boundaries are extended for the tilted machining depending on the settings in the template.

Minimize inclination , angle optimization

In the case of steeply angled parts, e.g. abutments, the tilt of the stepover directions must be aligned to an average value so as not to exceed the maximum tilt angle of the milling machine.

Undercut machining

You can also perform undercut machining for a 3+1-axis machining. To do so, enter the rotation axis and rotation optimization and set the respective parameters in the template.

③ Risk of collision!
The milling boundaries are extended for the undercut machining depending on the settings in template.

The selection window shows the buttons that are used to rotate and tilt the part and minimize the height.

	Details about the machine
Machine	
	Selection box for the rotation axis (X, Y) of the machine:
Rotation axis X, Y	Axis around which the tool (holder) can be pivoted. Essential for undercut machining.
	Details about the tilt part and alignment.
Position part	
	Center the part in the height in the blank.
Center part	
3+1-rotation optimization	
	Optimally align the tilt part to the rotation axis. Essential for coping-specific machining on 3+1 machines. Also possible for tilted parts without insertion direction.
	round Z Align the tilt part by rotating it by 180°, e.g. for more favorable milling boundaries.
Rotate 180 degrees	
	Lock the alignment to the rotation axis.
Lock rotation	
Tilt part	
Minimizing	Minimize the height, the inclination can increase, e.g. for bridges in order to use thinner raw material.
Height	
Inclination	Minimize the inclination, the height can increase, e.g. for steeply angled abutments or copings with a slanting tooth edge and slanting preparation line.

Max. tilt angle	Set the maximum tilt angle.
Lock tilt axis	Secure inclination.
Tilt	
Arbitrary axis	Create an inclination on an arbitrary axis.
Rotation axis	Inclination around the rotation axis.
Tilt	Create an inclination.
Reset tilting	Reset the inclination

Example of tilt part in blank

For a tilted workpiece, the rotation axis of the machine must be taken into account. If there is no 5-axis simultaneous machining, then the tilt axis of the dental restoration must be brought into line with the rotation axis of the machine.

Example of minimize height

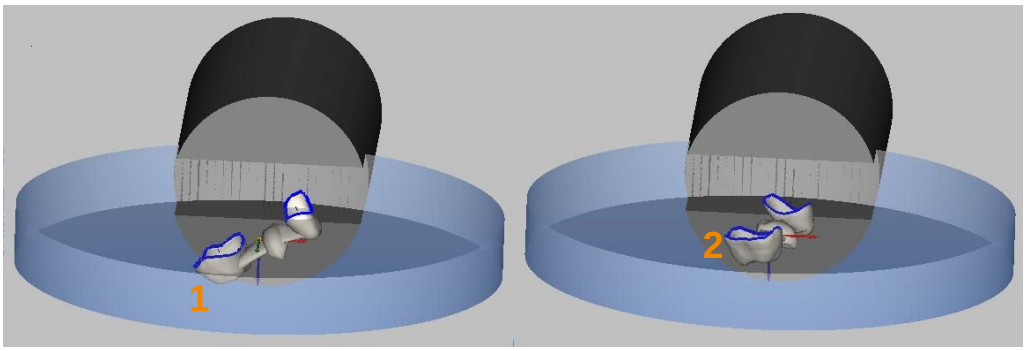


Figure 11-1

Part (1) has been manually placed. As a result of the direction adjustment setting, the part protrudes from the blank.

Due to the kinematic options of the milling unit, X was set as the rotation axis of the machine when the tilt part was determined. Click on [Tilt] and the part is:

③ Rotated: The part is aligned in accordance with the rotation axis (2) of the machine, so that the tilt can be set for the machining.

and

③ Tilted: The part is tilted in accordance with the defined \tab degree value and direction so that it is fully in the blank.

Example of angle optimization

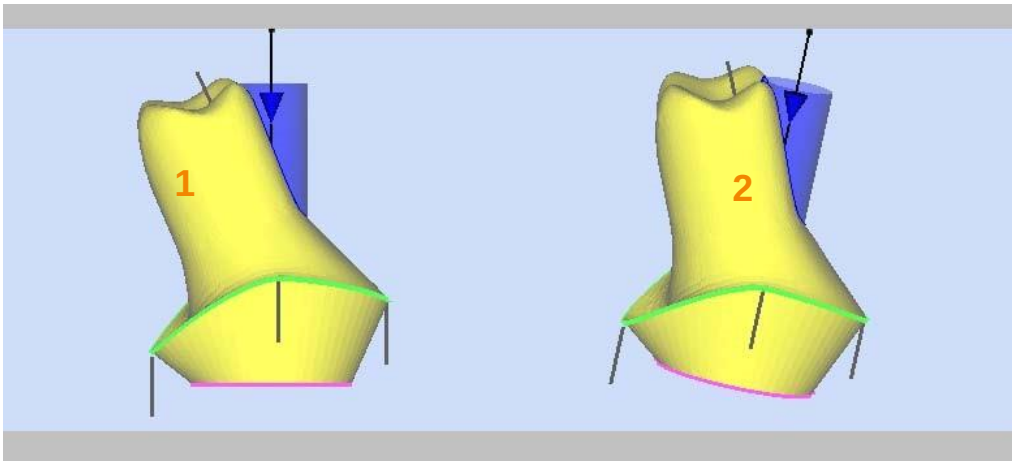


Figure 11-2

Part (1) has been manually placed and the occlusal insertion direction has been set --> “Occlusal stepover direction”. The part shows evidence of undercuts in this position which require considerable tilting. By tilting the part, the undercuts are reduced which creates more favorable tilt angles for the machining.

13. **Select template**

The templates contain the working plan (milling strategy) for machining on the milling unit and are available for different materials and part types.

Different templates can be selected for the different parts, depending on the details in the previous process steps.

The icon is active if at least one part is selected. You can also select several parts.

In gereral settings [Settings > General > Micellaneous > Template defaults] you can select the default kind of templates for the machining. Use “Protect” for good quality and “Fast” for faster milling and less quality.

This will be selected automatically when loading part. Make sure, you are useing the right part type for the dental restauration. Otherwise it is not guaranteed to get good results!

Select the template that you would consider from experience to be most suitable for the selected part.

The template can significantly influence the quality, accuracy, and runtime of the calculation and machining process.

The selected template must be compatible with the construction machine and must be suitable for the material.

Several parts with the same template or several parts with different templates can be calculated and machined together in a blank.

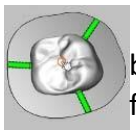
If a template is to be assigned to several parts, the parts must have the same part type.

The selection window shows the buttons used to select the templates. Here you can change the template from the default setting.

Template profiles	Selection box for the template.
Accept	Accept selection.
Close	Close window.

14. Set connectors, sinter frames

Connectors



The connectors or support pins are small connections that hold the part in the blank during the milling process. The dental restoration can thereby be machined from all sides. Separate the connectors after the milling stage and remove the pins.

The icon is active if at least one part is selected. The function works for all parts.

Set enough connectors so that the part is retained securely and accurately until machining has finished.

You can set the connectors automatically or manually and save these settings as defaults.

You can change each set connector individually, assign a cut to it, or delete it.

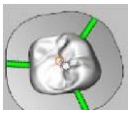
In the case of open fixture geometries, if the milling area boundary protrudes beyond the blank, connectors will only be set inside the blank.

Screw channel connectors

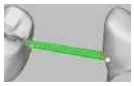
The screw channel connector is used with prefabricated blanks (prefabs). It runs along the prefabricated screw channel of the occlusal side of the part to the opposite holder and surrounds the screw channel depending on the angle input in cylinder shape (0°) or cone shape.

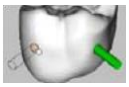
14.1 Set connectors

1. Select the [Connectors] tab:
   The selection window shows the settings for the connectors. The function [Set connectors] is active if the window is open.



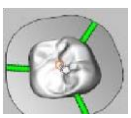
Mode	Type of connector placement.



 Automatic	Click on the part: Automatically set all connectors in accordance with the settings.
 Traverse	Click on original and target part one after the other: Connect two parts with overlapping milling area using a traverse (consisting of two connectors) (optional).
Manual	Click on the position for the connector: Set a connector in accordance with the settings at this location. Optional with cut.
Screw channel conn	ctor (Schraubenkanal Konnektor) Click part: Set screw channel connector in accordance with the settings in the track of the prefabricated screw channel. Optional with cut. Apply modified settings.
Angle	Taper angle of the connector: Cylinder = 0
Diameter	Diameter at the part
Wall thickness	0.1 mm Wall thickness of the screw channel connector. The diameter of the connector on the part is: Diameter of the prefabricated screw channel + 2x wall thickness.
Distance to preparation line	Distance to preparation line. If the safety distance is too small, this may damage the crown edge.

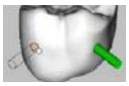
Count	Number of connectors for a crown that are automatically set.
Connectors at pontic position	Also set connectors at the pontics.
Cut	Connectors that are automatically cut at the end of the machining. Manually set individual connectors with cut or assign cut at a later stage. The job must be stored in the template.
Cut depth	Percentage value for the cut:
0%, None	No cut.
100%, Complete	Complete cut, the connector is completely cut.
Cut safety distance	Distance of the cut to the part. If the distance is too small, this may damage the part.
Parameter profile	Selection field for the saved connector types.
 Save	Call up selection window [Save profile]. Save settings, save under a new name, set as default.

14.1.1 Setting connectors automatically



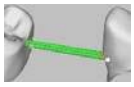
1. Click on the part:
All connectors are set automatically according to the settings.

14.1.2 Setting connectors manually



1. Click on the position for the connector:
A connector is set at this location according to the settings. Optional with cut.

14.1.3 Setting connectors as a traverse (optional)



If the milling area of the two parts overlaps, you can connect the parts using a traverse.

1. Click on original part for the traverse:
   The auxiliary line for the traverse is displayed from the original part.
2. Drag auxiliary line for the traverse to the target part and click on the target part:
   The traverse is placed between the parts. The traverse consists of two connectors.

14.1.4 Set screw channel connector

The function is active for prefabricated blanks with a prefabricated screw channel.

1. Click on the part:
The screw channel connector is automatically set in accordance with the settings.

14.2 Deleting connectors

1. Select connector.
2. Call up context menu.
3. Select menu item [Delete selected].

13.3 Edit connectors

You can change the settings for an existing connector, e.g. assign, change, or remove a cut.
Editing can be done across the parts.

Call-up via the context menu or the menu [Edit]

1. Select connector.
2. Call up context menu or menu [Edit] > [Connector].
3. Select menu item [Edit connectors].

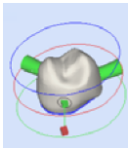
The selection window shows the settings for the selected connector.

Caution!
With screw channel connectors, the diameter must be greater than: Screw channel diameter + 2x wall thickness.

Milling cut	Assign or change the cut at a later stage. For connectors that are automatically cut at the end of the machining.
Cut depth	Percentage value for the cut:
0%, None	No cut.
100%, Complete	Complete cut, the connector is completely cut.
Cut safety distance	Distance of the cut to the part. If the distance is too small, this may damage the part.
Apply	Apply changes.
Close	Close window, do not apply changes.

14.4 Moving connectors

For an existing connector, you can change the pin on the part and the direction. You can therefore for example better adapt the automatically set connectors to the shape of the part and optimize the construction.

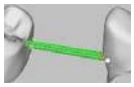


1. Select the connector by double-clicking on it:

The axis of the connector and both end points are shown. The pin on the part is highlighted by a line.

2. Click on the end point or starting point with the left mouse button. Hold the mouse button down and move to the desired position.
3. Finish the selection by clicking on the workspace: The connector is displayed at the new position.

14.5 Autoconnect the connectors



If the milling area of two or more parts overlaps, you can autoconnect the connectors of the parts (optional). The function depends on the menu [Settings] > [General] > [Connector behavior], --> “Edit connector settings” > “Connector behavior”.

Reload parts

1. Place parts:
   Ensure that the milling boundaries of the parts overlap, but do not protrude into other, unfinished parts.
2. Set connectors in automatic mode, --> “Set connectors”. The connectors are also set between the parts.

Move parts

1. Highlight part to be moved: Double-click on the part.
2. Move part so that the milling boundaries of the parts overlap, but do not protrude into other, unfinished parts. Connectors that overlap are connected to one another; connectors that intersect the milling boundary are connected to the other part.

Remove connection

1. Move part so that the milling boundaries no longer overlap. The connection between the connectors is cut.

14.6 Edit connector settings

14.6.1 Connector settings, screw channel connectors

1. Call up the menu [Settings] and select the menu item [Building elements...].
2. Select the tab [Connectors] or select the tab [Screw channel connectors] (Schraubenkanal Konnektoren).

The selection window shows the list of connector types, the settings for the selected connector type, and the toolbar for editing the settings: new, edit, apply, delete, copy.

Name	Name for the connector type.
Angle	Taper angle of the connector: Cylinder = 0
Diameter	Diameter at the part.
Wall thickness	0.1 mm Wall thickness of the screw channel connector. The diameter of the connector on the part is: Diameter of the prefabricated screw channel + 2x wall thickness.
Distance to preparation	ine Distance of the connector to preparation line. If the distance is too small, this may damage the part (crown edge).
Count	Number of connectors for a crown that are automatically set.

Milling cut	Cut depth (percentage value) for connectors that are automatically cut at the end of the machining.
0%	No cut.
100%	Complete cut, the connector is completely cut.
Cut safety distance	Distance of the cut to the part. If the distance is too small, this may damage the part.
Material	Displays the assigned material.
Connectors at pontic po	ition Also set connectors at the pontics
Default for	Determining entries as default for the displayed material.

14.6.2 Connector behavior

1. Call up the menu [Settings] and select the menu item [General].
2. Select [Connector behavior] area.

The selection window shows the setting options for updating the connectors and the toolbar for editing the settings: OK, cancel.

Connector update/connect overlapping connectors

Yes	Autoconnect existing connectors that overlap (1).

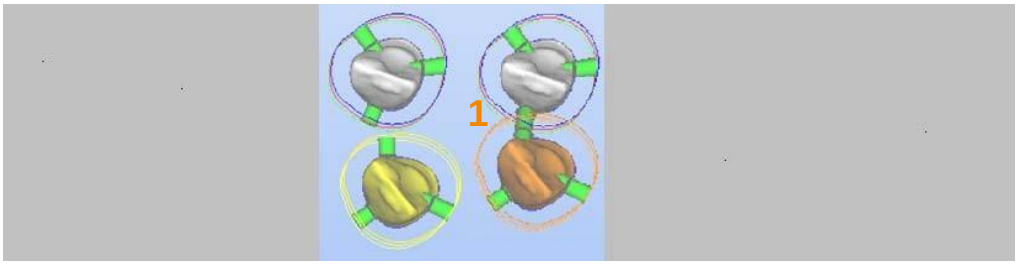


Figure 13-1

No — Do not autoconnect connectors.

Connector update/autoconnect

Connect existing connectors if the connectors overlap after manual positioning of the part or connector.

If you move the part or the connector far enough that the milling boundaries no longer overlap, the connection between the connectors is removed.

No autoconnect

Do not autoconnect the connectors.

Connect connectors of other parts

Connect connectors of a part (1) with the moved part (2), if the milling boundary of the moved part is pushed over the connector.

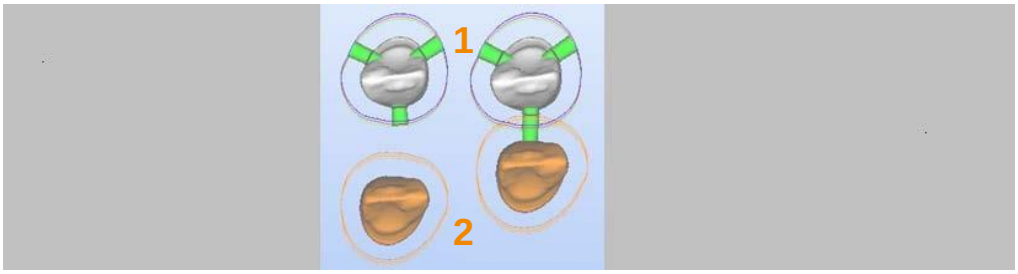


Figure 13-2

Connect connectors of the moved part

Connect connectors of the moved part (2) with another part (1), if the connector of the moved part is pushed over the milling boundary of the other part.

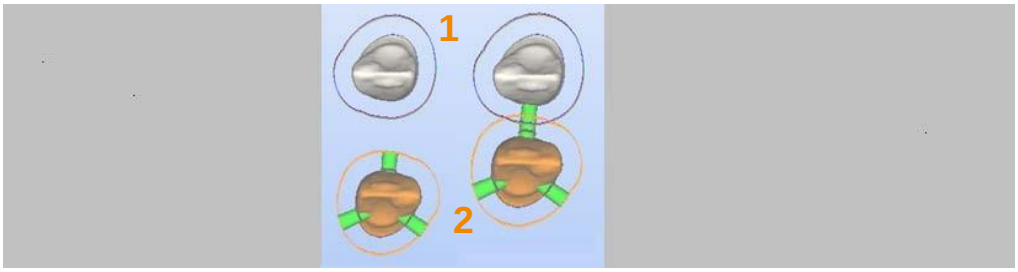


Figure 13-3

Connect all — Connect connectors of all parts if their milling

boundaries (1) are pushed over one another.

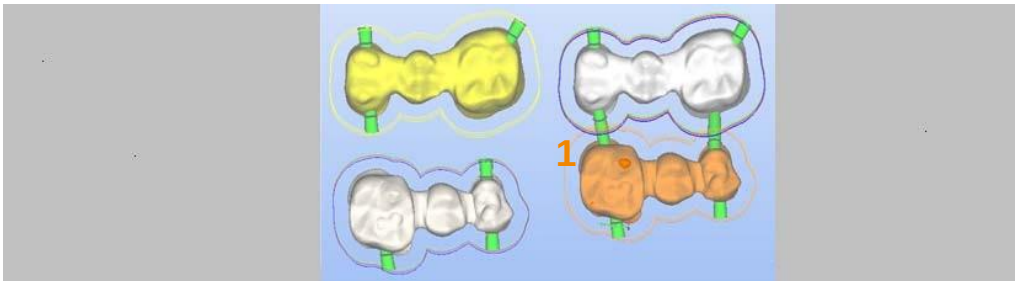
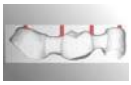


Figure 13-4

15. Set sintering pins



The sintering pins are small posts that support the part during the subsequent sintering process and provide a level plane for larger dental restorations. The sintering pins must be removed after sintering.

Sintering pins can be inserted as an option and are not essential for the completion of the process steps.

15.1 Setting a sintering pin

The icon is active if at least one part is selected. The function works for all parts.

You can save the settings for the sintering pins as defaults. You can move, edit, or delete the set sintering pins individually.

The selection window shows the settings for the sintering pins. The function [Set sintering pins] is active if the window is open.

Angle	Taper angle of the sintering pin: Cylinder = 0 An angle of > 0° is required so that the sintering pins are not damaged during the milling process. The larger the angle, the larger the plane area on the part.
Diameter	Diameter at the boundary area. If the distance to the part is large, then the plane area on the part also becomes larger.
Parameter profile	Selection field for saved sintering pin types.
Save	Call up selection window [Save profile]. Save settings, save under a new name, set as default.

1. Click on the position for the sintering pin:
   A sintering pin is set at this location in accordance with the settings.

15.2 Deleting a sintering pin

1. Select sintering pin.
2. Call up context menu.
3. Select menu item [Delete selected].

15.3 Editing a sintering pin

You can change the settings for an existing sintering pin.
Editing can be done across the parts.

Call-up via the context menu or the menu [Edit]

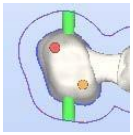
1. Select sintering pin.
2. Call up context menu or menu [Edit] > [Sintering pin].
3. Select the menu item [Edit sintering pins].

The selection window shows the settings for the selected sintering pin.

Edit	Activate settings for the machining.
Angle	Taper angle of the sintering pin: Cylinder = 0 An angle of > 0° is required so that the sintering pins are not damaged during the milling process. The larger the angle, the larger the plane area on the part.
Diameter	Diameter at the boundary area. If the distance to the part is large, then the plane area on the part also becomes larger.

15.4 Moving a sintering pin

You can move an existing sintering pin to another position on the part or to another part in order to better adapt it to the shape of the part.



1. Select the sintering pin by double-clicking on it: The sintering pin is shown in orange.
2. Holding the left mouse button down, move the sintering pin to the desired position.
3. Finish the selection by clicking on the workspace or pressing [Esc].

15.5 Edit sintering pin settings

Call-up via the main menu

1. Call up the menu [Settings] and select the menu item [Building elements...].
2. Select the [Sintering pins] tab.

The selection window shows the list of sintering pin types, the settings for the selected sintering pin and the toolbar for editing the settings: new, edit, apply, delete, copy.

Name	Name for the sintering pin type.

Angle	Taper angle of the sintering pin: Cylinder = 0
Diameter	Diameter at the boundary area.
Material	Displays the assigned material.
Default for	Determining entries as default for the displayed material.

15.6 Setting part sintering pin top plane

Especially where the surfaces of the blank are concave, we recommend that you determine a sintering pin top plane for one or more parts.

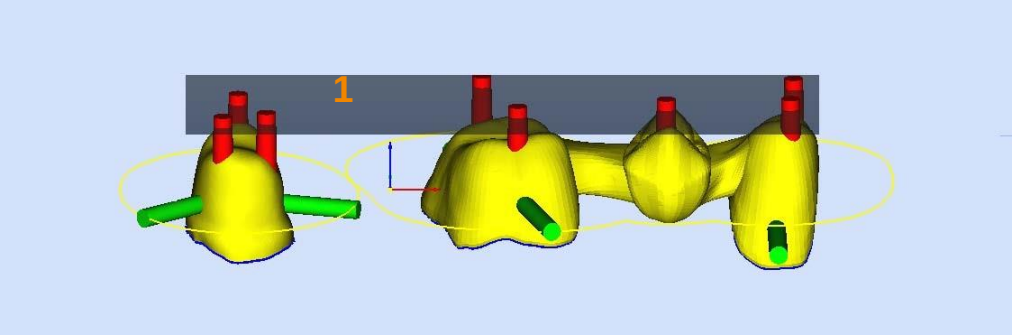


Figure 14-1

1. Select one or more parts.
2. Either call up the context menu or from the menu [Edit], select the menu item [Part] and menu item [Set part sintering pin top plane]: The boundary area (1) is shown in gray.
3. Using the mouse, drag the boundary area (1) to the desired position.

16. Calculate toolpaths

The toolpaths indicate the milling movements that the machining device must perform to mill the part, the dental restoration, out of the raw material.

The toolpaths are created based on details from the previous process steps and templates.

The icon is active if at least one part is selected for which all process steps have been completed. You can also select several parts – the function works for all parts that are selected.

Click on the icon to start the calculation.

Once the calculation has started, the selected parts are locked for further machining, see icon in the part browser.

A message in the message window indicates when the calculation is finished. The part is locked and appears in the blank in gray or as an outline. The area in the blank is therefore considered to have been machined.

Depending on the selected settings, once the calculation has finished, hyperVIEW® is started, the NC file is created and the toolpaths are displayed.

The display screen shows the sequence of the calculations along with any possible error messages that may have occurred and the progress bar stating the job and the progress of the calculation as a percentage.

Cancel calculation.

Stop

Pause calculation.

Pause

Resume calculation that has been paused.

Resume

Exit hyperDENT® on successful finish of the calculation

Close hyperDENT® once the calculation has successfully finished.

The calculated data can be displayed in the machining directory with the file “blank.hv”.

16.1 Notes concerning the calculation

- The type of preparation line must be compatible with the part type, otherwise the calculation is not possible for safety reasons.
- If the direction selected or communicated for insertion or stepover is incorrect to a significant degree, a warning message is displayed prior to the start of calculation.

hyperDENT® Lava Edition
Instruction manual

Software for dental CAM applications

FOLLOW-ME!
TECHNOLOGY GROUP

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Address	FOLLOW-ME! Technology Systems GmbH	
	Regerstr. 27	
	81541 Munich, Germany	
Contact	Tel.:	+ 49 (89) 45 21 70 60
	Fax:	+ 49 (89) 45 21 70 69
	E-mail	info@follow-me-tech.com

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