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Materialise Magics Dental Module 1.3

User Guide

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Copyright Information

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1 Installation and licensing

The Dental Module is installed like standalone software. However, licensing must be done through Magics.

1.1 Minimum system requirements

The Dental Module is not standalone software. To use it, you must have either *Magics RP* in version *25.02* or higher or *Magics Print* in version *25.2* or higher installed. We strongly recommend you also have a *Build Processor* installed. Refer to the Magics user manual and the user manual of your Build Processor for further system requirements.

1.2 Installing the Dental Module

1. Open the installer.
2. Click **Next**.
3. Click **Browse...** to change the directory where the Dental Module will be installed. If you do not want to change the default directory, skip to step 4.
4. Click **Next**.
5. Read the license agreements.
6. Select **I accept the license agreements**.
7. Click **Next**.
8. Click **Install**.
9. Click **Finish**.

1.3 Licensing

The Dental Module must be licensed. The Dental Module may only be used for processing dental parts. Processing different kinds of parts with the Dental Module constitutes a license breach. If you encounter any issues with your license, contact Materialise costumer support.

License activation is different depending on the type of license.

For local licenses:

1. Click ribbon **Options & Help**.
2. Click **Licenses**.
3. Click **Activate or renew local license**.
4. Select **Automatic activation and renewal**.
5. Click **Next**.
6. Enter your license code.
7. Click **Next**.
8. Click **Finish**.

For floating licenses:

1. Click ribbon **Options & Help**.
2. Click **Licenses**.

3. Click **Connect to floating license server**.
4. Enter your server.
5. Enter your port.
6. Click **Next**.
7. Click **Finish**.

2 Getting started

The Materialise Magics Dental Module is a software for fully automated 3D print preparation of dental prostheses. The Dental Module supports the following dental applications:

- Crowns
- Bridges
- Removable partial frameworks

2.1 Dental Module Features

The Dental Module automates the following steps of your 3D-printing workflow:

- Fixing mesh defects
- Orienting the occlusal surface of crowns and bridges toward the platform
- Orienting technical areas such as screw channels perpendicular to the platform
- Orienting partial frameworks in an optimal way
- Creating labels for crowns and bridges
- Creating supports
- Dense nesting of all parts on the platform

The dental module also creates a platform report of every finished platform.

2.2 Adjust settings

In order for the Dental Module to work correctly, you must disable the *Send solid supports as STL to the Build Processor* option.

1. Click ribbon **Options & Help**.
2. Click **Settings**.
3. Double-click **Modules** in the left-hand sub-menu.
4. Click **Support Generation**.
5. Disable **Send solid supports as STL to the Build Processor**.
6. Click **Ok**.

2.3 How to print parts using the Dental Module

Here we describe the basic usage of the Dental Module. Wherever your application may differ, we have provided a cross-reference to the relevant part of the manual.

2.3.1 Create scene

The first step is to create a scene.

1. Click ribbon **Basic Flow**.
2. Click **New Scene**.
3. Select your machine from the drop-down menu.

4. Adjust parameters.

> Available parameters may differ depending on your machine. Refer to your machine's user manual for further information.

5. Click **Ok**.

2.3.2 (Optional) Adjust machine parameters

If your machine has a hard recoater, it is useful to know the direction of the recoater. This may not be enabled by default.

Your machine may also have zones where you should avoid placing parts. These must be configured before using the Dental Module. Refer to your machine's user manual for further information.

2.3.2.1 Show recoater direction

1. Click ribbon **Options & Help**.
2. Click **Machine Properties**.
3. Click **General info** in the left-hand sub-menu.
4. Enable **Show recoater direction**.
5. Click **Ok**.

2.3.2.2 Enable no-build zones

1. Click ribbon **Options & Help**.
2. Click **Machine Properties**.
3. Click **Default Parts** in the left-hand sub-menu.
4. Enable **Enable no-build zones**.
5. Click **Add Zone** button.
6. Change parameters to fit your needs.
7. Repeat steps 5 and 6 for every no-build zone you need to add.
8. Click **Ok**.

If you need further information or if you encounter any warning or error messages, refer to the Magics user manual.

2.3.3 Import parts

This step is not unique to dental parts. Refer to the Magics user manual for further information.

1. Click ribbon **Basic Flow**.
2. Click **Import Part**.
3. Select all dental parts you want to print.
4. Select **As Is** under *Placement*.

5. Do **not** enable *Autofix during import*.
6. Click **Open**.

> ⚠ Magics may prompt you to select a part orientation. Select **Original**. You can select **Apply to all** and **Never ask again** to ensure parts are always imported correctly.

> ⚠ When loading very small parts, Magics displays a warning asking for the measurement unit (inches/mm). Select the correct option for your parts. You can disable this warning in the Magics settings under **General** > **Unit size** > **Automatic Unit Conversion**.

You now have a scene containing a platform and your parts. The parts are located at random positions and need further processing. If you need further information or if you encounter any warning or error messages, refer to the Magics user manual.

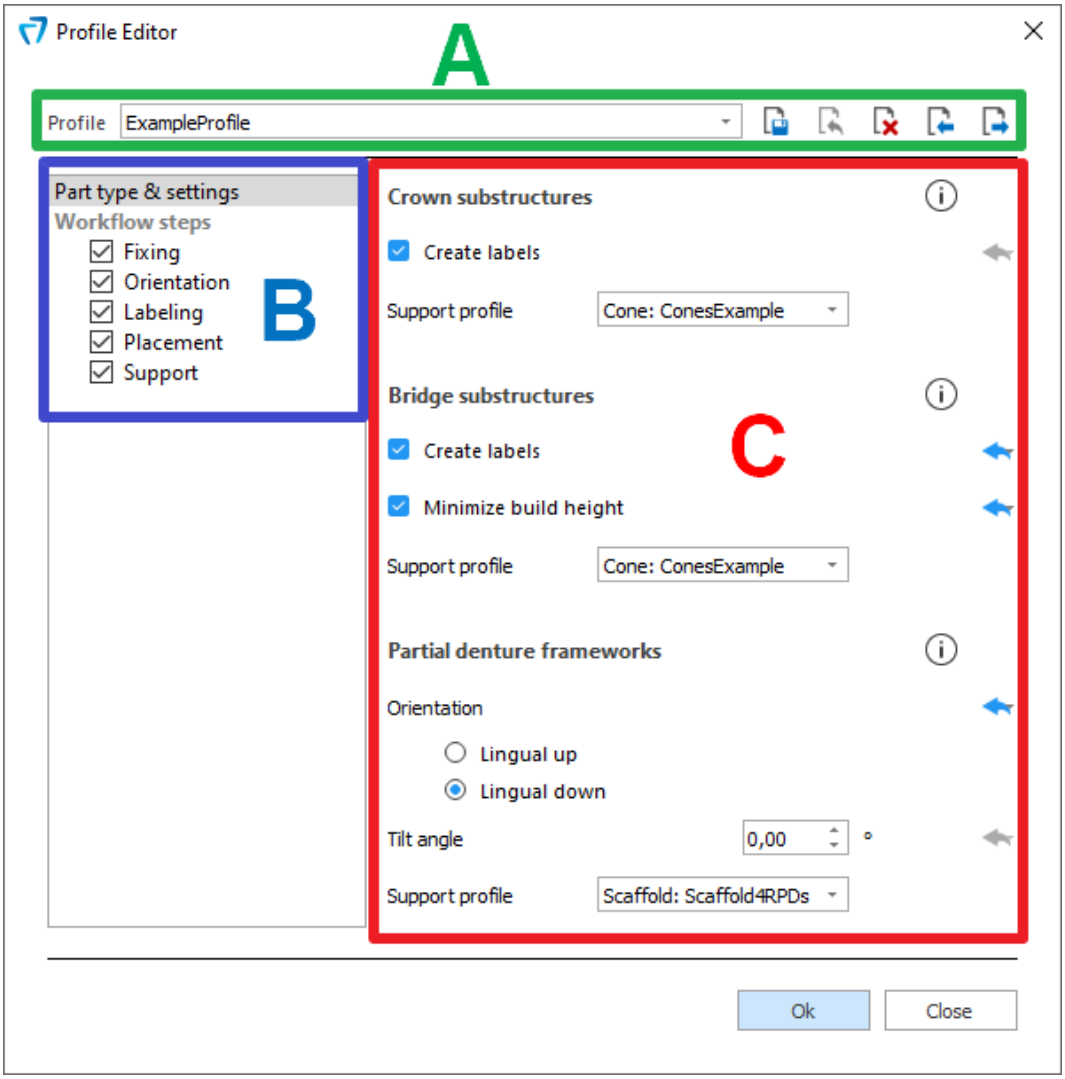
2.3.4 Profile Editor

The imported parts are not located on the platform, are not oriented correctly, do not have supports and may be in need of fixing. The Dental Module automates the steps necessary to process the parts. Here we describe how to adjust the parameters that determine how your parts are processed and save them in a profile. If you already have a saved profile, skip to *2.3.5 Prepare Platform*. If you want to import a profile, skip to *2.3.4.10 Import Profile*.

There are tooltips available for every parameter. Hover over the ⓘ icon to see an explanation of each parameter. Alternatively, for an explanation of the parameters available, refer to *7 Prepare Platform*.

The parameter adjustments described here are intended for printing crowns and bridges on a machine with a soft recoater. If your machine has a hard recoater, refer to *3.1 How to print parts with a hard recoater*. If you want to print partials, refer to *3.2 How to print partials*.

2.3.4.1 Overview



Area	Description
A	Select which profile to edit. Save your profile. Import and export profiles.
B	Access parameters related to each workflow step. Enable and disable workflow steps.
C	Adjust parameters.

2.3.4.2 Start

1. Click ribbon **Plug Ins**.
2. Click **Profile Editor**.

2.3.4.3 Label parameters

The Dental Module can create a label for each part. You can either use simple auto-numbering or use regular expressions to label the parts based on their file names. Refer to *6.6 Labeling* or

hover over the ⓘtooltip icon for an explanation of the options available for labels. Refer to *6.6.1 Regular expressions* for an explanation of regular expressions.

1. Click workflow step **Labeling**.
2. To use auto- numbering instead of regular expressions as labels, enable **Auto-numbering**. If you enable this parameter, skip to step 6.
3. To edit regular expression, click **Edit expression** button.
4. Enter a regular expression or select a predefined regular expression.
5. Click **Ok**.

> ⚠ If you want to use regular expressions, *Auto-numbering* must be disabled.

6. To align labels in recoater direction, select **Recoater direction** under *Label orientation*.
7. To change the label height, adjust *Tag height*.
8. To change the pin size where it meets the part, adjust *Pin width*.
9. To change the thickness of the label text, adjust *Text offset*.

2.3.4.4 Placement parameters

These parameters determine where and in what kind of arrangement parts will be placed on the platform. Refer to *6.7 Placement* or hover over the ⓘtooltip icon for an explanation of the available options.

If your machine has two lasers with partially overlapping scan fields, the Dental Module will place your parts in a way that ensures that each part is printed by only one of the lasers.

1. Click workflow step **Placement**.
2. If you selected *Recoater direction* under *Label orientation*, select **Translate only** under *Placement constraints*.

> 💡 *Translate only* ensures that labels that have been aligned in recoater direction are not rotated out of alignment afterwards.

3. To change how far apart parts are placed, adjust *Part interval*.
4. To change how close to the platform edge parts are placed, adjust *Platform margin*.
5. Select a *Placement* option. **Center** places parts around the center of the platform. **Minimum_XY** places parts in the lower left corner of the platform.
6. To change how high above the platform parts are placed, adjust *Default z-height*. There are separate parameters for each part type.

2.3.4.5 Supports

There are four available support types: cone, tree, scaffold and block supports. You can assign different support types to different part types. Refer to *6.8 Support* or hover over the ⓘtooltip icon for an explanation of support types and the available options.

1. Click workflow step **Support**.
2. To generate supports for parts that could not be placed on the platform, enable **Create supports for surplus parts**.
3. To generate supports for labels if necessary, enable **Add support to labels**.
4. To change how close to the margin line of crowns and bridges supports are created, adjust *No supports close to margin line*.
5. Click the type of support you want to adjust under *Support profiles*.
6. Click **Add...**.
7. Enter a name.
8. Adjust parameters.
9. Click **Ok**.

2.3.4.6 Orientation

If you want to print parts with technical surfaces that must be oriented perpendicular to the platform, you can use the Dental Module to orient your parts. Refer to *3.3 Printing Telescopic Crowns and Screw Channels* for more information.

2.3.4.7 Fixing

If the Dental Module can not achieve a high enough quality standard when fixing a part, it will not place that part on the platform. Enable the *Reduced defect sensitivity* option if you want to lower the quality threshold.

2.3.4.8 Part type & settings

These are general parameters. There are separate parameters for each part type. Refer to *6.2 Part type & settings* or hover over the ⓘ tooltip icon for an explanation of the available options.

1. Click **Part type & settings**.
2. To generate a label for each part, enable **Create labels**.
3. Select the *Support profile* you created from the drop-down menu.
4. To place bridges as low on the platform as possible, enable **Minimize build height**.
5. Select an *Orientation* option. **Lingual up** orients the side of the framework that is in contact with the gingiva away from the platform. **Lingual down** orients it toward the platform.
6. To change the angle by which the framework is tilted, adjust **Tilt angle**.

> For an in-depth explanation of the workflow for printing partials, refer to *3.2 How to print partials*.

2.3.4.9 Save Profile

Once you have created a profile, you must save it to use it for printing.

1. Click **Save profile** button in the upper right corner.
2. Enter a name.
3. Click **Ok**.

2.3.4.10 Import Profile

You can import and export profiles from the Profile Editor via the buttons in the upper right corner. Exported profiles are stored as JSON-files.

2.3.5 Prepare Platform

Once you have a saved profile, you can select it for print jobs.

1. Click ribbon **Plug Ins**.
2. Click **Prepare Platform**.
3. Select the profile you created from the drop-down menu.
4. Click **Ok**.

The parts are now fully processed and ready to be printed. If you need further information, refer to *7 Prepare Platform*. If you encounter any warning or error messages, refer to *5 How to deal with warnings, errors, and unexpected results*. If some of the parts are colored yellow or red and placed outside the platform, refer to *4.1 How to fix defective and non-alignable parts*.

2.3.6 (Optional) Add more parts

Depending on the size of your machine and the amount of imported parts, there may be empty space remaining on the platform. You can fill that space by importing additional parts and running the Dental Module a second time. This step is different for scaffold supports. Refer to *4.2 How to add more parts to a platform containing parts with a scaffold support* for an explanation of how to handle scaffold supports.

1. Import additional parts.
2. Click ribbon **Plug Ins**.
3. Click **Prepare Platform**.
4. Click **Classification** column.
5. Select the parts that were processed during the first run of the Dental Module.
6. Select *Processed Part* from the *Classification* drop-down menu.
7. Ensure that *Translation only* is selected from the *Placement* drop-down menu if you enabled *Directed labels*.
8. Click **Ok**.

If there still is empty space on the platform, you can add more parts. Repeat this process until the platform is filled completely.

If you often add more parts to a platform, you can speed up processing by selecting *Processed Part* from the Classification drop-down menu and *Fixed Position* from the Placement drop-down menu for parts that were processed in previous runs of the Dental Module. Using these options, old parts are neither moved nor processed when new parts are added. Note that this may result in suboptimal part placements, especially on circular platforms.

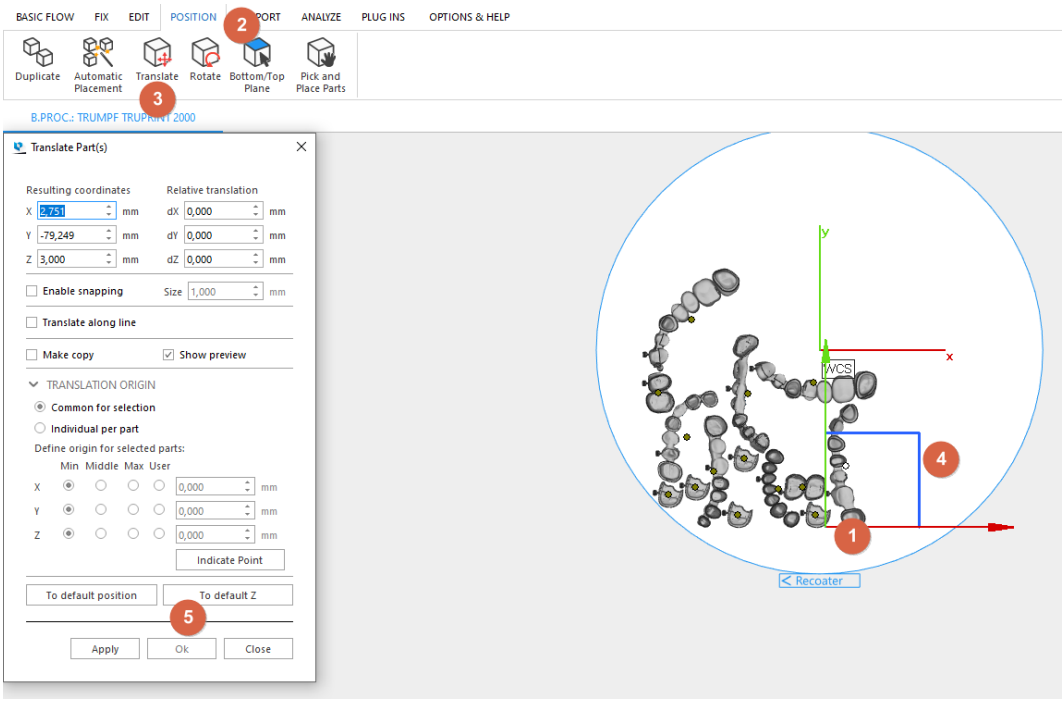
2.3.7 (Optional) Manual placement

The Dental Module may leave small gaps where additional parts could be placed. If you notice such a gap, you can manually move the parts. If you enabled *Create supports for surplus parts*, you do not need to run the Dental Module again to create supports. Refer to the Magics user manual for an in-depth explanation of how to move parts.

Do not place parts too closely together or too close to the edge of the platform.

Do not move parts along the z-axis.

1. Select the part you want to move.
2. Click ribbon **Position**.
3. Click **Translate**.
4. To move the part, click and drag the blue square.
5. Click **Ok**.



If you need further information or if you encounter any warning or error messages, refer to the Magics user manual.

2.3.8 Approve Platform

Before the parts can be printed, any parts that are placed outside the platform must be removed. Information about what kind of parts are on the platform may be passed on to the Build Processor to make the following steps more convenient. The Dental Module automates this. It also keeps track of the parts that were placed on the platform and can move the corresponding files from the input to an output folder. Finally, it saves the finished platform along with a report containing part and platform information.

1. Click ribbon **Plug Ins**.
2. Click **Approve Platform**.
3. If you want the Dental Module to group your parts for the Build Processor, enable **Group parts by application type**.
4. If you want the Dental Module to move your files after processing, enable **Move part files from input folder**.
5. If *Move part files from input folder* is enabled, choose an input folder.
6. Choose an output folder.
7. Click **Ok**.

The platform is now ready to be printed. An output folder containing all relevant information regarding the platform has been created. If you need further information, refer to *8 Approve Platform*. If you encounter any warning or error messages, refer to *5 How to deal with warnings, errors, and unexpected results*.

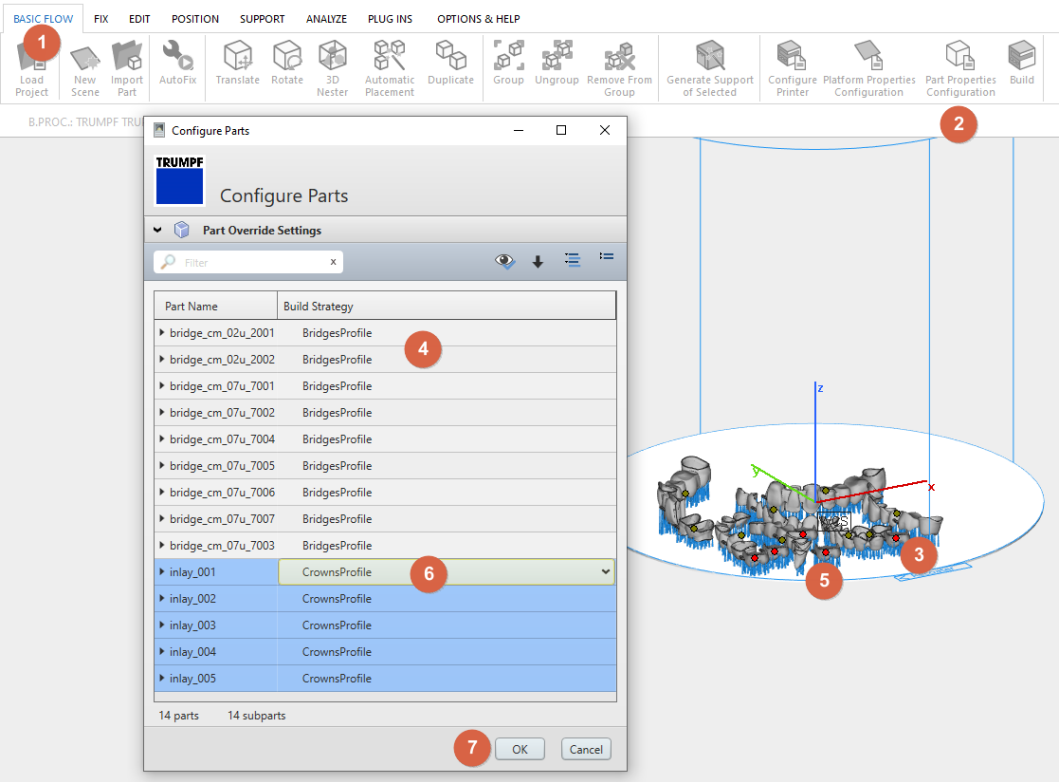
2.3.9 Build Processor

The final step before sending the platform to the printer is to create a build job. We recommend using a Build Processor to do this. If you enabled *Group parts by application type*, you can assign build strategies to multiple parts at once. Refer to your Build Processor's user manual for an explanation of build strategies.

1. Click ribbon **Basic Flow**.
2. Click **Part Properties Configuration**.
3. Click a part of type bridge in the Magics scene.
4. Select a build strategy for bridges from the drop-down menu in the *Build Strategy* column.
5. Click a part of type crown in the Magics scene.
6. Select a build strategy for crowns from the drop-down menu in the *Build Strategy* column.

> If you did not enable *Group parts by application type*, you must instead assign a build strategy to each part one by one.

7. Click **OK**.



8. Click **Build**.
9. Select *Preprocess Only* from the *Job type* drop-down menu.
10. Enter a name in the *Job name* field.
11. Choose an output directory. We recommend choosing the same directory as in *Approve Platform*.
12. Click **Submit Job**.

If you need further information or if you encounter any warning or error messages, refer to your Build Processor's user manual.

2.3.10 Final result

The output folder now contains the following files:

- Build job file that is ready to be printed
- SourceData subfolder containing STL files of the parts present on approved platform (if you enabled *Move part files from input folder*)
- Approval report containing information about the platform and a list of the parts of the platform
- platform.MATAMX file
- platform-top_down.PNG file, a view of the platform in Magics from the top where each part is allocated a unique number. This image is also part of the approval report.
- platform-bottom_up.PNG file, a view of the platform in Magics from the bottom, showing contact points of supports.
- Log files

3 Advanced uses of the Dental Module

The Getting started tutorial describes how to use the Dental Module for printing crowns and bridges on a machine with a soft recoater. Here we describe several other ways of using the Dental Module.

3.1 How to print parts with a hard recoater

A hard recoater constrains the placement of your parts. Here we explain how to use the Dental Module to minimize the attack surface of the recoater while still nesting your parts as densely as possible. There are two ways to achieve this. The straightforward approach is to orient your parts first, then use the Dental Module. The iterative approach is to use some of the Dental Module's features, orient your parts, then run the Dental Module again to finalize the platform.

3.1.1 Straightforward approach

This approach is best for when you have enough parts to completely fill the platform.

3.1.1.1 Import parts and adjust machine parameters

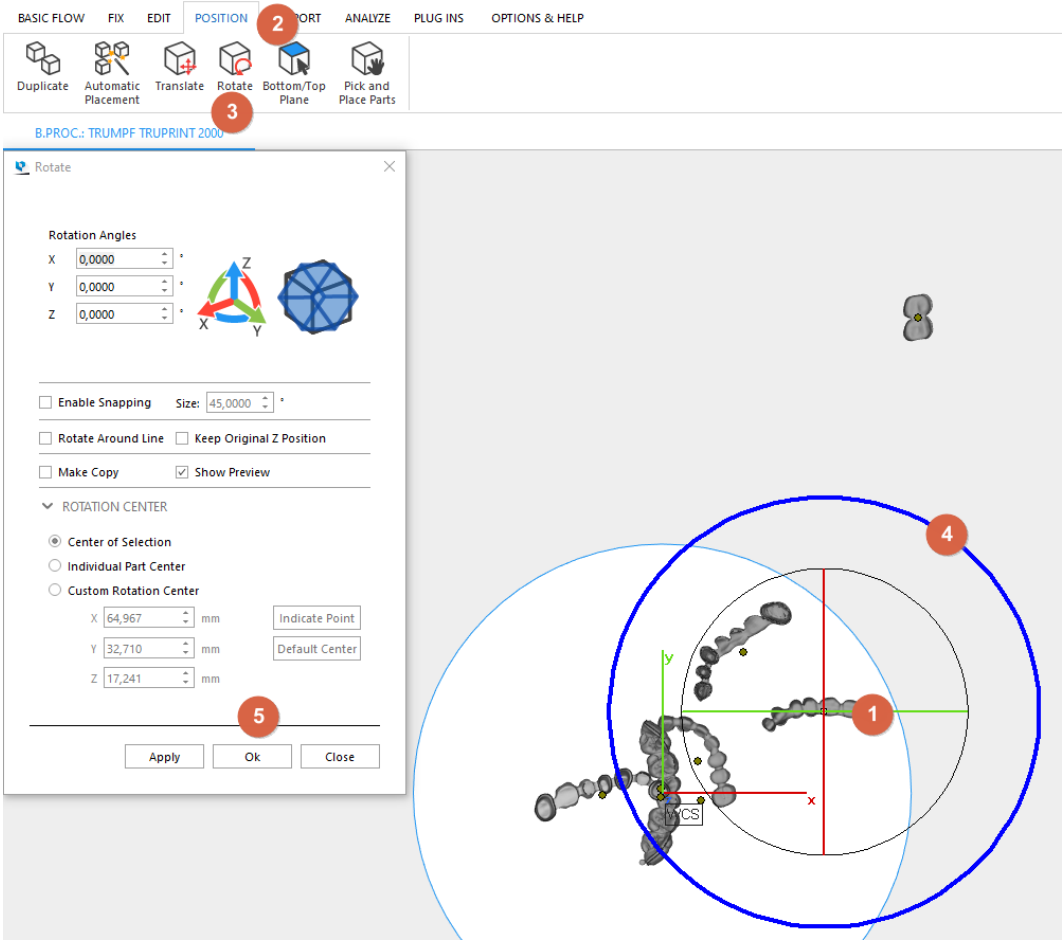
1. Adjust machine parameters as described in *2.3.2 (Optional) Adjust machine parameters*.
2. Import parts as described in *2.3.3 Import parts*.

3.1.1.2 Align parts in recoater direction

Do not rotate parts around the x-axis or y-axis.

1. Select a part.
2. Click ribbon **Position**.
3. Click  **Rotate**.
4. To rotate the part around the z-axis, click and drag the blue circle.

5. Click **Ok**.



3.1.1.3 Profile Editor

If you already have a saved profile, skip to *3.1.1.4 Prepare Platform*.

1. Click ribbon **Plug Ins**.
2. Click **Profile Editor**.
3. Click workflow step **Labeling**.
4. Select **Re-coater direction** under *Label orientation*.
5. Click workflow step **Placement**.
6. Select **Translate only** from the *Placement constraints* drop-down menu.
7. Adjust any other parameters.
8. Click **Save Profile** button.
9. Enter a name.
10. Click **Ok**.

3.1.1.4 Prepare Platform

Once you have a saved profile, you can select it for print jobs.

1. Click ribbon **Plug Ins**.
2. Click **Prepare Platform**.
3. Select the profile you created from the drop-down menu.
4. Click **Ok**.

3.1.1.5 Approve Platform and Build Processor

From here on, the process is the same regardless of recoater type. Refer to *2.3.8 Approve Platform* for further instructions.

3.1.2 Iterative approach

This approach is best for when you want to process parts in batches that don't completely fill the platform.

3.1.2.1 Import parts and adjust machine parameters

1. Adjust machine parameters as described in *2.3.2 (Optional) Adjust machine parameters*.
2. Import parts as described in *2.3.3 Import parts*.

3.1.2.2 Profile Editor 1

If you already have a saved profile, skip to *3.1.2.3 Prepare Platform*.

1. Click ribbon **Plug Ins**.
2. Click **Profile Editor**.
3. ☑Enable workflow step **Fixing**.
4. ☑Enable workflow step **Orientation**.
5. ☐Disable workflow step **Labeling**.
6. ☑Enable workflow step **Placement**.
7. ☐Disable workflow step **Support**.
8. Click **Save Profile** button.
9. Enter a name.
10. Click **Ok**.

3.1.2.3 Prepare Platform

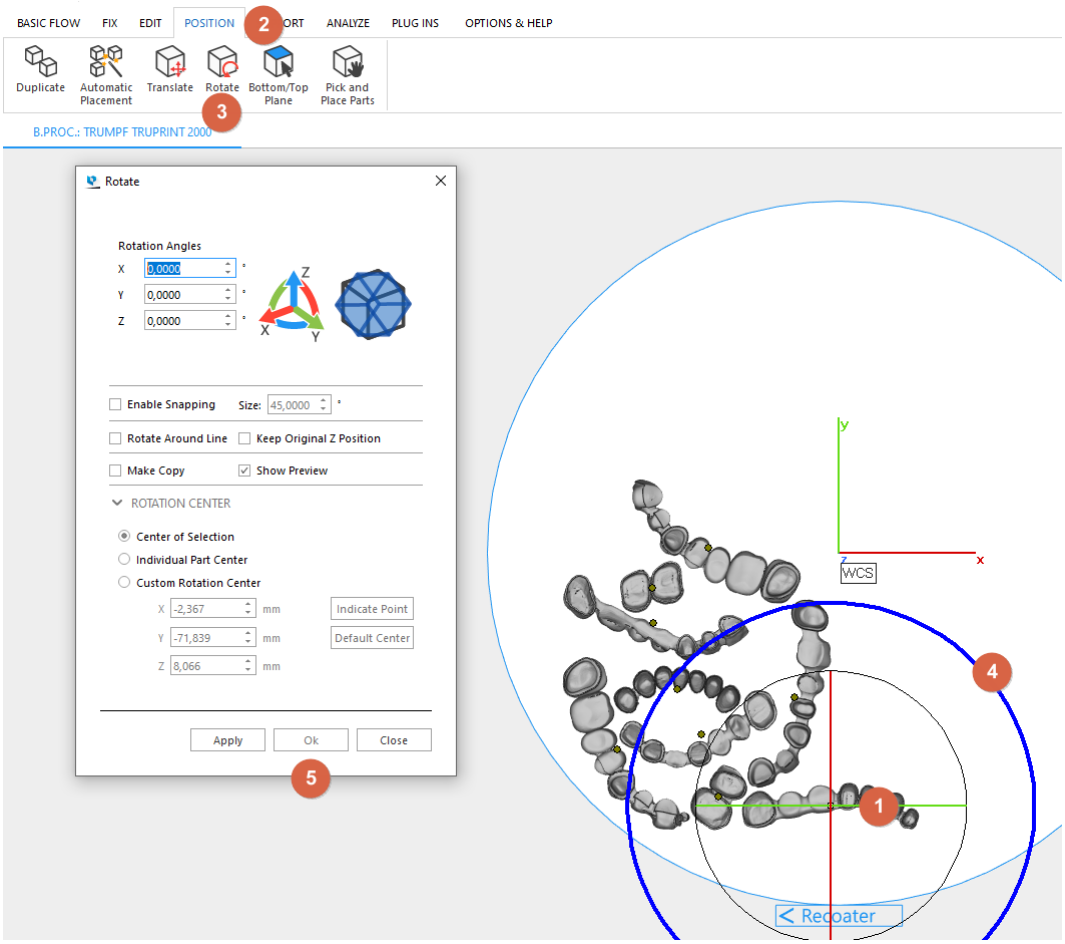
Once you have a saved profile, you can select it for print jobs.

1. Click ribbon **Plug Ins**.
2. Click **Prepare Platform**.
3. Select the profile you created from the drop-down menu.
4. Click **Ok**.

3.1.2.4 Align parts in recoater direction

> ⚠ Do not rotate parts around the x-axis or y-axis.

1. Select a part.
2. Click ribbon **Position**.
3. Click **Rotate**.
4. To rotate the part around the z-axis, click and drag the blue circle.
5. Click **Ok**.



3.1.2.5 Profile Editor 2

If you already have a saved profile, skip to *3.1.2.6 Prepare Platform*.

1. Click ribbon **Plug Ins**.
2. Click **Profile Editor**.
3. Click **Labeling**.
4. Select **Re-coater direction** under *Label orientation*.
5. Click **Placement**.
6. Select **Translate only** from the *Placement constraints* drop-down menu.

7. ☐Disable workflow step **Fixing**.
8. ☐Disable workflow step **Orientation**.
9. ☑Enable workflow step **Labeling**.
10. ☑Enable workflow step **Placement**.
11. ☑Enable workflow step **Support**.
12. Adjust any other parameters.
13. Click **Save Profile** button.
14. Enter a name.
15. Click **Ok**.

3.1.2.6 Prepare Platform

Once you have a saved profile, you can select it for future print jobs.

1. Click ribbon **Plug Ins**.
2. Click **Prepare Platform**.
3. Select the profile you created from the drop-down menu.
4. Click **Ok**.

3.1.2.7 Approve Platform and Build Processor

From here on, the process is the same regardless of recoater type. Refer to *2.3.8 Approve Platform* for further instructions.

3.2 How to print partials

It is crucial to orient partials in a way that avoids supports on the labial surface. Here we explain how to use the Dental Module to achieve this. First, use the Dental Module to place parts in a way that makes it easy to change their orientation. Manually correct the automatically determined alignment. Finally, use the Dental Module to nest the parts on the platform and generate supports.

> Some of the Magics functions used in this tutorial are not available in Magics Print, only in Magics RP.

3.2.1 Import parts and adjust machine parameters

1. Adjust machine parameters as described in *2.3.2 (Optional) Adjust machine parameters*.
2. Import parts as described in *2.3.3 Import parts*.

3.2.2 Profile Editor 1

If you already have a saved profile, skip to *3.2.2.1 Prepare Platform*.

1. Click ribbon **Plug Ins**.
2. Click **Profile Editor**.

3. ☑Enable workflow step **Fixing**.
4. ☑Enable workflow step **Orientation**.
5. ☐Disable workflow step **Labeling**.
6. ☑Enable workflow step **Placement**.
7. ☐Disable workflow step **Support**.
8. Click workflow step **Placement**.
9. Increase *Part interval*.
10. Increase *Default z-height* for partials.

> Larger distances between parts make it easier to find the best alignment. Higher placement above the platform prevents slope changes from placing parts below the platform.

11. Click **Save Profile** button.
12. Enter a name.
13. Click **Ok**.

3.2.2.1 *Prepare Platform*

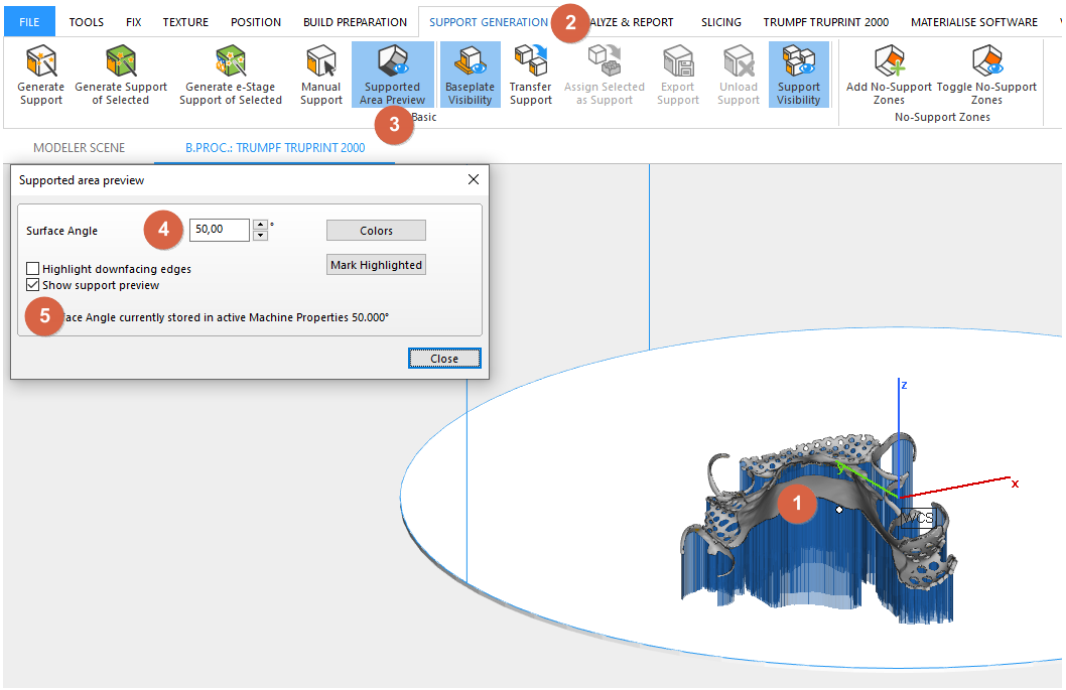
Once you have a saved profile, you can use it for print jobs.

1. Click ribbon **Plug Ins**.
2. Click **Prepare Platform**.
3. Select the profile you created from the drop-down menu.
4. Click **Ok**.

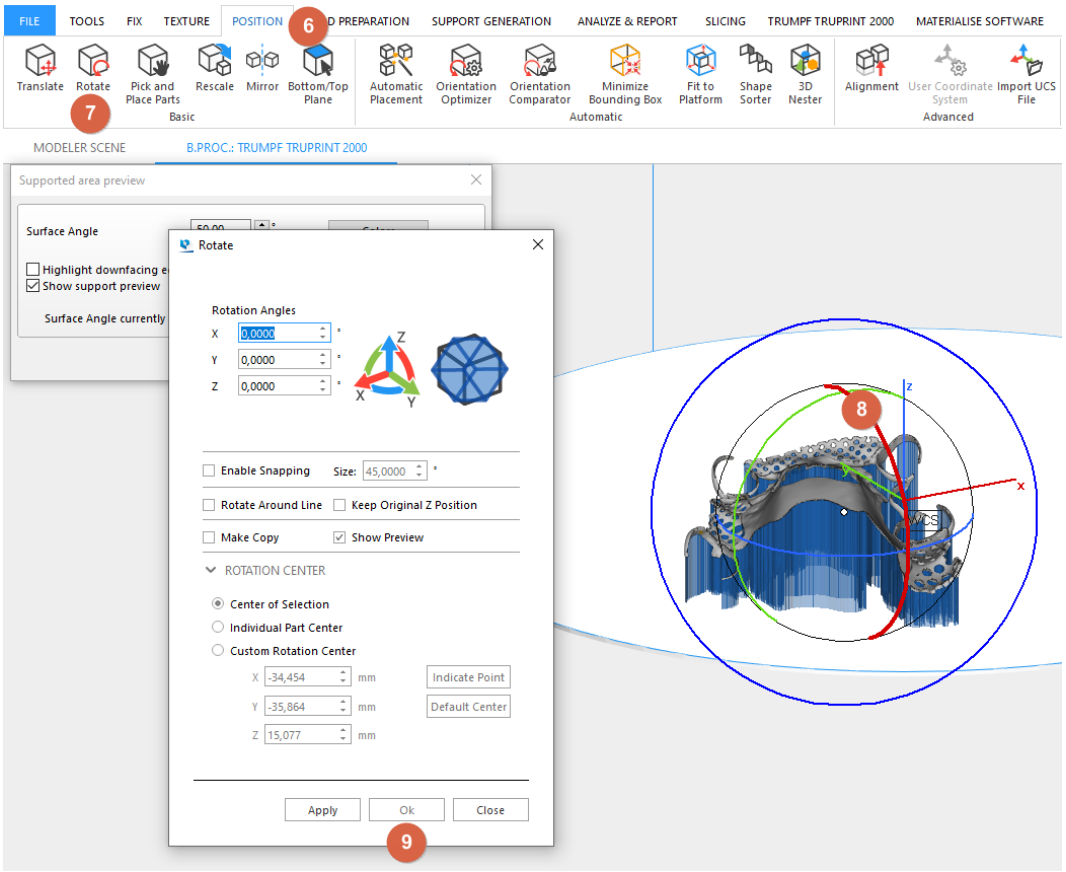
3.2.3 Orient parts

1. Select a part.
2. Click ribbon **Support Generation**.
3. Click **Supported Area Preview**.
4. Ensure that *Surface Angle* is the same as *Minimum self support angle* of the support profile used for partials.

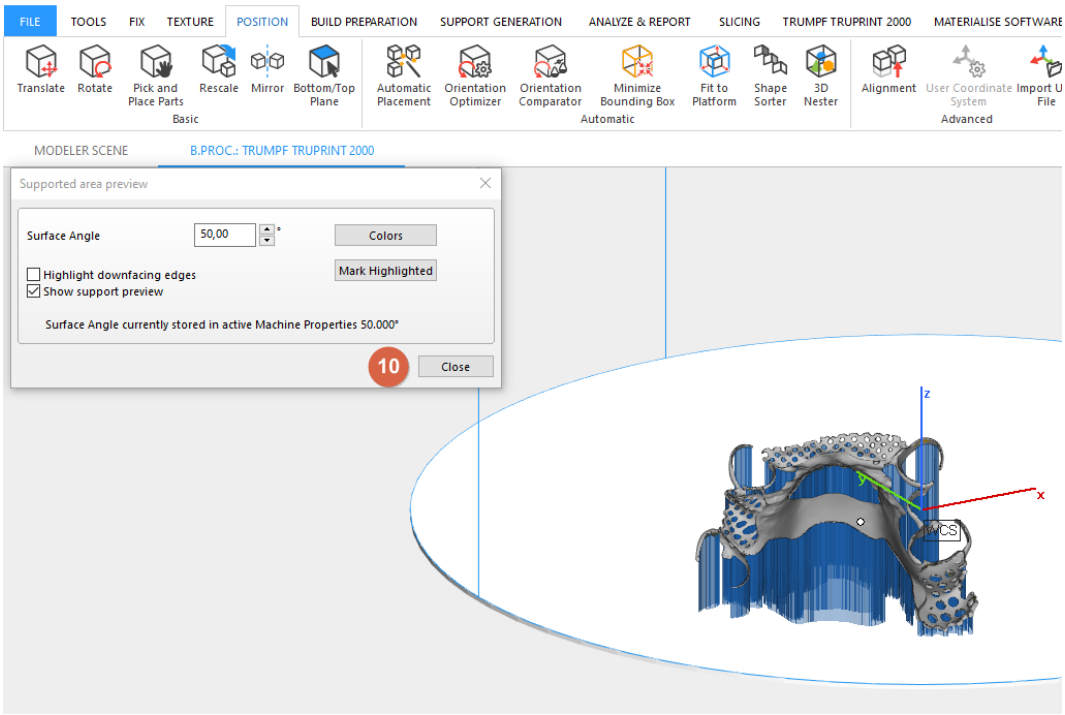
5. ☑Enable **Show support preview**.



6. Click ribbon **Position**.
7. Click **Rotate**.
8. To rotate the part around the x-axis, click and drag the red circle.
9. Click **Ok**.



10. Click **Close**.



3.2.4 Profile Editor 2

If you already have a saved profile, skip to *3.2.4.1 Prepare Platform*.

1. Click ribbon **Plug Ins**.
2. Click **Profile Editor**.
3. ☐Disable workflow step **Fixing**.
4. ☐Disable workflow step **Orientation**.
5. ☑Enable workflow step **Labeling**.
6. ☑Enable workflow step **Placement**.
7. ☑Enable workflow step **Support**.
8. Click workflow step **Placement**.
9. Decrease *Part interval* to the value you want to use for printing.
10. Decrease *Default z-height* for partials to the value you want to use for printing.
11. Adjust any other parameters.
12. Click **Save Profile** button.
13. Enter a name.
14. Click **Ok**.

3.2.4.1 Prepare Platform

Once you have a saved profile, you can use it for print jobs.

1. Click ribbon **Plug Ins**.
2. Click **Prepare Platform**.
3. Select the profile you created from the drop-down menu.
4. Click **Ok**.

3.2.5 Approve Platform and Build Processor

From here on, the process is the same regardless of part type. Refer to *2.3.8 Approve Platform* for further instructions.

3.3 Printing Telescopic Crowns and Screw Channels

Crowns and bridges with certain features require that those features be built perpendicular to the platform. Here we describe how to use the Dental Module to achieve this.

3.3.1 Profile Editor

1. Click ribbon **Plug Ins**.
2. Click **Profile Editor**.
3. Click workflow step **Orientation**.
4. Select **Calculate** from the *Orientation constraints* drop-down menu.
5. Enable *Auto-rotation*.
6. Select either **Regular surfaces** or **Screw channels** under *Alignment by technical areas*.

> The Dental Module can not detect both regular surfaces and screw channels on the same platform.

7. If you want the Dental Module to change the orientation of crowns even if no technical areas were detected, enable *Alignment by cavities*.
8. To change by how much the Dental Module is allowed to rotate parts, adjust *Maximum angular deviation*.
9. Adjust any other parameters.
10. Click **Save Profile** button.
11. Enter a name.
12. Click **Ok**.

3.3.2 Prepare Platform

Once you have a saved profile, you can use it for print jobs.

1. Click ribbon **Plug Ins**.
2. Click **Prepare Platform**.
3. Select the profile you created from the drop-down menu.
4. Click **Ok**.

3.3.3 Approve Platform and Build Processor

From here on, the process is the same regardless of part type. Refer to *2.3.8 Approve Platform* for further instructions.

4 How to solve common issues

Here we describe issues that commonly arise when using the Dental Module.

4.1 How to fix defective and non-alignable parts

In rare circumstances, the Dental module may fail to completely process a part. It is often possible to process these parts by running the Dental Module a second time.

Incompletely processed parts are color-coded and placed outside of the platform.

- Red: The dental module could not repair these parts with sufficient quality.
- Yellow: The dental module could not detect the occlusal surface of these parts with sufficient certainty.

4.1.1 Preconditions

The following conditions must be met in order to place incompletely processed parts on the dental platform by running the Dental Module a second time:

- The *Create supports for surplus parts* option must be enabled in the parameter profile used.
- The parts whose occlusal surface was not correctly recognized must have already been correctly aligned before running the Dental Module for the first time, so that the supports are created on the correct side.

4.1.2 Instructions

1. Click ribbon **Plug Ins**.
2. Click **Prepare Platform**.
3. Select a profile from the drop-down menu.
4. If labels are aligned in recoater direction, select **Translation only** from the *Placement* drop-down menu.
5. Click **Ok**.

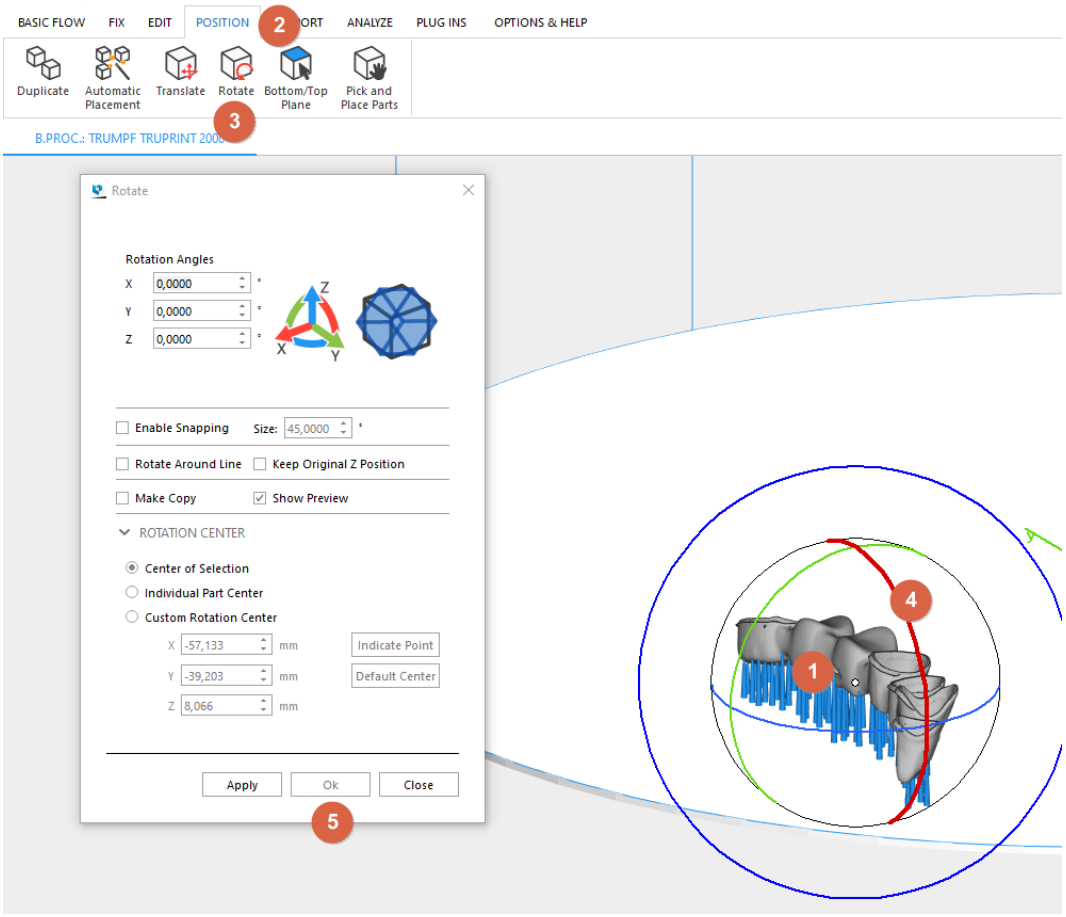
4.1.3 Persistent yellow parts

This can occur when a crown or bridge is oriented on its side. For the Dental Module to correctly detect the occlusal surface, it must be oriented either towards or away from the platform.

If a part is still yellow after a second run of the Dental Module, you must fix its alignment manually using Magics.

1. Select the part.
2. Click ribbon **Position**.
3. Click **Rotate**.
4. To rotate the part around the x-axis, click and drag the red circle.

5. Click **Ok**.



6. Click ribbon **Plug Ins**.
7. Click **Prepare Platform**.
8. Select the part.
9. Select **As given** from the *Build Orientation* drop-down menu.
10. Click **Ok**.

4.1.4 Persistent red parts

If a part is still red after a second run of the Dental Module, you must fix it manually using Magics. Refer to the Magics user manual for further instructions.

4.2 How to add more parts to a platform containing parts with a scaffold support

Go to this step in Getting Started

If the number of processed parts is sufficiently small, there will be a large area on the platform where additional parts could be placed. This can also occur if you remove parts after they have been processed. In these cases, you can fill the free area by running the Dental Module a second time.

Placing additional parts on a platform that contains a scaffold support requires special attention. Scaffold supports are different from other support types in that they are considered part of the platform. Scaffold supports are assigned to only one part, even if they support

multiple parts. Adding parts to a platform that has a scaffold support may require generating a new scaffold.

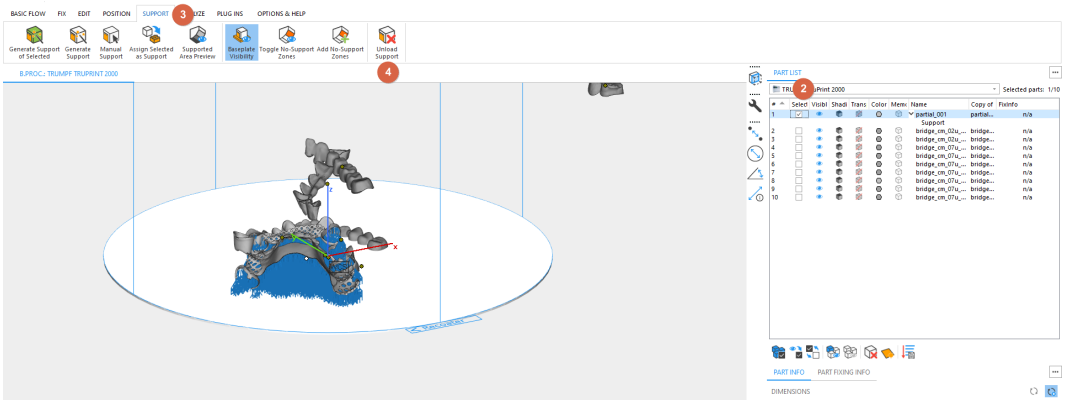
When placing additional parts on an existing dental platform with a scaffold support, you have two options:

- At least one of the added parts should receive a scaffold support
- None of the added parts should receive a scaffold support

4.2.1 At least one added part should receive a scaffold support

In order to extend the scaffold support to the new parts, it must be removed so that a new one can be created.

1. Import additional parts as explained in Getting started.
2. Select the part to which the scaffold support has been assigned.
3. Click ribbon **Support**.
4. Click **Unload Support**.



5. Click ribbon **Plug Ins**.
6. Click **Prepare Platform**.
7. Click **Ok**.

4.2.2 None of the added parts should receive a scaffold support

There are two options depending on whether you want to keep the already created scaffold support:

- Keep the current scaffold support.
- Delete the current scaffold support and create a new one.

Keeping the current scaffold support saves time during platform generation. Creating a new one may lead to better part placement.

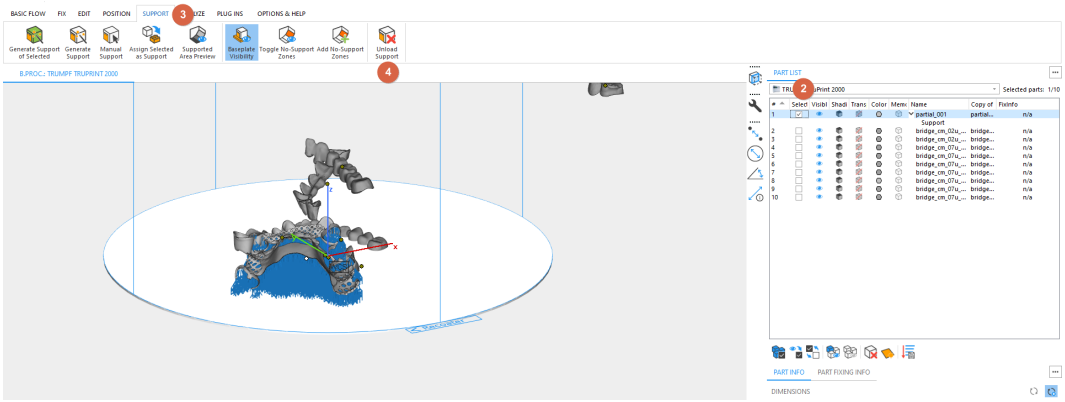
4.2.2.1 Keeping the current scaffold support

1. Import additional parts as explained in Getting started.
2. Click ribbon **Plugs Ins**.
3. Click **Prepare Platform**.
4. Select the parts that have the scaffold support.

5. Select **Fixed Position** from the *Placement* drop-down menu.
6. Click **Ok**.

4.2.2.2 Creating a new scaffold support

1. Import additional parts as explained in Getting started.
2. Select the part to which the scaffold support has been assigned.
3. Click ribbon **Support**.
4. Click **Unload Support**.



5. Click ribbon **Plug Ins**.
6. Click **Prepare Platform**.
7. Click **Ok**.

4.3 How to print parts that are not supported by the Dental Module

The Dental Module can automatically process crowns, bridges, and partials. It is possible to print dental parts that are currently not supported by the Dental Module alongside supported ones. However, you must process them manually. Refer to the Magics user manual for in-depth instructions on how to process parts manually.

1. Import all parts that are not supported by the Dental Module.
2. Use Magics to fix the parts.
3. Use Magics to position the parts.
4. Use Magics to generate supports for the parts.
5. Import any other parts (that are supported by the Dental Module) you want to print.
6. Click ribbon **Plug Ins**.
7. Click **Prepare Platform**.
8. Select a profile from the drop-down menu.
9. Select the parts that are not supported by the Dental Module.
10. Select **Processed Part** from the *Classification* drop-down menu.
11. Select **As given** from the *Build Orientation* drop-down menu.

12. Select **Fixed Position** from the *Placement* drop-down menu.
13. Click **Ok**.

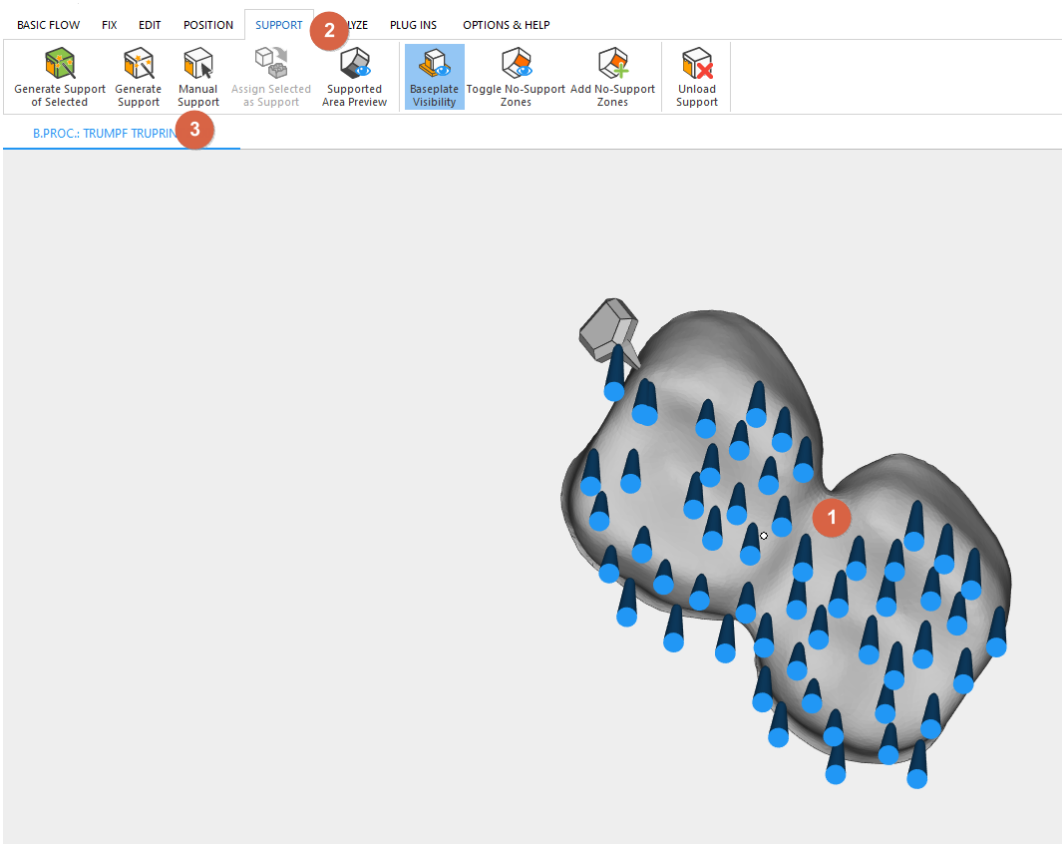
From here on, the process is the same regardless of part type. Refer to *2.3.8 Approve Platform* for further instructions.

4.4 How to delete single cone supports

You can delete cone supports using Magics. Refer to the Magics user manual for in-depth instructions.

> ⚠ If you manually edit the supports of a part, you must classify the part as *Processed Part* in Prepare Platform.

1. Select the part whose cone supports you want to delete.
2. Click ribbon **Support**.
3. Click **Manual Support**.

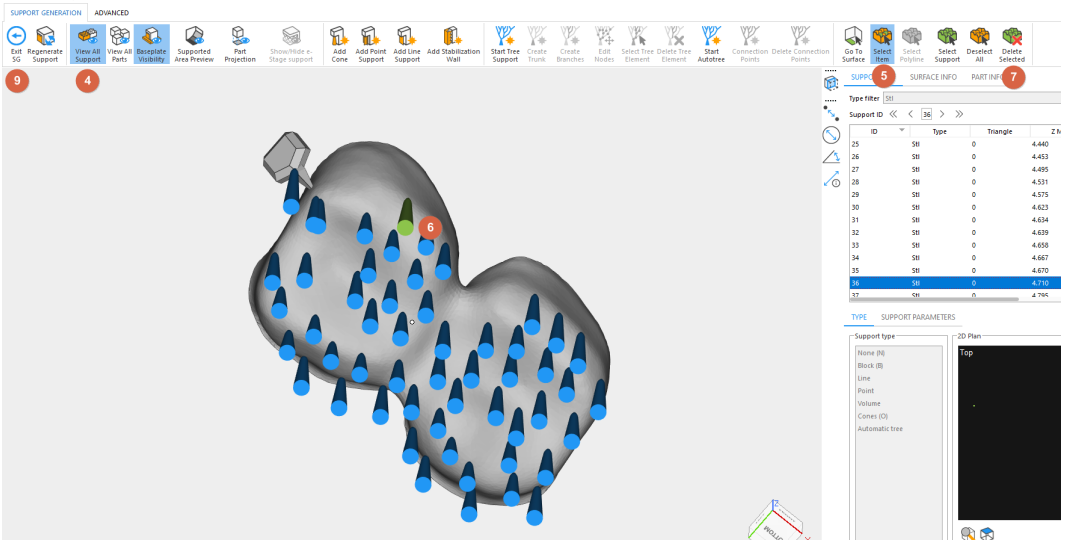


4. Click **View All Support**.
5. Click **Select Item**.

6. Click the bottom of the support you want to delete.

> The selected support is green. If the support you clicked is yellow, you clicked the side of the support instead of the bottom.

7. Click **Delete Selected**.
8. Repeat steps 6 and 7 for every support you want to delete.
9. Click **Exit SG**.



5 How to deal with warnings, errors, and unexpected results

Here, we list any warning and error messages and unexpected results you might encounter when using the Dental Module and how to solve them. If your issue persists after consulting this list, contact costumer support.

5.1 Warning and error messages

5.1.1 Magics v25.02 needed

Your version of Magics is incompatible with the Dental Module. Magics RP must be version 25.02 or higher, Magics Print must be version 25.2 or higher.

5.1.2 Please select a machine to prepare

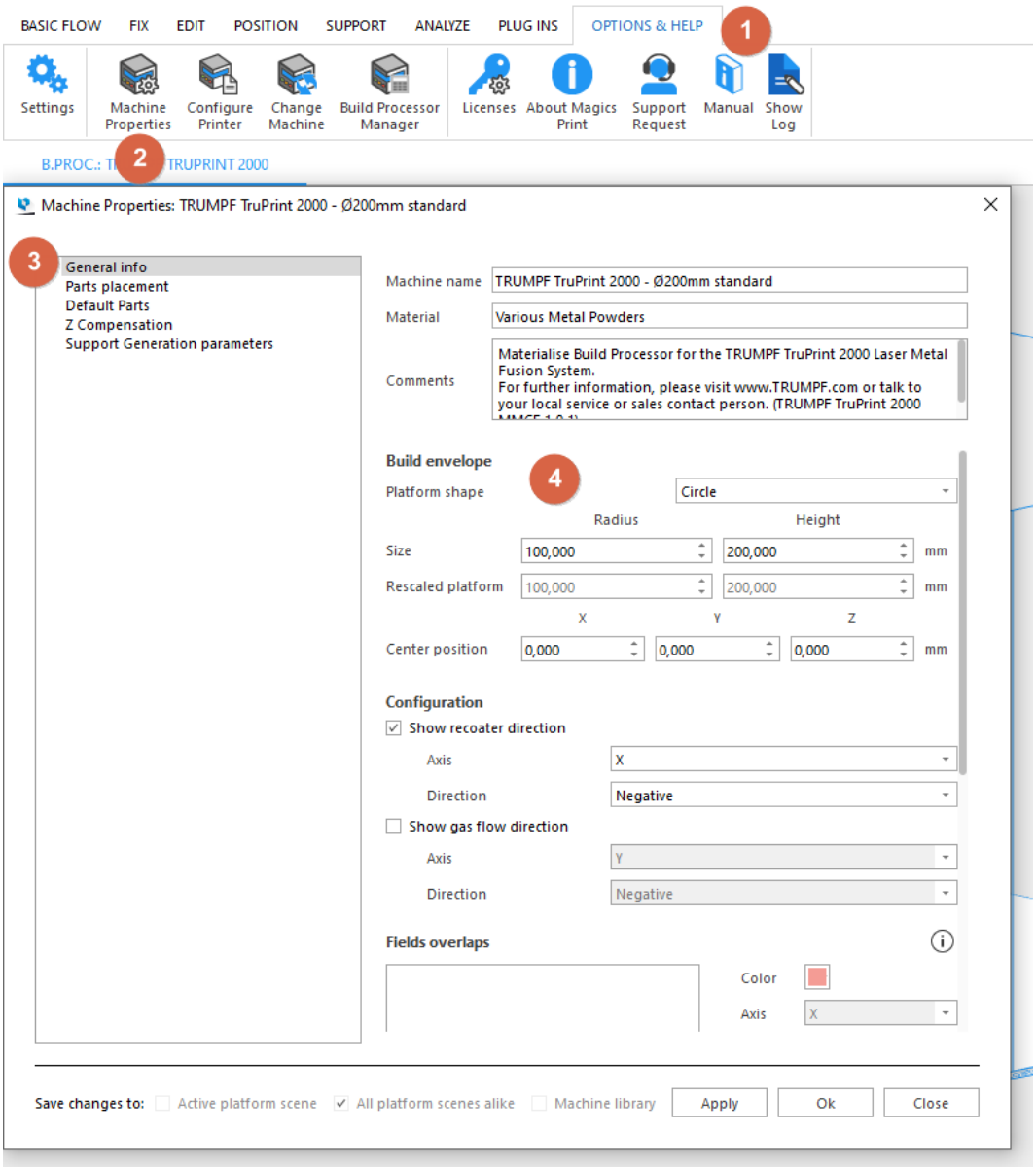
A machine must be selected before using the Dental Module. Refer to *2.3.1 Create scene* for instructions.

5.1.3 No Platform

The build envelope must be defined.

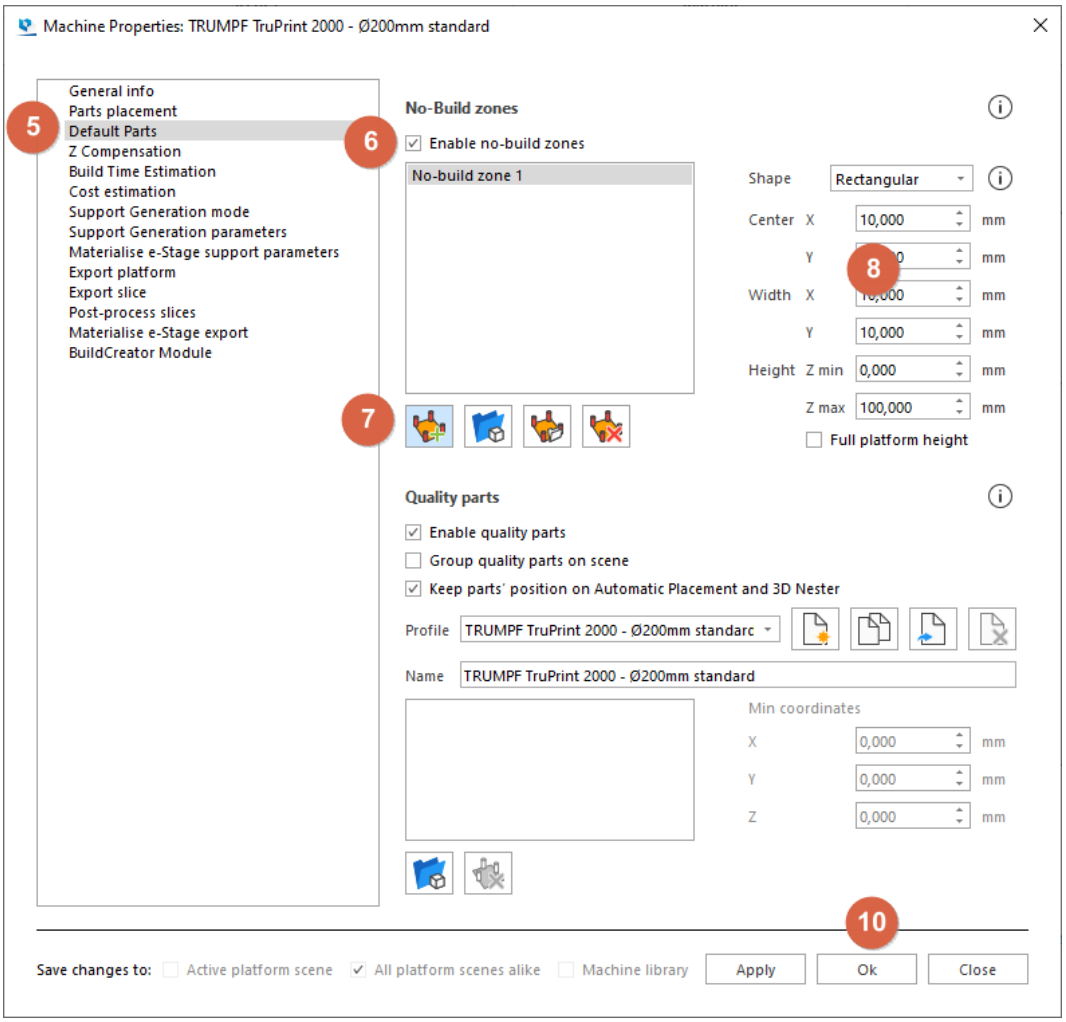
1. Click ribbon **Options & Help**.
2. Click **Machine Properties**.
3. Click **General info**.

4. Adjust build envelope parameters.



5. Click **Default Parts**.
6. Enable **Enable no-build zones**.
7. Click **Add Zone** button.
8. Change parameters to fit your needs.
9. Repeats steps 7 and 8 for every no-build zone you need to add.

10. Click **Ok**.

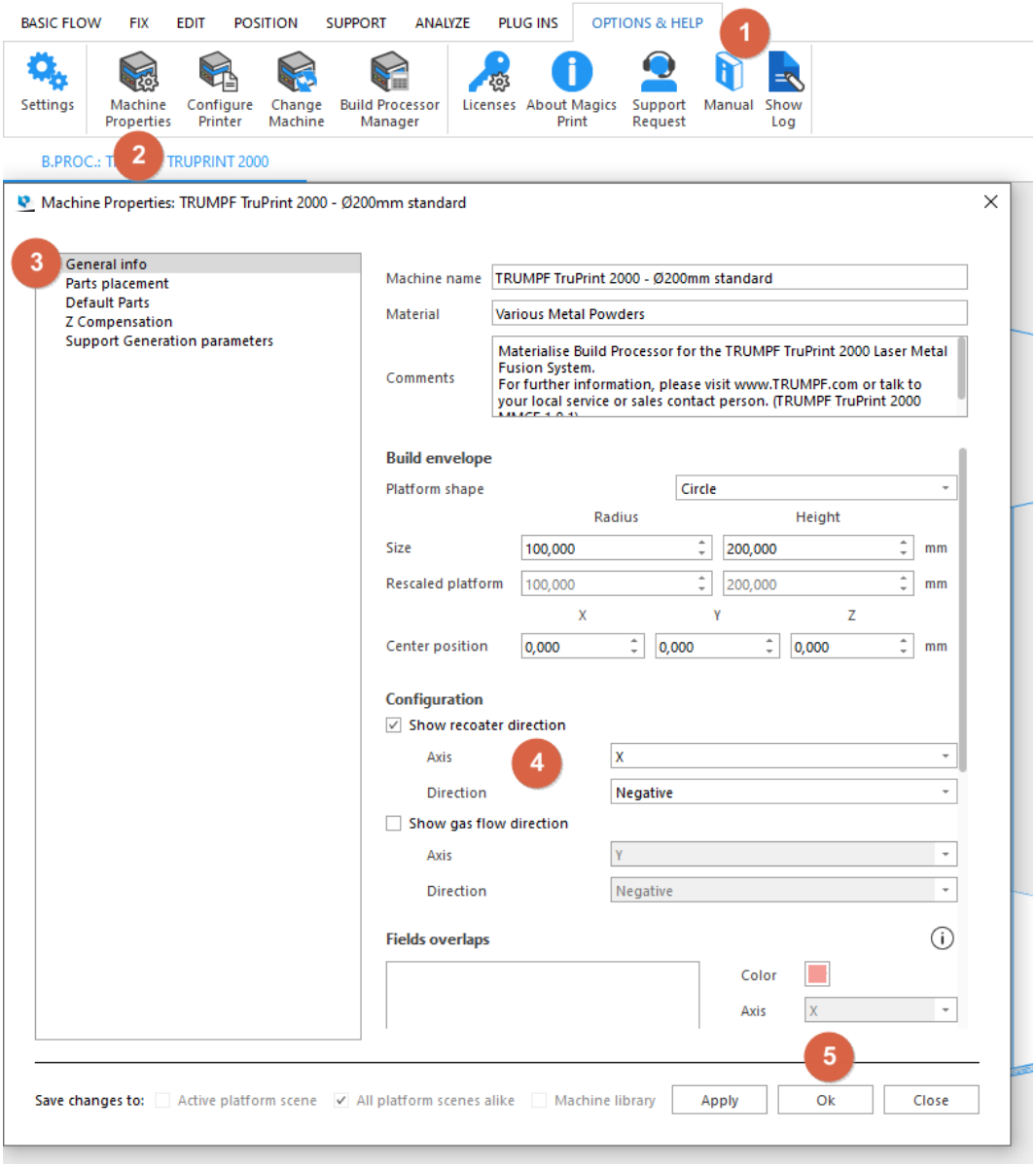


5.1.4 No Recoater direction

The recoater direction must be defined.

1. Click ribbon **Options & Help**.
2. Click **Machine Properties**.
3. Click **General info**.
4. Adjust recoater parameters.

5. Click **Ok**.



5.1.5 Fixing bridge <Part_Name> failed, fallback to shrink wrap (this may influence the mesh morphology)

Fixing for a bridge part used the *ShrinkWrap* functionality. We recommend a visual inspection of the part to ensure that the mesh was not changed significantly.

5.1.6 Part <Part_Name> (type=<Part_Type>) fixing failed

A part could not be fixed. It is not processed further and instead colored red and placed next to the platform. Refer to *4.1 How to fix defective and non-alignable parts*.

5.1.7 Could not create label with text 'your_label_text'

The label text is too long. We recommend a maximum of four characters.

5.1.8 Label may stick out above the part

In rare cases, a label cannot be placed correctly, i.e. in such a way that it does not stick out above the part mesh. There is no way to fix this. You must delete the label and manually keep track of the part.

5.1.9 Orientation of part <Part_Name> (type=<Part_Type>) is uncertain

Also: Orientation top/down of part<Part_Name> (type=<Part_Type>) is uncertain

The Dental Module was not able to determine the orientation of a part with sufficient certainty. You may need to orient the part manually. If you do so, you must assign *As given* from the *Build Orientation* drop-down menu to the part.

5.1.10 Part <Part_Name> is of unknown type (no initial positioning performed)

The part was not classified before running Prepare Platform. Manually assign a classification (crown, bridge, partial) to the part.

5.1.11 Unable to generate scaffold support

There are many possible reasons why this error can occur. The most important are:

- The mesh configuration on the platform makes it impossible to generate scaffold supports.
- Your license is invalid.

You can try to generate a scaffold with different parameters. If the error persists, you must use a different support type. If you have trouble with your license, contact Materialise costumer support.

5.1.12 Empty support generated for part <Part_Name> (type=<Part_Type>)

The platform configuration is incompatible with scaffold supports. Use a different type of support for the part or print it on another platform with different other parts.

5.1.13 Recoater direction is not set, matamx file defaults to POSITIVE_X

If the recoater direction is not configured, the Dental Module assumes it to be in positive x-direction. If your machine has a different recoater direction, refer to *2.3.2 (Optional) Adjust machine parameters* to configure the recoater direction.

5.1.14 Warning: You can only run 1 instance of the Dental Module.

An attempt was made to start the Dental Module in a second Magics instance while it is already being used in a different Magics instance. Or Magics was not shut down properly the last time it was run (e.g. because the computer crashed).

1. Close Magics.
2. Open the Task Manager.
3. Locate the process *plug-in host*.
4. End the process *plug-in host*.
5. Restart Magics.

5.2 Unexpected Results

5.2.1 Parts are placed beyond the platform

The error occurs on rectangular platforms with rounded corners. The corners up to the rounding of the build platform were not correctly defined as no-build zones in the machine configuration of the Build Processor. Refer to *2.3.2 (Optional) Adjust machine parameters* or request a machine configuration from the manufacturer or Materialise.

5.2.2 The part is placed outside the platform and colored yellow

The occlusal surface could not be determined with sufficient certainty. Refer to *4.1 How to fix defective and non-alignable parts*.

5.2.3 The part is placed outside the platform and colored red

The part could not be repaired with sufficient quality. Refer to *4.1 How to fix defective and non-alignable parts*.

5.2.4 The orientation of a part is different than expected

The part may be classified incorrectly. Select the correct type in the *Classification* column of Prepare Platform. Alternatively, the orientation can be done manually in Magics. If you manually orient the part, you must select *As given* from the *Build Orientation* drop-down menu for that part.

5.2.5 The generated platform shows an incorrect part assembly

In order for the Dental Module to work correctly, you must disable the *Send solid supports as STL to the Build Processor* option. Refer to *2.2 Adjust settings*.

6 Profile Editor

Go to this step in Getting Started

Use the Profile Editor to create parameter profiles that determine how imported parts are processed.

The Profile Editor includes the following options:

- Determine general settings for each part type
- Adjust processing parameters of the workflow steps: **Fixing**, **Orientation**, **Labeling**, **Placement** and **Support**
- Enable and disable individual workflow steps
- Save the determined parameters in profiles
- Import and export of profiles

6.1 Profile management

The Dental Module saves parameter sets in profiles. You can create profiles in the Profile Editor. When using Prepare Platform, you must select a profile. The profile applies to all parts on the platform. A default profile is provided. If you want to change any parameters, you must create a new profile.

Button	Function	Description
	Save profile	Save changes made to the current profile. Enter a new name to create a new profile. Keep the current name to overwrite the current profile. The default profile cannot be overwritten.
	Revert profile to last saved state	Undo every change you made to the current profile. It is not possible to selectively undo changes.
	Delete Profile	Delete the current profile. The default profile cannot be deleted.
	Import Profile	Import a profile.
	Export profile	Export either the current or every saved profile. Profiles are exported as .JSON files.

6.2 Part type & settings

Go to this step in Getting Started

These parameters determine general settings for each part type.

Parameter	Unit	Description
Create labels	—	Determines whether the Dental Module creates labels for each crown and bridge.
Support profile	—	Determines which support profile is applied to the parts. You can use individual support profiles for different part types or use the same support profile for multiple part types.
Minimize build height	—	The Dental Module will orient bridges in a way that minimizes their height above the platform.

Lingual up	—	The Dental Module will orient partials in a way that the side that is in contact with the gingiva points is facing away from the platform.
Lingual down	—	The Dental Module will orient partials in a way that the side that is in contact with the gingiva points is facing toward from the platform.
Tilt Angle	°	Determines the angle by which the partial is tilted. A positive angle tilts the anterior region away from the platform, a negative angle towards the platform.

If the *Build Orientation* of a part is set to *As given*, the parameters *Minimize build height*, *Lingual up*, *Lingual down*, and *Tilt Angle* have no effect on that part.

The following image illustrates the *Lingual up*, *Lingual down*, and *Tilt Angle* parameters.

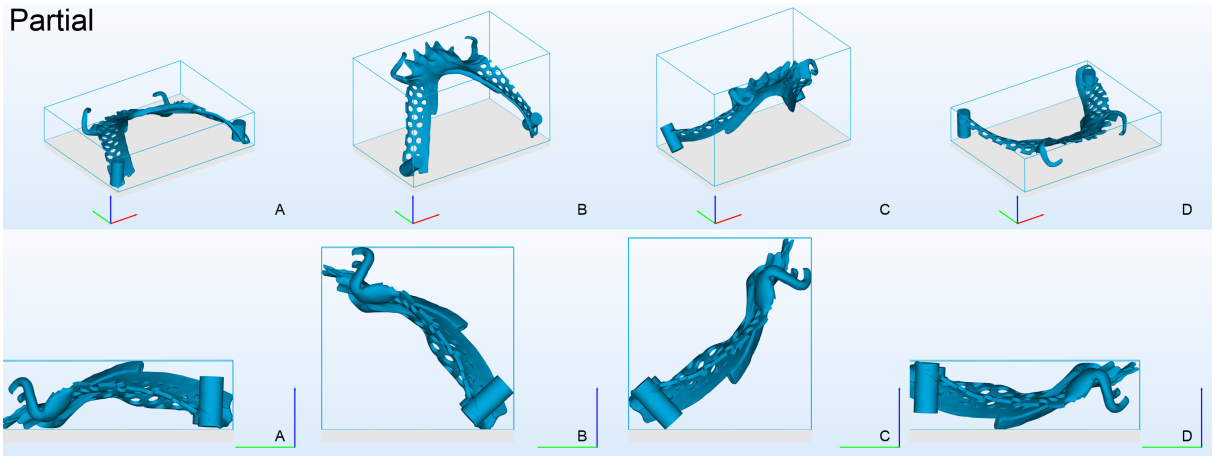


Image	Description
A	Lingual up, Tilt Angle = 0°
B	Lingual up, Tilt Angle = 45°
C	Lingual up, Tilt Angle = 135°
D	Lingual up, Tilt Angle = 180°

6.3 Workflow steps

You can adjust the parameters of each workflow step. You can also ☑enable and ☐disable individual workflow steps by ticking/unticking the box next to them.

Workflow step	Description
Fixing	The dental module repairs errors in the STL data.
Orientation	The Dental Module orients the parts.
Labeling	The Dental Module generates labels for crowns and bridges.
Placement	The Dental Module places the parts on the platform.
Support	The Dental Module generates supports for the parts.

6.4 Fixing

Go to this step in Getting Started

If *Reduced defect sensitivity* is enabled, the Dental Module continues processing parts even if they could not be completely fixed. If the parameter is disabled, any part that could not be fixed is placed outside of the platform and not processed further.

6.5 Orientation

Go to this step in Getting Started

These parameters determine the orientation of parts on the platform.

Parameter	Unit	Description
Orientation constraints	—	Select *Calculate* if you want the Dental Module to automatically determine the optimal print orientation for all parts. (Can be overridden in the *7 Prepare Platform* dialog for certain parts.) Select *As given* if you want to keep the given part orientation.
Auto-rotation (for crowns and bridges)	—	Activate this option if you want the Dental Module to automatically determine the optimal build orientation for crowns and bridges with technical areas such as screw channels. If there are no technical areas, the Dental Module can also detect crowns with steeply sloped cavities. Refer to *3.3 Printing Telescopic Crowns and Screw Channels* for further information.
Alignment by technical areas	—	Select *Regular Surfaces* if you want the Dental Module to align regular faces (if large enough) perpendicularly to the platform. Select *Screw channels* if you want the Dental Module to align the cylindrical part of an existing screw channel perpendicularly to the platform.
Alignment by cavities (of crown units)	—	Activate this option if you want the Dental Module to detect steeply sloped cavities in crowns. The margin lines will be aligned parallel to the platform. This will only be attempted if no technical areas were detected before.
Maximum angular deviation	°	Determines the maximum deviation of the given part orientation from the print orientation. This allows to ignore technical areas that are not to be aligned to the building direction. Both the positive and negative Z-axis are taken as reference, so that a value from 0-90 degrees is sufficient.

The following image illustrates *Alignment by technical areas > Regular Surfaces*.

The following image illustrates *Alignment by technical areas > Screw channels*.

The following image illustrates *Alignment by cavities (of crown units)*.

6.6 Labeling

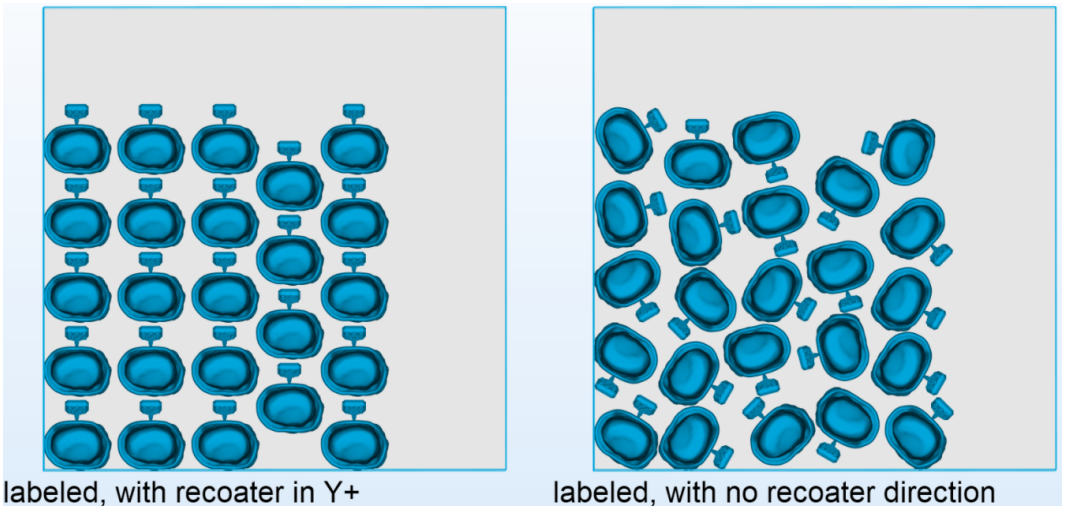
Go to this step in Getting Started

These parameters determine how parts are labeled.

Parameter	Unit	Description

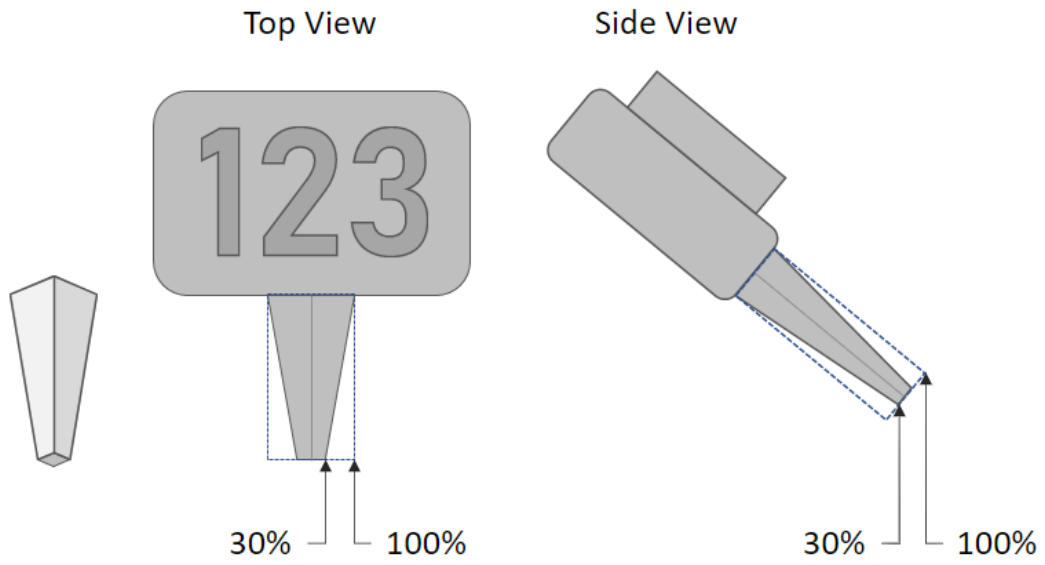
Auto-numbering	—	Determines whether auto-numbering is used to label the parts. Which number is assigned to which part is listed in the approval report. If this is enabled, you cannot use regular expressions to create the labels.
Regular expression	—	Determines how labels are generated from file names. To be able to select this option, disable auto-numbering. You can either type a regular expression or select a predefined one from the list. If the regular expression does not yield a result, auto-numbering will be used instead.
Any direction	—	Orients labels in any direction. This alignment option allows the highest possible packing density on the platform but carries a higher risk for collisions of the recoater with the tag.
Recoater direction	—	Aligns labels in recoater direction. This alignment option reduces the impact of a potential collision of the recoater with the tag.
Tag height	mm	Determines the label height.
Pin width	%	Determines the size of the pin contact to the part as a percentage of the size of the pin contact to the label.
Text offset	mm	Determines the offset (thickness) of the text on the label tag.

The following images illustrate the options for *Label orientation*. The image on the left shows the option **Recoater direction**. The image on the right shows the option **Any direction**.



The following image illustrates *Tag height*.

The following image illustrates a *Pin width* of 30%.



The following image illustrates *Text offset*.

6.6.1 Regular expressions

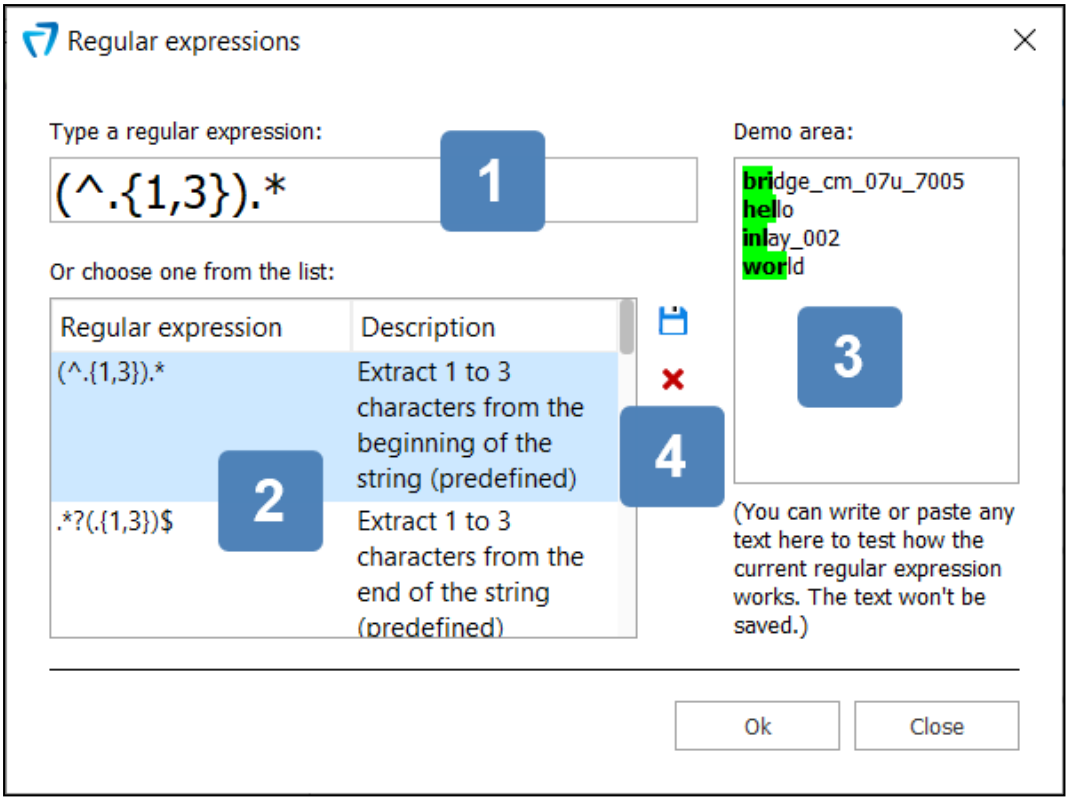
File names may already contain information that uniquely identifies each part. If file names are always structured in a certain way, you may want to use a substring of the file name as label text. This can be done using regular expressions.

To extract a substring from file names, you must ensure the following:

- File names are always structured exactly the same way.
- The regular expression describes the complete structure of the file name.
- The regular expressions correctly filters out the substring.

6.6.1.1 Regular expression window

Number	Name	Description
1	Regular expression	Determines the regular expression.
2	Predefined regular expressions	The Dental Module provides predefined regular expressions for the most common extraction patterns. You can also save your own regular expressions.
3	Demo area	Enter a file name in this field to see which substring the current regular expression extracts. The extracted string is highlighted in green.
4	Save and delete	You can save the custom regular expressions you type in field 1 using the save button. You can delete the currently selected regular expression using the delete button.



6.6.1.2 Predefined regular expressions

Regular expression	Description
(^.{1,3}).*	First three characters of the file name.
.*?(.{1,3})$	Last three characters of the file name.
.*?_([a-zA-Z0-9]{3}).*	Three alphanumeric characters after the first underscore in the file name.
.*_(.{3})_[^_]*$	Three characters after the second underscore in the file name.
.*_([0-9]{1,3}).*$	Three digits after the first underscore in the file name.
^[a-zA-Z0-9]{2,4}(.{3})_.*	Last three alphanumeric characters of the character sequence before the first underscore.

6.6.1.3 Regular expression rules

The following rules apply to the creation of regular expressions. This is just a very small excerpt of possible rules. Check the internet for more information on regular expressions and more detailed tutorials.

Character(s)	Description
.	any character
[abc]	a, b or c, (simple character set)
[^abc]	Everything except a, b or c (negation)
[a-z]	a to z or A to Z (simple character range)

[a-d[n-p]]	a to d or n to p; identical with [a-dn-p] (union)
[a-z&&[^bc]]	a to z, without b and without c (character range with exclusion)
^	Start of a character string
$	End of a character string
X?	X exactly once or not at all
X*	X 0-times to many
X+	X 1-time to many
X{n}	X exactly n-times
X{n,}	X at least n-times to many
X{n,m}	X n to m-times
X*?	X 0-times to as little as possible
X+?	X 1 time to as little as possible
X{n,}?	X at least n-times to as little as possible
X{n,m}?	X at least n-times up to highest m-times
XY	X followed by Y
X|Y	Either X or Y
X(Y)Z	Y describing the part of a string to be used as label text.

6.7 Placement

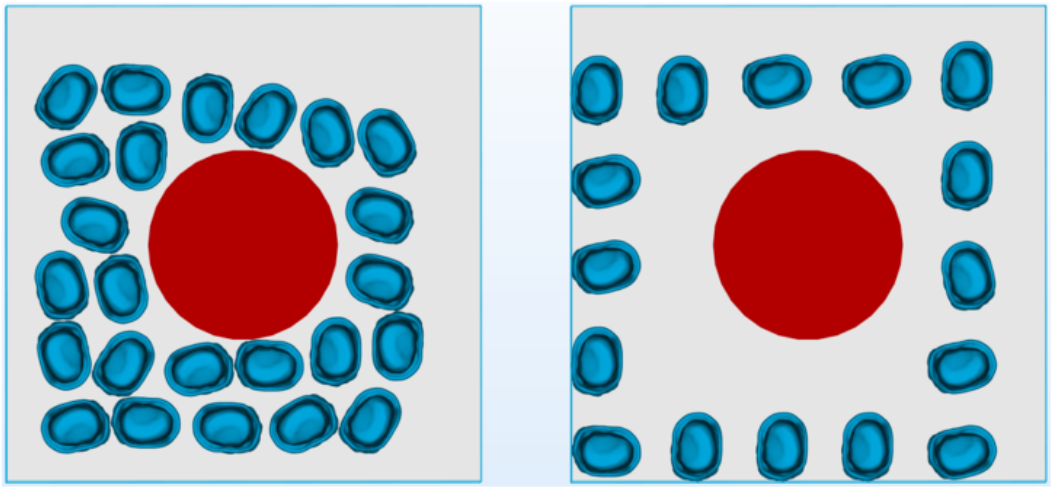
Go to this step in Getting Started

These parameters determine where parts are placed on the platform. They also determine where they are placed in relation to each other.

Parameter	Unit	Description
Translate & rotate	—	The Dental Module moves and rotates the part around the z-axis freely to find the optimal position.
Translate only	—	The Dental Module does not rotate the part. It still moves the part to find the optimal position given its current angle. Choose this option if you selected *Recoater direction* under *6.6 Labeling* to ensure that labels that have been aligned in recoater direction are not rotated out of alignment afterwards.
Fixed position	—	The Dental Module neither moves nor rotates the part.
Part interval	mm	Minimum distance between parts on the platform. The lower the value, the tighter the parts are nested.
Platform margin	mm	Minimum distance between parts and the platform border. The lower the value, the closer the parts are placed to the border.
Center	—	Parts are placed around the platform center.

Minimal XY	—	Parts are placed with minimum expansion in x- and y-direction, i.e. in the lower left corner of the platform.
Default z-height	mm	Determines the expansion of parts in z-direction. There is a separate parameter for each part type. The lower the value, the closer the parts are placed to the platform and the shorter the supports.

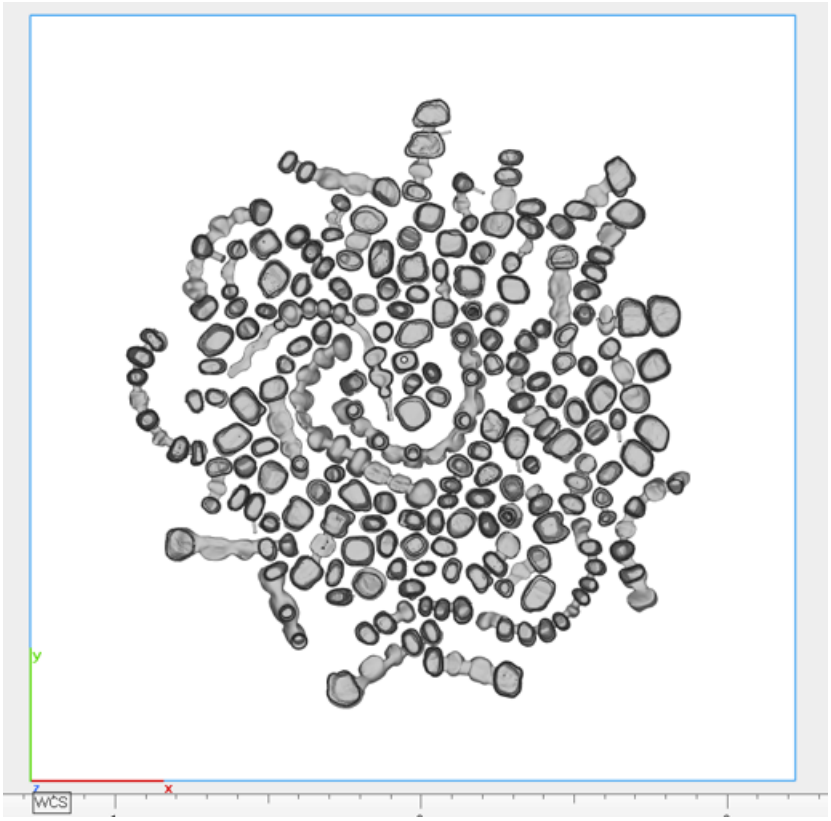
The following image illustrates the parameters *Part interval* and *Platform margin*.



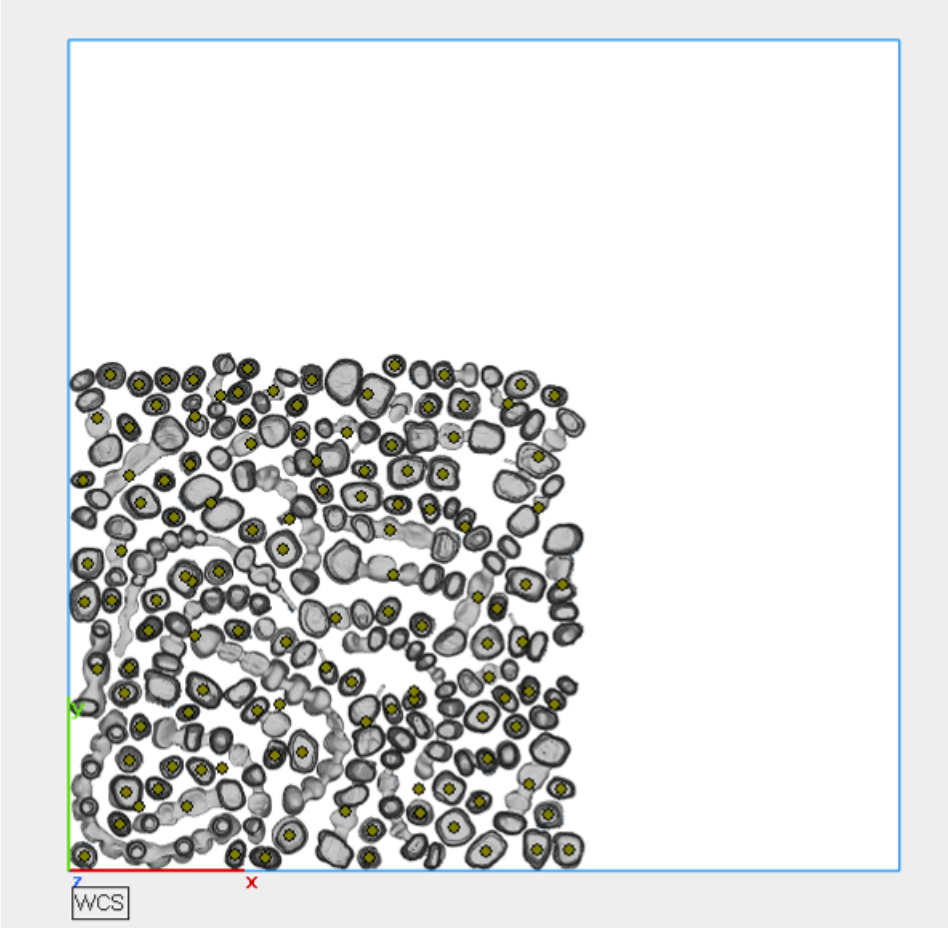
Part interval = 0.0 mm
Platform margin = 3.0 mm

Part interval = 3.0 mm
Platform margin = 0.0 mm

The following image illustrates *Center*.



The following image illustrates *Minimal XY*.

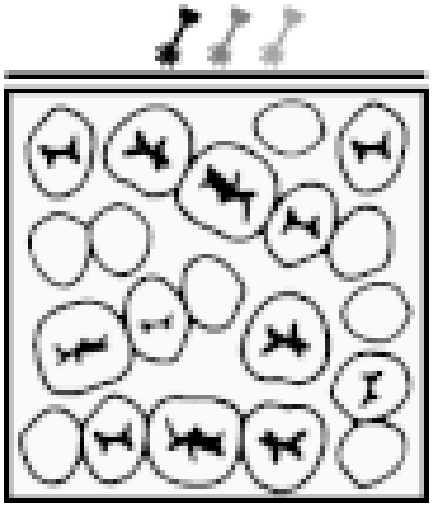


6.7.1 Automatic placement according to scan field configuration

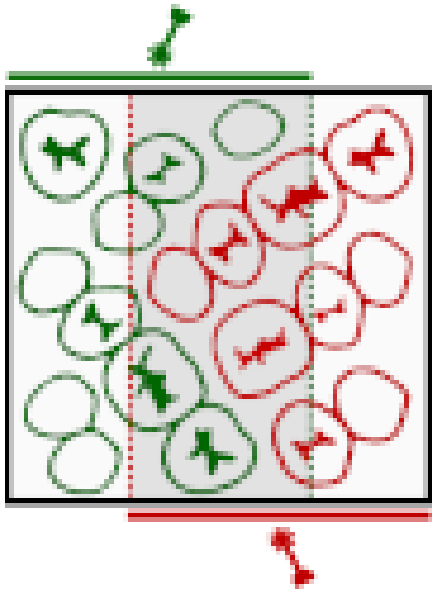
The Dental Module automatically adapts the placement behavior to the scan field configuration of the selected machine to avoid an unwanted change of the laser during the production of a part.

Configuration	Description
Full-platform scan fields	If the machine has full-platform scan fields, each scan field covers the entire platform and thus all parts on the platform. In this case, the parts are placed anywhere on the platform.
Sub-platform scan fields	If the machine has sub-platform scan fields, each scan field covers only a partial area on the platform. In this case, the parts are automatically placed so that each part lies completely in one of the scan fields.

The following image illustrates Full-platform scan fields.



The following image illustrates Sub-platform scan fields.



6.8 Support

Go to this step in Getting Started

These options determine how supports are generated. There are four support types:

- Cone
- Tree
- Scaffold
- Block

6.8.1 General parameters

Parameter	Unit	Description
Create supports for surplus parts	—	The Dental Module generates supports for parts that could not be placed on the platform.
Add support to labels	—	The Dental Module generates supports for labels if necessary.
No supports close to margin line	mm	Distance to the margin line of crowns and bridge beyond which supports are not generated.

6.8.2 Support profiles

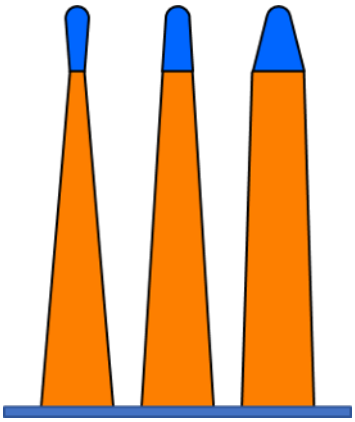
The Dental Module saves parameter sets in profiles. There are separate profiles for each support type. A default profile for each support type is provided. Edit the default profile or create new ones to adjust support parameters.

6.8.3 Cone supports

Cone supports are wide where they meet the platform and narrow where they meet the part. The wide base provides a stable connection to the platform. The narrow top makes them easy to remove from the part.

The longer the trunk and the narrower the tip, the more unstable the support becomes. To prevent this, two truncated cones are combined: a regular cone as the trunk and an inverted cone as the tip. This kind of support is wide at both the base and the top, with the base usually being wider than the top. The narrowest part is where the two cones meet.

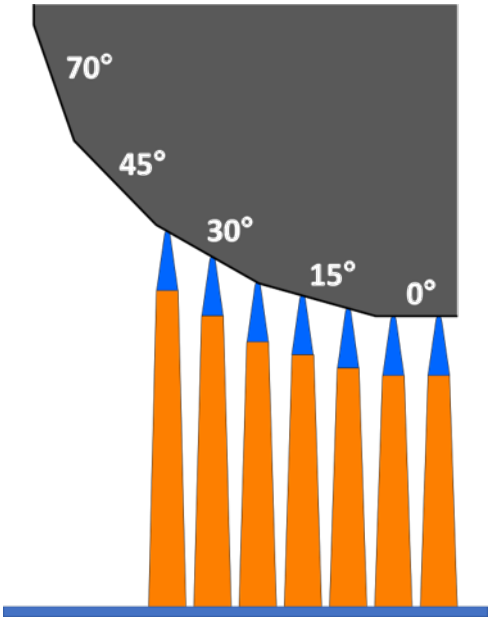
The following image illustrates some example cones. The tip is blue, the trunk is orange.



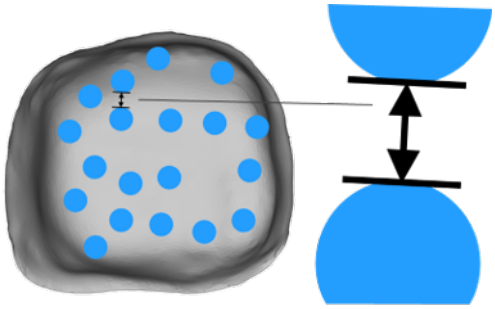
6.8.3.1 General parameters

Category	Parameter	Unit	Description
General	Surface angle	°	Angle of inclination up to which surfaces are supported.
General	Minimal distance between cones	mm	Minimal distance between any two pairs of cones, measured from the edge of the base.

The following image illustrates a *Surface angle* of 45°.



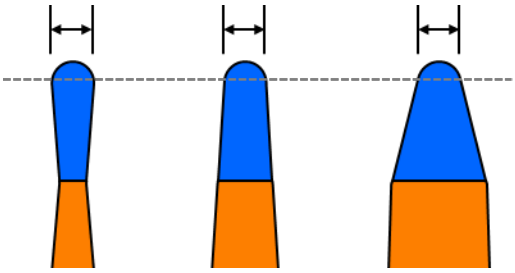
The following image illustrates *Minimal distance between cones*.



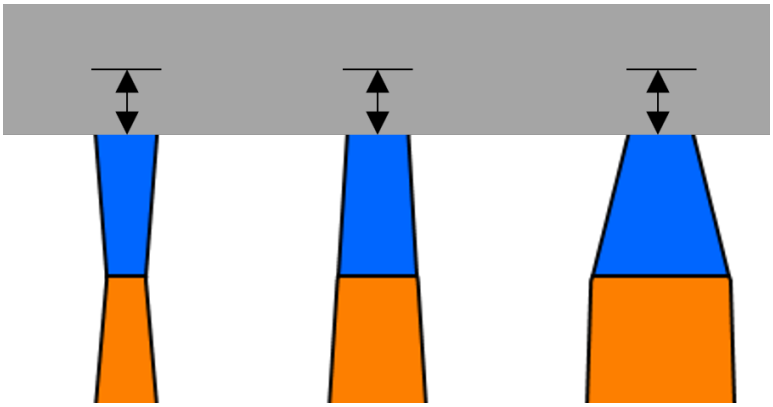
6.8.3.2 Tip and trunk parameters

Category	Parameter	Unit	Description
Tip	Top radius	mm	Radius at the top of the tip where it meets the part.
Tip	Z offset	mm	Distance the tip penetrates into the part to improve connectivity.
Tip	Length	mm	Length of the tip.
Trunk	Top radius	mm	Radius of the top of the trunk (bottom of the tip).
Trunk	Bottom radius	mm	Radius of the bottom of the trunk where it meets the platform.

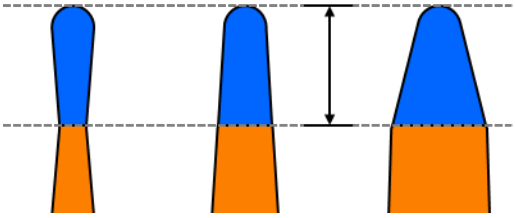
The following image illustrates *Top radius* of the tip.



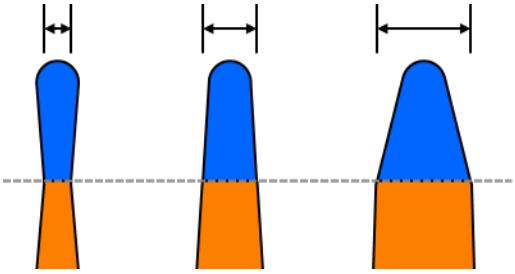
The following image illustrates *Z offset* of the tip.



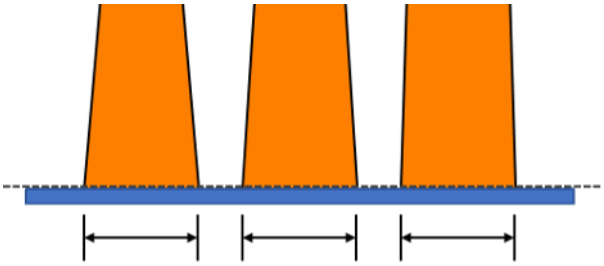
The following image illustrates *Length* of the tip.



The following image illustrates *Top radius* of the trunk.



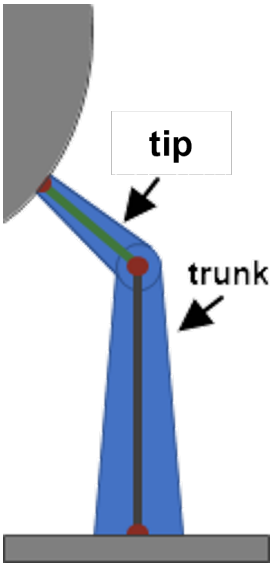
The following image illustrates *Bottom radius* of the trunk.



6.8.4 Tree supports

Tree supports are borrowed from the tree supports in Magics and are used to connect cone supports perpendicular to the surface of parts. Real trees with multiple branches cannot be created. Tree supports consist of two cones that are connected at an angle: the tip and the trunk.

The following image illustrates an example tree.



6.8.4.1 General parameters

Category	Parameter	Unit	Description
Support area > Surface filters	Surface angle	°	Angle of inclination up to which part surfaces are supported.
Offset	XY offset	mm	Distance from the border of the surface area to be supported to the border of the support.
Support density	Minimal distance between cones	mm	Minimal distance between any two pairs of trees, measured from the edge of the base.

6.8.4.2 Tip and trunk parameters

Category	Parameter	Unit	Description
Cone tip	Top radius	mm	Radius at the top of the tip where it meets the part.
Cone tip	Z offset	mm	Distance the tip penetrates into the part to improve connectivity.
Cone tip	Break off point	—	Activates a break off point to attach the support perpendicular to the part surface. This provides a uniformly sized area of the support attachment for surfaces with different slopes.
Cone tip > Break off point	Radius	mm	Radius of the break off point between the bottom of the tip and the trunk.

Cone tip > Break off point	Distance from top	mm	Distance between the top of the tip and the break off point.
Cone trunk	Top radius	mm	Radius of the top of the trunk (at the bottom of the tip).
Cone trunk	Bottom radius	mm	Radius of the bottom of the trunk where it meets the platform.
Cone trunk	Braces	—	Activates braces that connect the trunks. This increases stability of the support and avoids its deformation during the printing process.
Cone trunk > Braces	Radius	mm	Radius of the braces.
Cone trunk > Braces	Offset from top and bottom	mm	Offset of the braces to the top and bottom of the trunks.
Cone trunk > Braces	Pattern	—	Defines the pattern for the braces. *Zigzag* uses a series of successive struts to connect two trunks at a time. This provides a slight reinforcement. *Cross* uses a set of cross braces to connect two trunks at a time. This provides a stronger reinforcement.

6.8.5 Scaffold supports

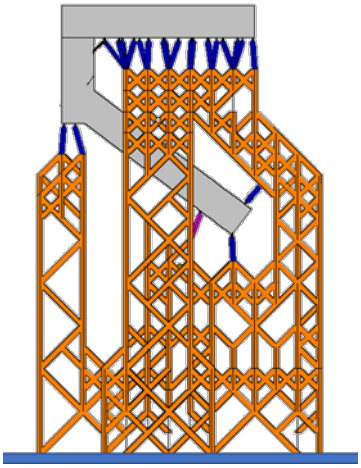
Scaffold supports are a framework structure with a diamond grid that does not entrap metal powder and is easy to remove from the part. If multiple parts are supported by scaffolds, a single, overarching structure is generated. You cannot create individualized scaffolds for each part.

The scaffold framework is composed of struts. Struts are connected to each other at intersection points. The number of struts per intersection point depends on the diamond width. The greater the diamond width, the more struts per intersection point. Struts are connected to the part in three possible ways:

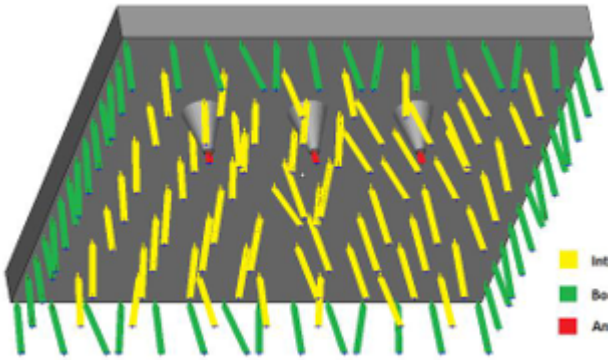
- Connection of local extrema by means of anchor contact points. These should be connected in a stable manner to be able to absorb greater loads.
- Connection of border areas by means of border contact points. These should be tightly and finely bonded to increase the surface quality at component edges.
- Connection of inner areas by means of inner contact points.

The scaffold support protrudes beyond the part by approx. half the width of the diamond. The distance to the platform edge should be set to at least half of the diamond width. A smaller distance can have a negative effect on the support performance of the scaffold support.

The following image illustrates an example scaffold. Struts connected to the part are blue, struts that comprise the grid are orange.



The following image illustrates anchor, border, and inner contact points. Anchor points are red, border points are green, inner points are yellow.

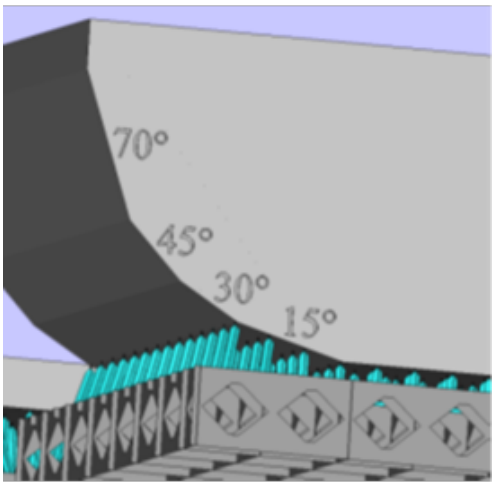


6.8.5.1 General parameters

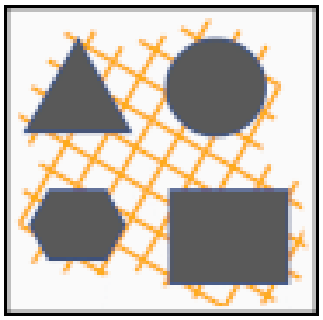
Category	Parameter	Unit	Description
Support area > Surface filters	Surface angle	°	Angle of inclination up to which part surfaces are supported.
Support creation	Single support for whole platform	—	Creates a single grid for all parts on the platform. This offers the ability to nest parts within each other as the grid can grow around non-support areas of parts.
Support creation	Individual support for each part	—	Creates a separate grid for each part. This allows the subsequent change of positioning on the platform.
Offset	XY offset	mm	Distance from the border of the surface area to be supported to the border of the

			support. This parameter must be less than or equal to √(3)/2 * *Border point influence region*.
Offset > No support	Wall offset	mm	Distance up to which an overhang is considered as self-supporting and no supports are created. This parameter should be greater than or equal to *Border point influence region* and two times greater than *XY offset*.

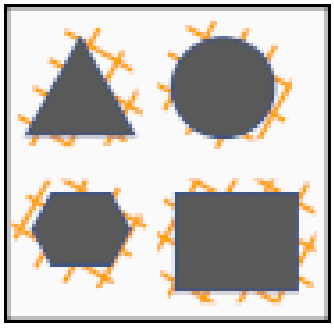
The following image illustrates a *Surface angle* of 30°.



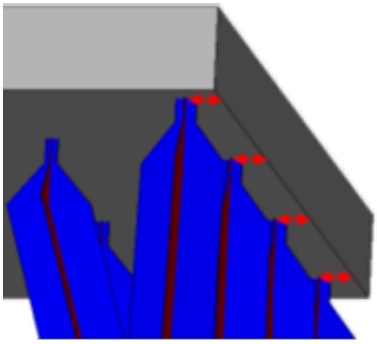
The following image illustrates *Single support for whole platform*.



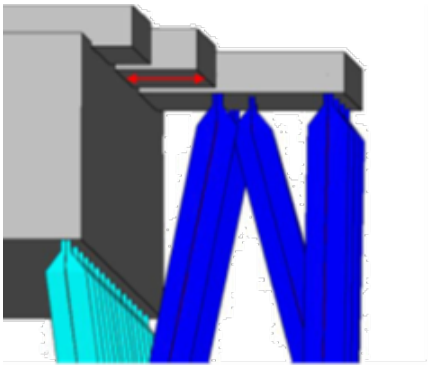
The following image illustrates *Individual support for each part*.



The following image illustrates *XY offset*.



The following image illustrates *Wall offset*.

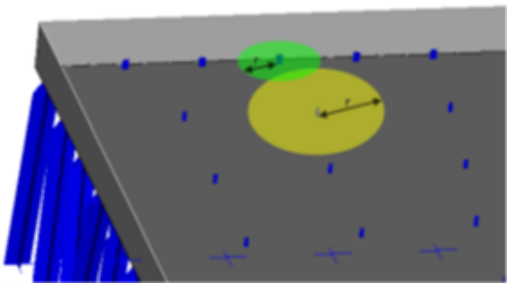


6.8.5.2 Point distribution parameters

These parameters determine where struts are connected to the part. They also determine where they are placed in relation to each other.

Parameter	Unit	Description
Border point influence region	mm	Radius of circular area around each border contact point in which no other contact points are placed. The lower the value, the higher the density of border contact points. This parameter should be less than or equal to *Interior point influence region*.
Interior point influence region	mm	Radius of circular area around each interior contact point in which no other contact points are placed. The lower the value, the higher the density of inner contact points.

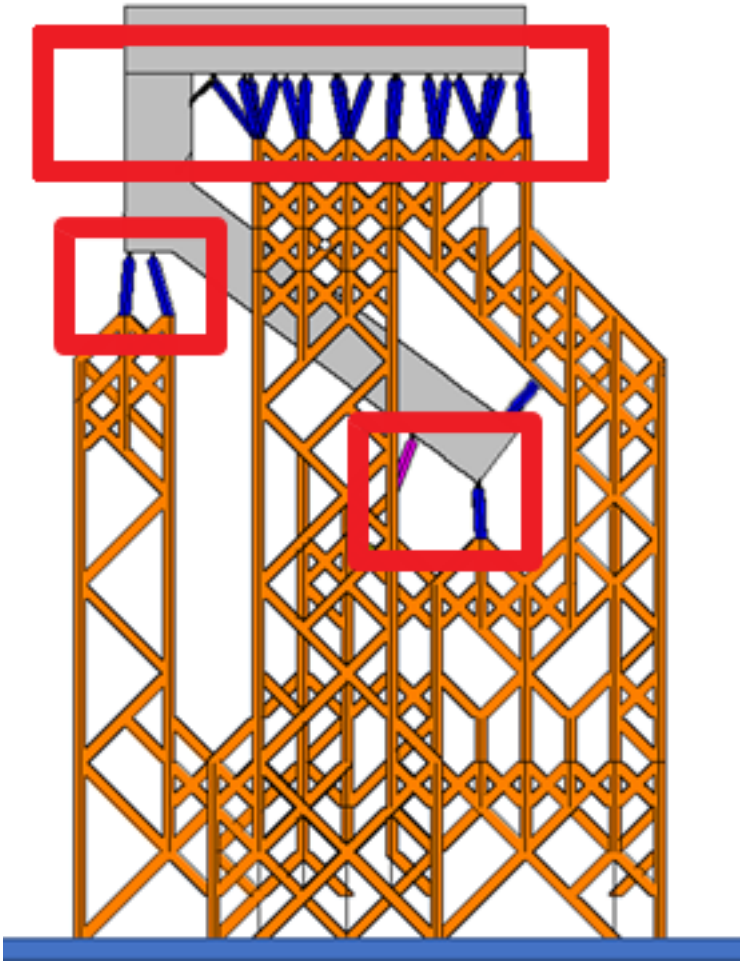
The following image illustrates *Interior* and *Border point influence region*. *Interior point influence region* is marked in yellow, *Border point influence region* is marked in green.



6.8.5.3 Top connection parameters

These parameters determine the shape of struts connected to the part in overhang areas.

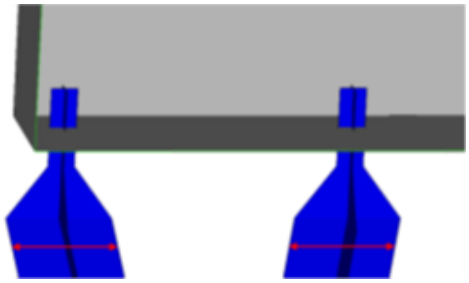
The following image illustrates which contact points are determined by these parameters.



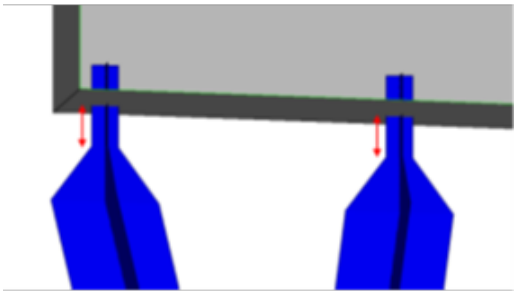
Category	Parameter	Unit	Description
Top connection	Connection width	mm	Width of the connecting struts leading from the grid to the contact struts.
Top connection	Contact margin	mm	Length of the contact strut

			that connects the grid connection strut to the contact point of the part surface. This parameter should be less than or equal to *Connection width*.
Top connection > Contact width	Border point	mm	Width of the part contact points for border points. This parameter should be greater than or equal to *Interior point*.
Top connection > Contact width	Interior point	mm	Width of the part contact points for interior points.
Top connection > Contact width	Anchor point	mm	Width of the part contact points for anchor points. This parameter should be greater than or equal to *Border point*.
Top connection	Z offset	mm	Distance a contact point penetrates into the surface of the part.

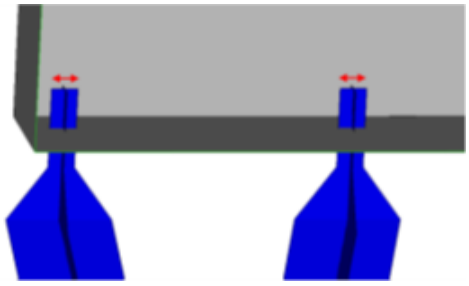
The following image illustrates *Connection width*.



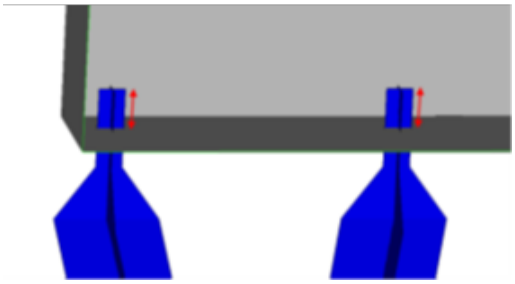
The following image illustrates *Contact margin*.



The following image illustrates *Contact width* of *border* and *interior points*.



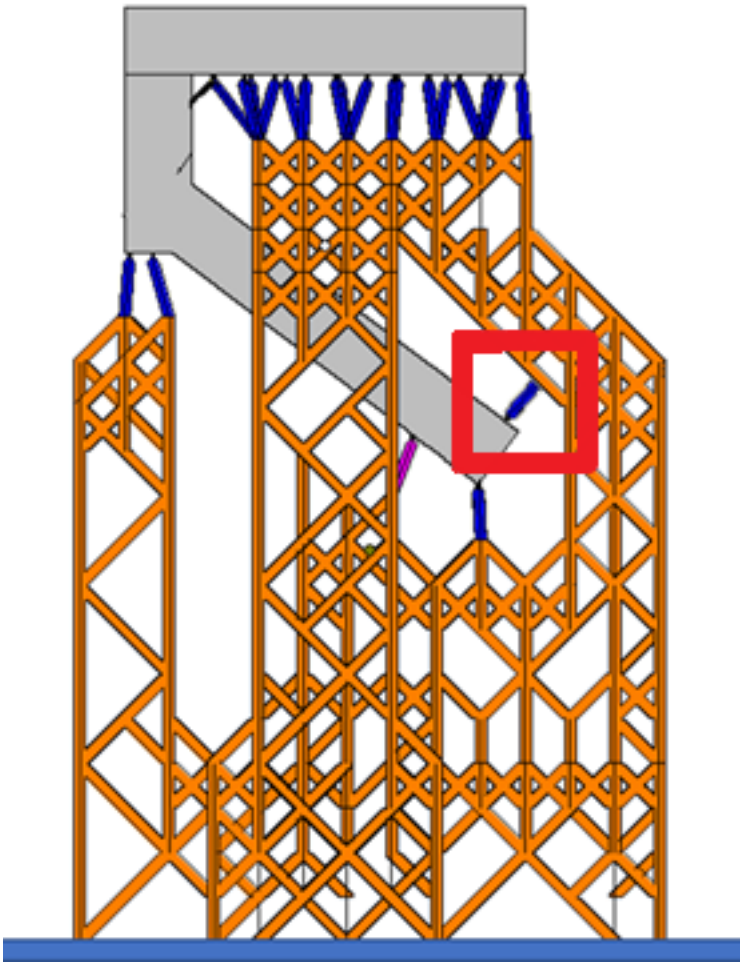
The following image illustrates *Z offset*.



6.8.5.4 Bottom connection parameters

These parameters determine the shape of struts connected to the part in non-overhang areas. These struts do not support the part. Depending on the size of the grid, bottom supports are necessary to support the scaffold.

The following image illustrates which contact points are determined by these parameters.



Parameter	Unit	Description
Connection width	mm	Width of the connecting struts leading from the grid to the contact struts.
Contact mar-	mm	Length of the contact strut that connects the grid connection strut to the

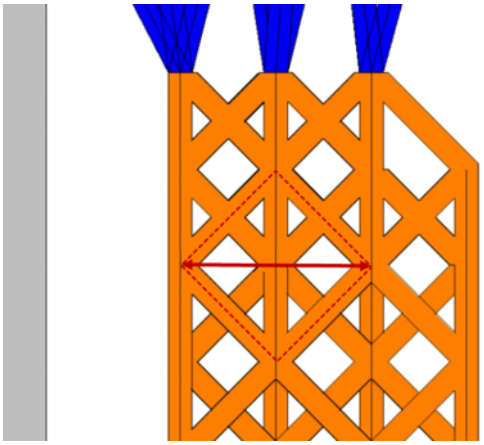
gin		contact point of the part surface. This parameter should be less than or equal to *Connection width*.
Contact width	mm	Width of the part contact points.
Z offset	mm	Distance a contact point penetrates into the surface of the part.

6.8.5.5 Grid parameters

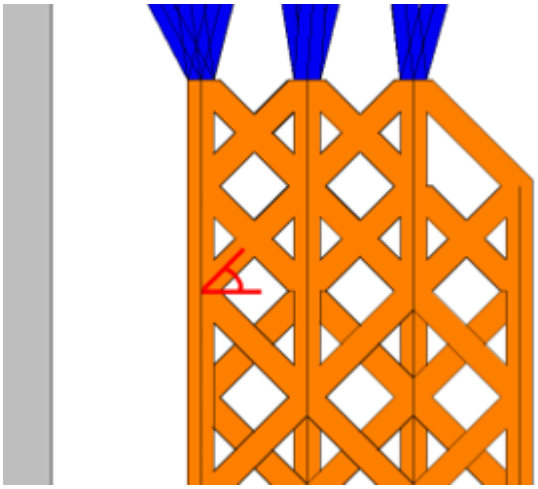
These parameters determine the shape of struts that make up the grid. They also determine the shape of the grid itself.

Category	Parameter	Unit	Description
Grid	Diamond width	mm	Width of the smallest diamonds that make up the lattice body of the support structure. The lower the value, the stiffer the grid.
Grid	Diamond angle	°	Inclination angle of the diamonds. This parameter must be between 15° and 75° (inclusive). This parameter should be larger than or equal to *Minimum self support angle*.
Grid	Edge width	mm	Width of the diamond edges. The higher the value, the stiffer the grid.
Grid	Edge thickness	mm	Thickness of the grid elements. The value "0" creates a non-solid support consisting of only one wall.
Grid > Grid reduction	Inner grid reduction level	—	The reduction of the inner grid increases the diamond perforations of the grid in the direction of the platform. This saves material and printing time and allows an easier removal of powder and supports. *None* does not change the diamond size. *Low* doubles the diamond size. *Strong* quadruples the diamond size.
Grid > Grid reduction	Outer grid reduction level	—	The reduction of the outer grid increases the diamond perforations of the grid in the direction of the platform. This saves material and printing time and allows an easier removal of powder and supports. *None* does not change the diamond size. *Low* doubles the diamond size. *Strong* quadruples the diamond size.
Grid	Rotation around Z-axis	°	Angle around the Z-axis by which the support grid is rotated relative to the platform. This avoids walls standing parallel to the recoater, which may cause problems with material application.
Grid	Foundation	—	Enable this parameter to generate an additional solid foundation between the grid and the platform. This improves the attachment of the grid to the platform. If disabled, the grid structure is connected directly to the platform.
Grid > Foundation	Foundation height	mm	Height of the foundation.

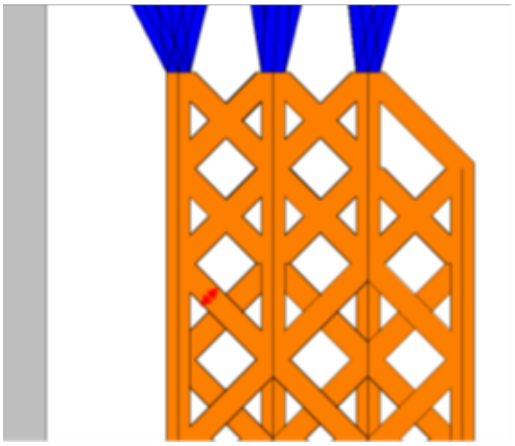
The following image illustrates *Diamond width*.



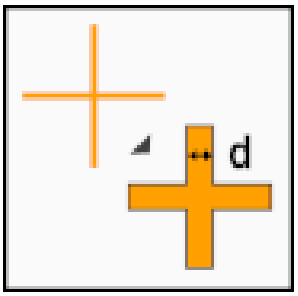
The following image illustrates *Diamond angle*.



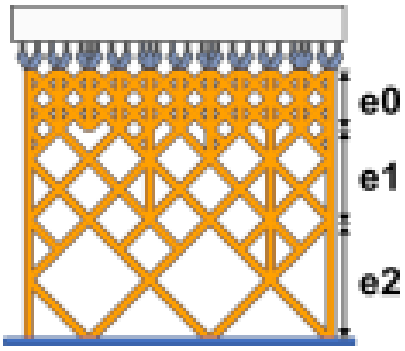
The following image illustrates *Edge width*.



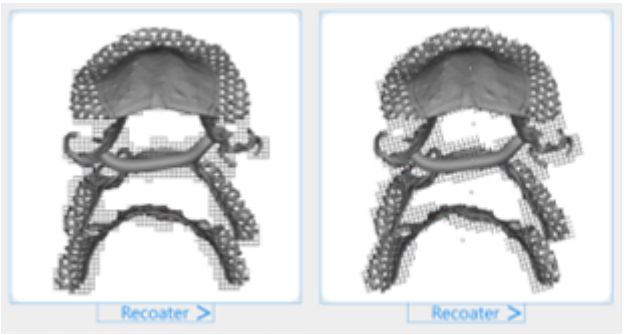
The following image illustrates *Edge thickness*.



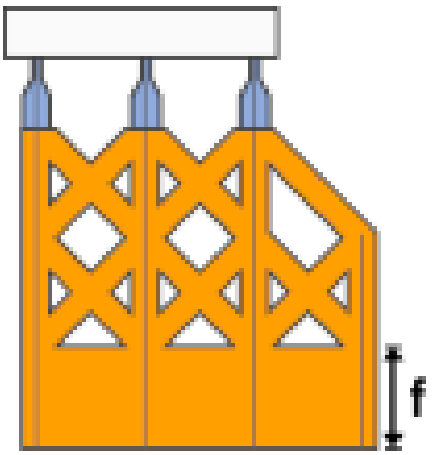
The following image illustrates *Inner* and *Outer grid reduction level*.



The following image illustrates *Rotation around Z-axis*.



The following image illustrates *Foundation height*.



6.8.5.6 Slicing parameters

Parameter	Unit	Description
Slice thickness	mm	Thickness of the layer the machine will use during the build.

6.8.6 Block supports

For information on block supports, refer to the Magics user manual.

7 Prepare Platform

Go to this step in Getting Started

Prepare Platform processes parts and places them on the platform according to your selected parameter profile.

Prepare Platform includes the following options:

- Select a parameter profile for print jobs.
- Determine which parameters in the profile apply to which parts by either automatic classification or manual classification of certain parts as either crown, bridge, partial or processed.
- Manually determine the build orientation of certain parts.
- Manually determine the placement of certain parts on the platform.

7.1 Profile

A profile stores all parameters that determine how parts are processed and applies to every part on the platform. In the Prepare Platform dialog, you can select the profile that you want to use for a print job. This can be the default profile or a custom profile that you created in the Profile Editor.

7.2 Configuration

The parameters under configuration apply to each part individually. *Classification* determines which of the parameters determined by the profile are applied to which individual part. *Build Orientation* determines whether the Dental Module orients the part. *Placement* determines whether and in what way the Dental Module places the part on the platform.

7.2.1 Classification

This parameter determines which parameters determined by the profile are applied to a part. For most applications, you can leave it as *Automatic*. You can also classify parts manually, e.g. if the automatic classification fails.

Parameter	Description
Automatic	The Dental Module automatically detects whether the part should be classified as crown, bridge or partial.
Crown	The part is processed according to the parameters for crowns as specified in the profile.
Bridge	The part is processed according to the parameters for bridges as specified in the profile.
Partial	The part is processed according to the parameters for partials as specified in the profile.
Processed Part	The part is considered fully prepared and not modified in any way. It is placed on the platform according to the option selected in *Placement*.

7.2.2 Build Orientation

This parameter determines whether the Dental Module will orient the part.

Parameter	Description
Calculate	The Dental Module automatically determines the optimal print orientation of the part. It detects the occlusal surface of crowns and bridges and orients them accordingly. It also detects technical areas such as screw channels and orients them perpendicular to the platform. Partial frameworks are automatically aligned and oriented in the build direction.
As given	The Dental Module does not orient the part and keeps the given part orientation.

7.2.3 Placement

This parameter determines whether and in what way the Dental Module will place the part on the platform. If you do not want a part to be rotated, select *Translation only*. If you want to keep a part in its exact position, select *Fixed Position*.

Parameter	Description
Translation & Rotation	The Dental Module moves and rotates the part around the z-axis freely to find the optimal position.
Translation only	The Dental Module does not rotate the part. It still moves the part to find the optimal position given its current angle.
Fixed Position	The Dental Module neither moves nor rotates the part.

The Dental Module automatically adapts the placement behavior to the scan field configuration of the selected machine to avoid an unwanted change of the laser during the production of a part. For further information refer to *6.7.1 Automatic placement according to scan field configuration*

8 Approve Platform

Go to this step in Getting Started

Approve Platform automates a number of operations that are often performed before creating a build job. Using Approve Platform is optional.

Approve Platform performs the following operations:

- Remove all parts that are not completely on the platform.
- Save platform in time-stamped subfolder of output folder.
- Generate approval report and save it in time-stamped subfolder of output folder.
- (Optional) Group parts and their supports by type.
- (Optional) Move all STL data of the parts on the platform from input folder to time-stamped subfolder of output folder.

8.1 Group parts by application type

Each part has been classified as either crown, bridge, or partial during Prepare Platform. The Build Processor can use this meta information to group parts by their type. This enables you to assign build strategies in the Build Processor once per part type rather than assigning a build strategy to each part one by one.

To group parts by their type and pass information about part types to the Build Processor, the *Group parts by application type* option must be enabled.

Not all Build Processors support grouping parts. Refer to your Build Processor's user manual for further information.

8.2 File input and output

For each platform approval process you must specify an output folder for part and processing data to be stored. If you want the Dental Module to keep track of which files were processed, you must also specify an input folder.

8.2.1 Input folder

If *Move part files from input folder* is enabled, the Dental Module moves the files of parts on the platform to the output folder. You must specify an *Input folder*. All part files must be stored in the same input folder.

8.2.2 Output folder

The Dental Module stores all output data in a time-stamped folder. The location of this folder is determined by the *Output folder* option. A new folder is created every time the Dental Module is run. The following data are stored in this subfolder:

- *SourceData* subfolder containing STL files of the parts present on approved platform (if *Move part files from input folder* is enabled)
- Approval report
- platform.MATAMX file

- platform-top_down.PNG file, a view of the platform in Magics from the top where each part is allocated a unique number. This image is also part of the approval report.
- platform-bottom_up.PNG file, a view of the platform in Magics from the bottom, showing contact points of supports.
- Log files

9 Logging and reporting

The Dental Module offers the following logging and reporting:

- Log files
- Approval report

9.1 Logging functionality

The Dental Module stores technical information about the preparation and approval processes in log files. The log files are stored in time-stamped folders. The Dental Module creates a new folder with the current timestamp for every prepared and approved platform. Should you encounter problems with the Dental Module, the Materialise support team may ask you to provide them with these log files.

9.1.1 Platform preparation log files

Log files created during platform preparation are stored as text files in the *AppData* directory. The time stamped folder is created at the following location:

C:\Users\your_username\AppData\Local\Materialise\DentalPlugin\DentalEngineData\out\

The *AppData* directory is hidden by default. To access it, enable the *Hidden items* option in the *View* ribbon of the Windows Explorer.

9.1.2 Platform approval log files

Log files created during platform approval are stored as text files in the output folder specified in Approve Platform.

9.2 Approval report

The approval report and all accompanying data are stored in the output folder. The approval report is stored in HTML and PDF format and can be displayed using any browser or PDF reader.

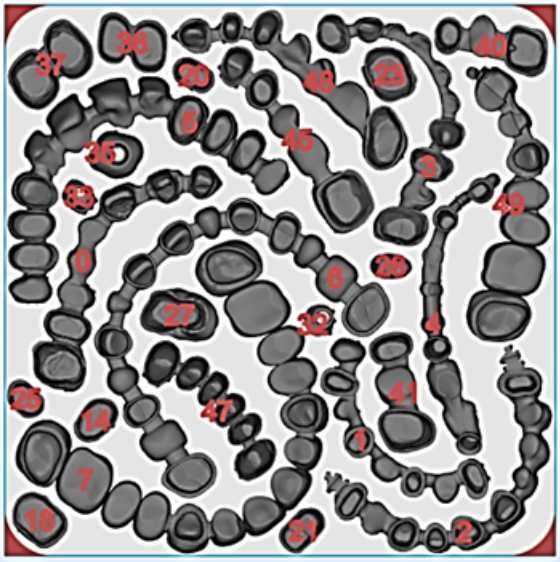
The approval report contains the following information:

- Approval date
- Machine
- Count of tooth units for crowns and bridges
- Platform height
- Dental Module version
- Top view of the platform where each part has a unique number
- Nesting density
- List of all approved parts showing number, part name, and part type

The following is an example of an approval report:

Materialise Dental Module - Platform Overview

Approval date:	20210224-192525
Machine:	Materialise LM Machine
Number of objects (units):	27 (127)
Height:	21.230 mm
Dental Module Version:	0.57.1



Nesting density: 56.2 %

Number of nested units: 127

Number	Part Name	Part Type
0	bridge_cm_08u_8006_1	BRIDGE
1	bridge_cm_08u_8007_1	BRIDGE
2	bridge_cm_10u_A001_1	BRIDGE

10 Contact and Technical Support

We want you to have a smooth user experience when working with the Materialise Magics Dental Module. If you do encounter any error, please always try to save your work and restart your system first.

In urgent cases you can contact our Technical Support for Maintenance Customers via e-mail.

Contact e-mails:

Worldwide: software.support@materialise.be

Korea: software.support@materialise.co.kr

USA: software.support@materialise.com

Germany: software.support@materialise.de

UK: software.support@materialise.co.uk

Japan: support@materialise.co.jp

Asia-Pacific: software.support@materialise.com.my

China: software.support@materialise.com.cn