materialise
innovators you can count on

Standard Image Build Processor 3.0

User Guide

Rev. 002

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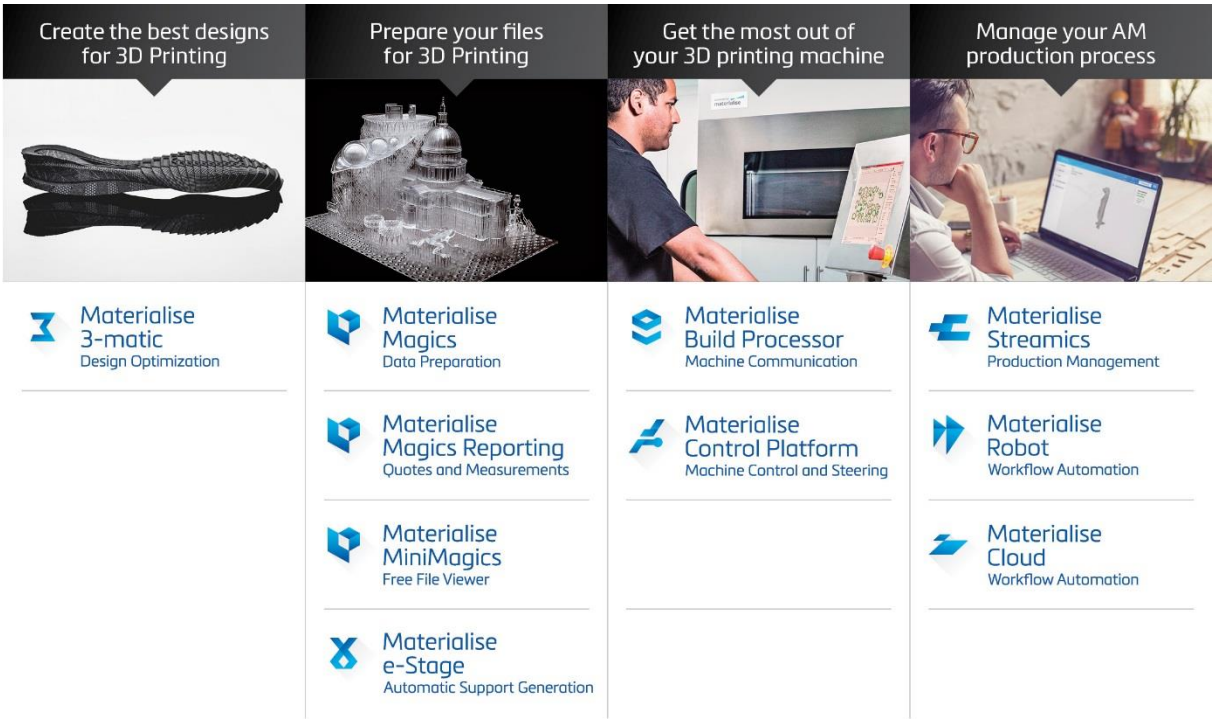
1 Introduction to Build Processors

Materialise works in close collaboration with image based 3D printer machine manufacturers to develop a customized and integrated solution, which allows you to get the most out of your image based machines and create parts with the highest quality possible. Our ***Build Processor Software*** can be considered as an advanced export function that bridges the gap between your digital build files and your image based 3D print machine, helping to ensure a smooth and trouble free production of parts both in R&D and production environments.

How the Build Processor connects with a Machine to the Materialise 3D Print Suite, is visualized below:

The complete Materialise 3D Print Suite includes the following components:



2 This User Guide

Will guide through all necessary steps in understanding:

- How to install and activate the Build Processor
- How to operate the Build Processor Manager
- How to handle the Build Processor from Magics
- How to setup the Build Processor processing profiles

And will also provide useful information on:

- How to setup your system for certain print technologies.
- Frequently asked questions
- Typical error messages
- How and where to request for support

In the guide these message boxes will indicate:

Technical Requirement

These boxes appear throughout this guide and describe a technical requirement to ensure that the build processor works correctly. If you are not sure on how to attend to these, please contact your IT department.

Warnings / Notifications

These boxes appear throughout this guide and emphasize various warnings or important notifications. Many of these are linked to some of the more frequently asked questions regarding the workings of the build processor.

3 Setup

3.1. Prerequisites

Before installing the Standard Image Build Processor

- Support

  It would be a great help if you could contact us in case you experience any unexpected software behavior. For all problems, questions or suggestions regarding the Standard Image Build Processor please contact your local Materialise office (see chapter 12: Support).

- Minimum System requirement

  - ✓ Windows® operating system version 7
  - ✓ Windows® operating system version 8
  - ✓ Windows® operating system version 10

- Software installation Packages

  - ✓ Materialise Magics software version 21
  - ✓ Standard Image Build Processor 3.0

- We hope you will enjoy the Standard Image Build processor in your image based 3D printing applications.

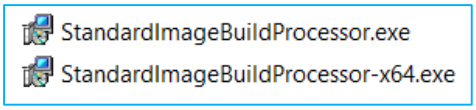
3.2. Installation

Technical Requirement

Please note that administrative rights are required to install the software.

Standard Image Build Processor

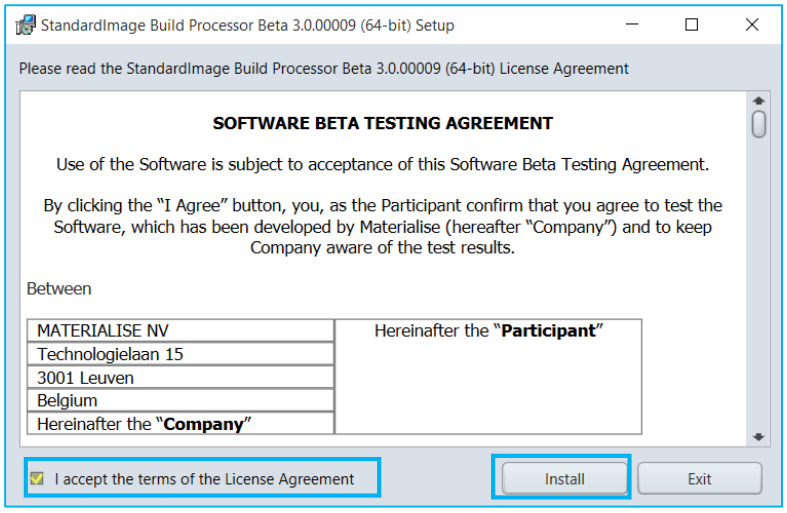
1. Double click the Standard Image Build Processor bundled installer (64- and 32-bit respectively):



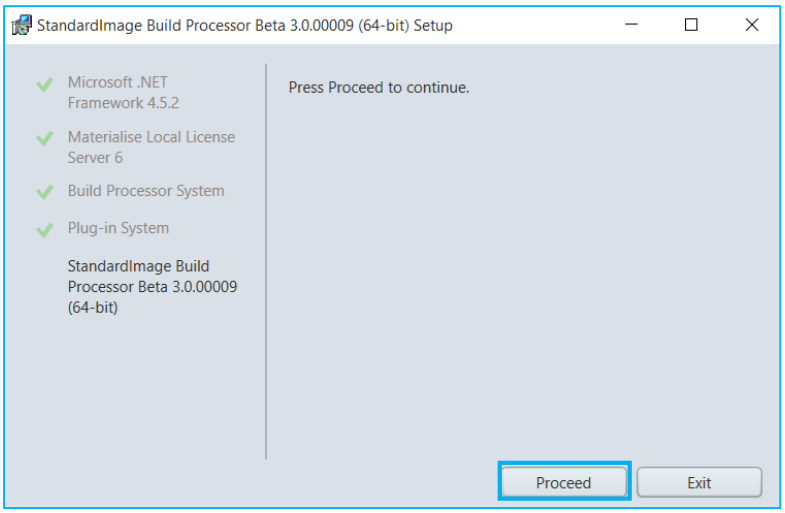
This is a 'bundled installer', meaning that it is responsible for installing all the different necessary components to run the Standard Image BP. These include:

- Microsoft® .NETFramework 4.5
- Materialise Local License Server 6.0
- Build Processor System 1.7
- Standard Image Build Processor 3.0

2. Read the license agreement, accept it and hit "Install":



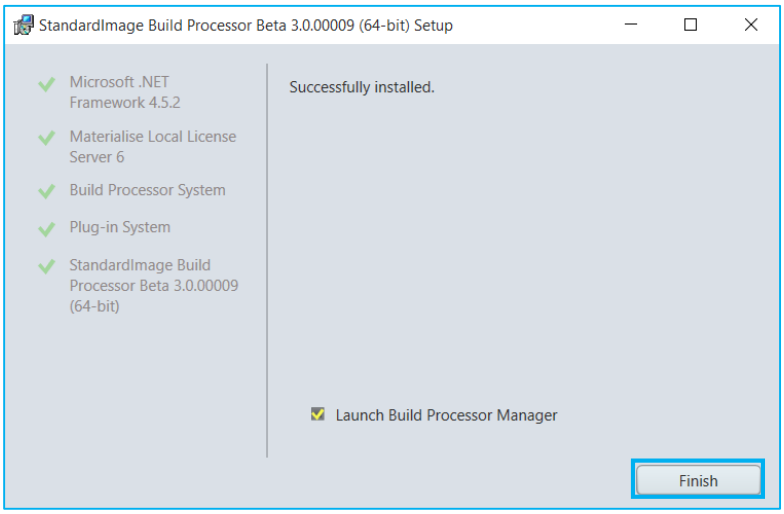
3. The following screen will appear, informing you about the components that are already installed on your system and those that will be installed during this installation. In the following dialog hit "Proceed":



 indicates that the component is (already) installed on your system.

When no such icon preceeds the component name, it means that it will be installed upon clicking *Proceed*

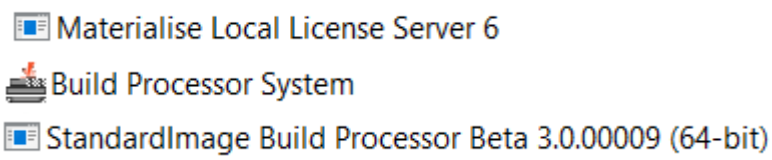
4. The Build Processor System, Standard Image BP and other components will be installed or updated. A final screen will appear showing you the overall result of the installation process. Pressing the “Finish” button will close the installation window.



Technical Requirement

If prompted to reboot your system after installation, please do as such.

5. Before using the Standard Image BP, please verify that all components have been correctly installed by checking the Programs and Features list on your system:



Magics

Please refer to the Magics User guide for detailed installation instructions.

3.3. Licensing

For instructions on how to (re)active your Materialise software licenses, please consult:

http://software.materialise.com/frequently-asked-questions-materialise-software

Once the Materialise Magics software and the Standard Image Build Processor have been successfully installed, you will need to license it. The Standard Image BP performs a license check when:

- Processing and uploading a job
- Calling BP functions from within Materialise Magics or Streamics software

You can either license your software locally or use a floating license server to supply a license for you. This section will quickly describe these two different models of licensing.

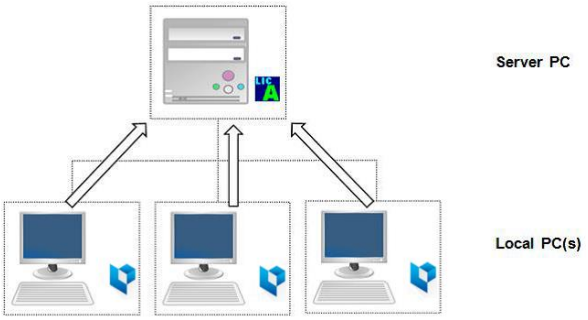
Working with a Local License

Local Licensing is the traditional system with the license stored locally on each computer (see figure below). The software can only be used on the computer for which the license is issued. However, more than one session of Materialise Magics software & Build Processor can be opened on a single computer.

Working with a Floating License

The licenses for Floating Licensing are stored on a central computer somewhere on the company network (Server PC). This computer has the Materialise Floating License Server installed to manage all the licenses available on the network.

When a session of Materialise Magics software and Build Processor is started on a computer, the software will contact the Floating License Server via the network. When there is a license available, the Floating License Server will assign a license to Materialise Magics software & Build Processor allowing it to open.



However, if all licenses are in use, Materialise Magics software & Build Processor will not open. The user must wait until elsewhere on the network an open session closes, thus making a license available.

You can install Materialise Magics software & Build Processor on every PC connected to the company network, but the number of open sessions is limited by the number of floating licenses available.

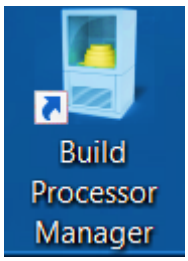
4 Build Processor Management

4.1. Access the Build Processor Manager

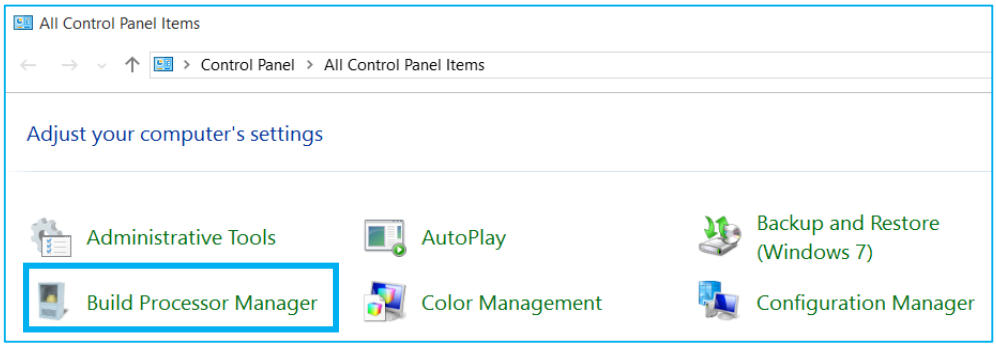
The Build Processor Manager is the main application for managing and configuring your 3D printers and their settings and profiles.

Therefore, you need to navigate to the **Build Processor Manager**, which you can find

as a desktop shortcut icon:



by going to your Windows® operating system *Control Panel* and clicking on Build Processor Manager

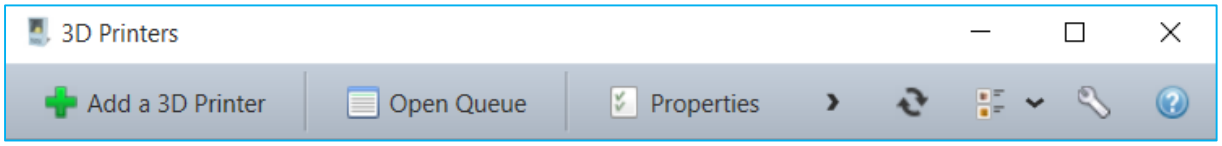


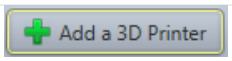
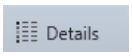
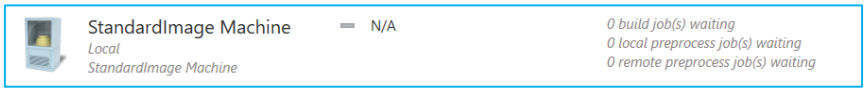
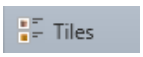
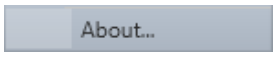
by double clicking the tray icon in the right of your taskbar

Note

Depending on your Windows® operating system settings, this icon might not be permanently visible and hidden behind the arrow shown in the screenshot above.

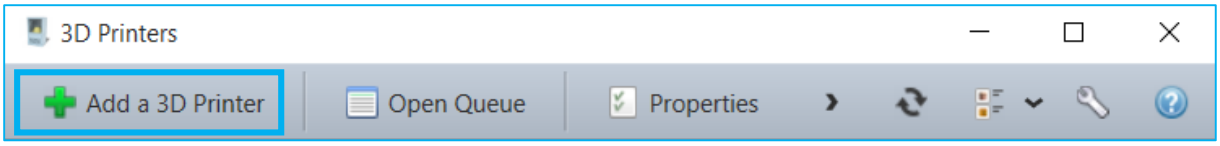
This BP Manager Toolbar contains the following control buttons:



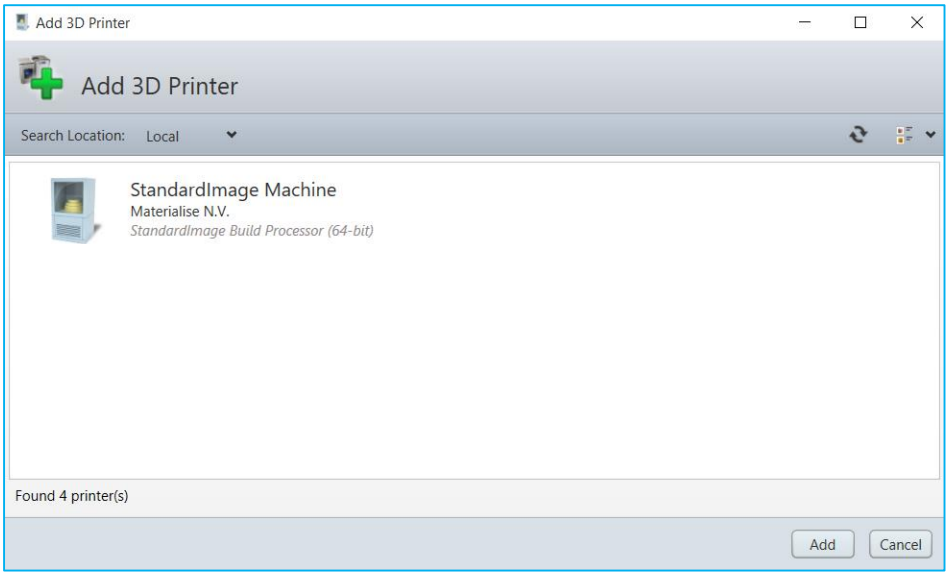
	This button is used to add a new 3D printer (local or network) to your system
	Refresh the list of installed printers.
	Change the way in which the printers are shown in the Build Processor Manager.  Shows all added printers in a list. Printers can be sorted by *Name, Status, Queue Status, Build Jobs, Description, Printer Location, Manufacturer, Model and Network Location* by left clicking the according entry in the menu bar.  Combination of *Details* and *Tiles* option:  StandardImage Machine — N/A Local StandardImage Machine 0 build job(s) waiting 0 local preprocess job(s) waiting 0 remote preprocess job(s) waiting An icon and information regarding the printer is shown but without sorting option.  Default alignment of all added printers. Printers are shown as separate big icons including their *Name*, *Printer Location* and *Status*.
	Open the Build Processor System options window
	Opens a menu selection:  Troubleshooter... Generate a report. This tool will assist you in collecting relevant information about the status of the BP System. No personal information is collected; you can verify the contents of the report by opening the generated Cabinet (.cab) file. Please see section 12.2: Create a Report File on page 85 for information on how to transfer the .cab file to Materialise. Provides access to the Standard Image BP User Guide  About... Opens new window containing information about the Build Processor system version and Copyright of Materialise.

4.2. Add a Local BP Machine

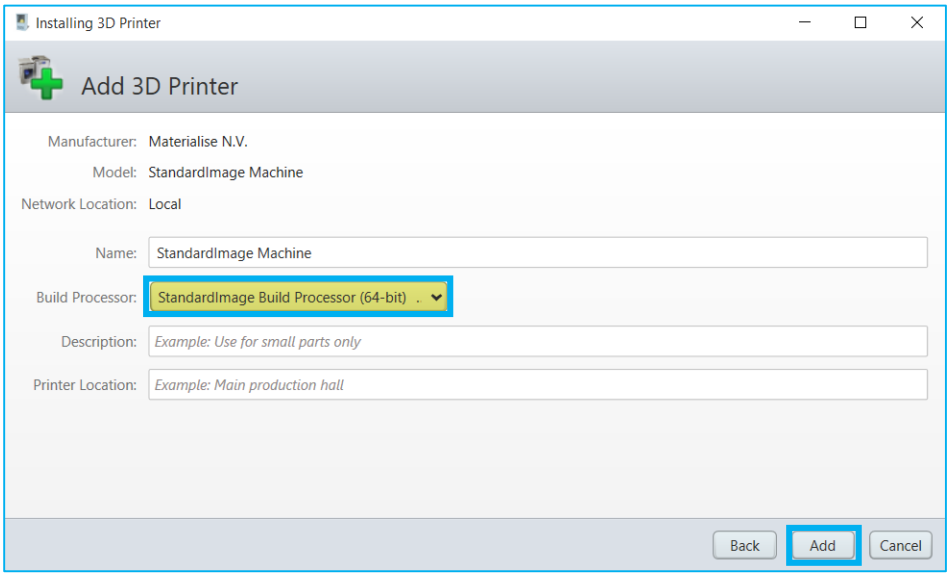
1. Open the Build Processor Manager. Click the “Add a 3D Printer” button in order to register a device in the System. When no machines have been installed yet, this button will also be visible in the center window region.



2. The following dialog will appear. Choose the machine type of which you want to register a new instance and hit the “Add”-Button:



3. A window will appear, allowing you to define your new printer properties. Please check if the correct version of the Standard Image BP is selected in the Build Processor dropdown menu.



Note

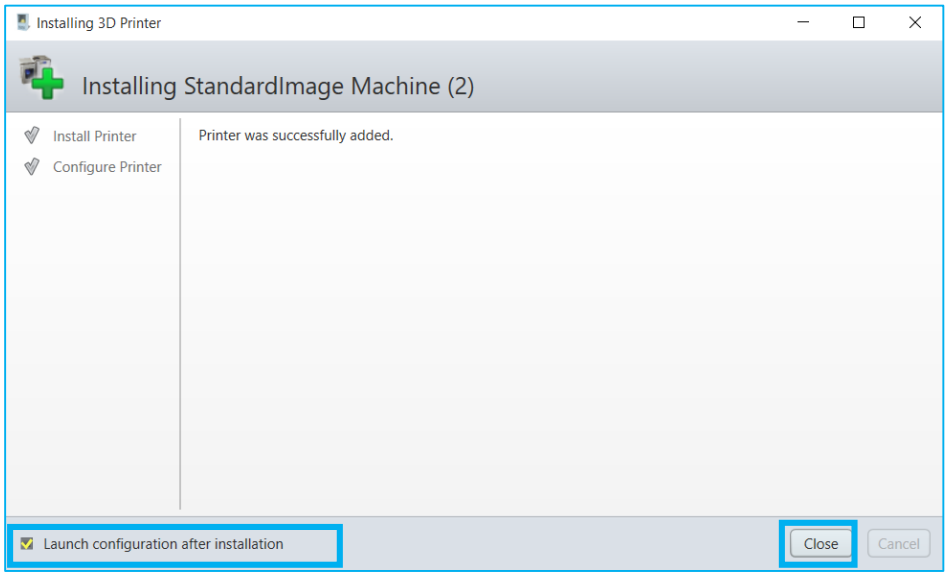
Most of the printer properties can always be changed afterwards, in the Printer Properties window.

The following printer properties can be set

Name	An appearance name for the printer
Build Processor	Select the appropriate Standard Image BP driver version
Description	A description of the printer's main functionality (optional)
Printer Location	A description of the printer's physical location (optional)

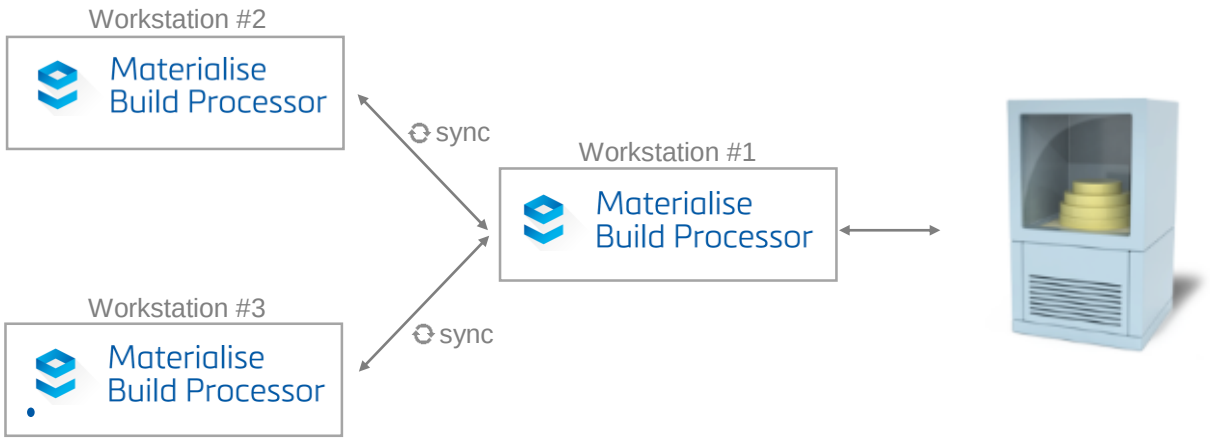
Click the "Add" button to proceed.

4. The "Launch configuration after install" option is enabled by default and will take you to Build Processor Configuration window after pressing the Close button.



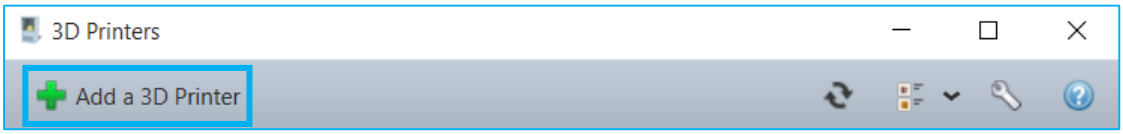
4.3. Add a Network BP Machine

With the Build Processor System, it is possible to work with network machines. This allows multiple users or workstations to connect to the same Build Processor machine, sharing and synchronizing its settings, profiles and job queues.



Adding a network Standard Image BP printer is similar to adding a Standard Image BP local printer. The only difference is the screen where you select your Standard Image BP printer:

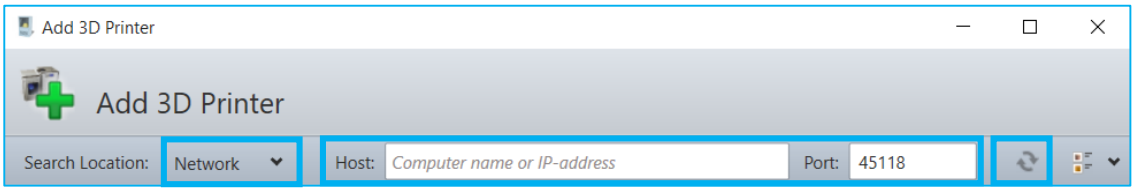
1. Open the Build Processor Manager (on Workstation #2 in the above diagram) and click the “Add a 3D Printer” button



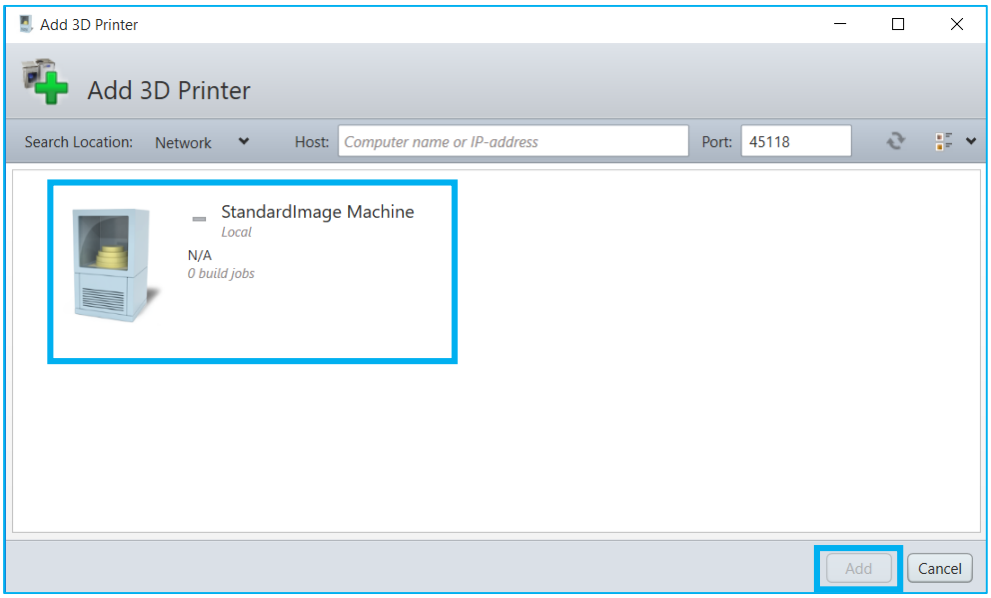
2. Pick Network from the search location drop-down list

3. In the Host entry field, enter the ‘Network Location’ of system which has the local printer installed (Workstation #1 in the above diagram). The name of this ‘Network Location’ can be found in the Printer Properties (see also section 4.6: Access the BP Machine Properties on page 20) window of the network printer. Next to this field you can define the port to be used for communication with the specified ‘Network Location’ – this is 45118 by default.

4. Press the refresh button to search for printers in this network location



5. Select the desired network printer(s) and click the Add button to proceed. Multiple printers can be selected (using CTRL) and added simultaneously

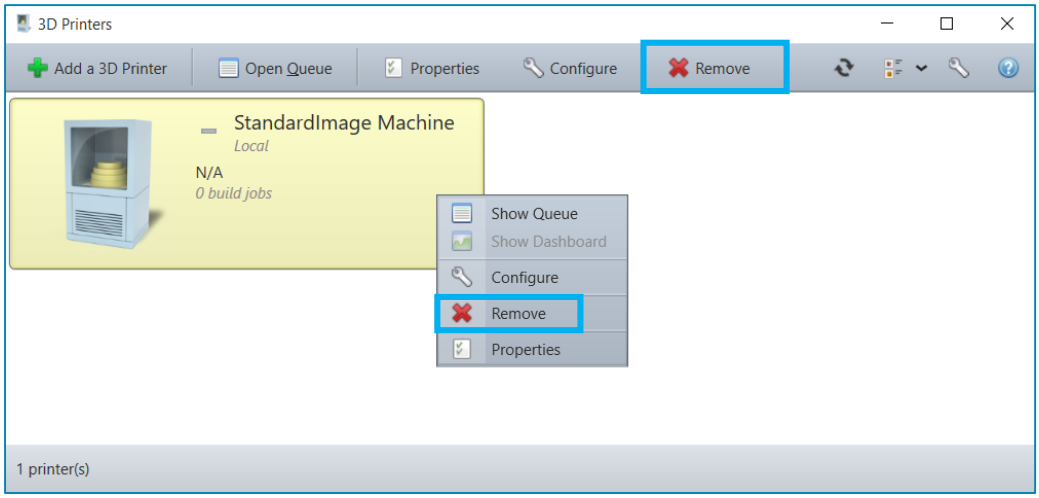


6. The following steps in the wizard are identical to step 3 onwards in section 4.2: Add a Local BP Machine on page 15.

4.4. Remove a BP Machine

In order to remove a machine, you can

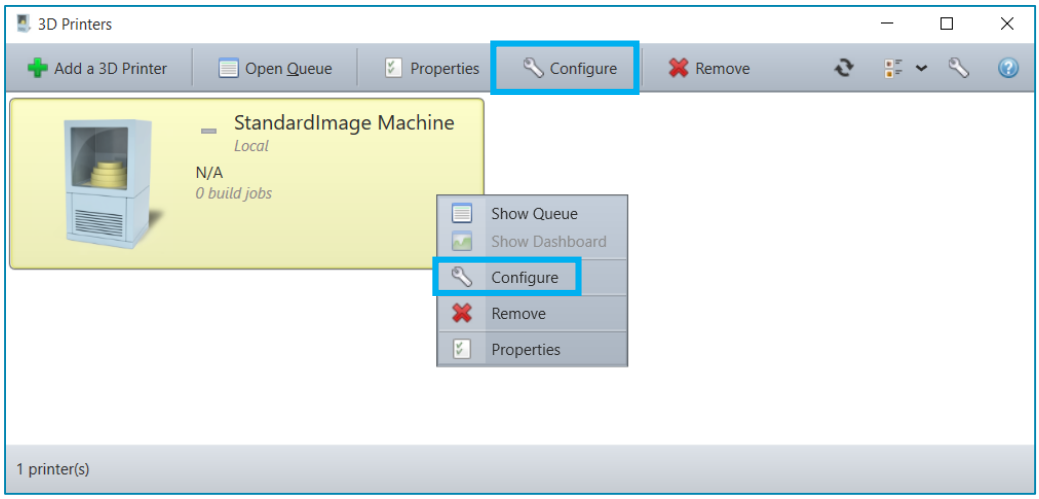
Select the printer you want to remove and click the “Remove” button in the BP Manager Toolbar
Right mouse click on the desired printer and select Remove



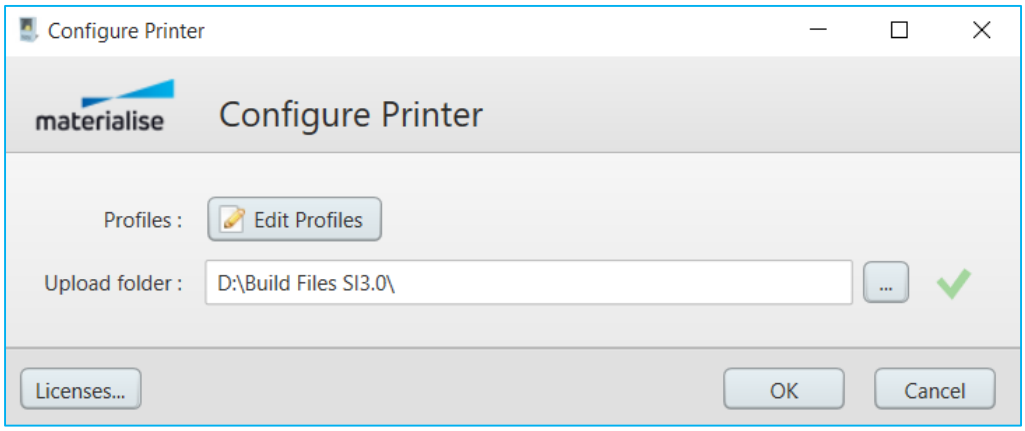
4.5. Configure a BP Machine

The Processor Configuration window can be accessed by either

Selecting the desired printer and clicking the Configure button
Right mouse click on the desired printer and selecting the Configure option



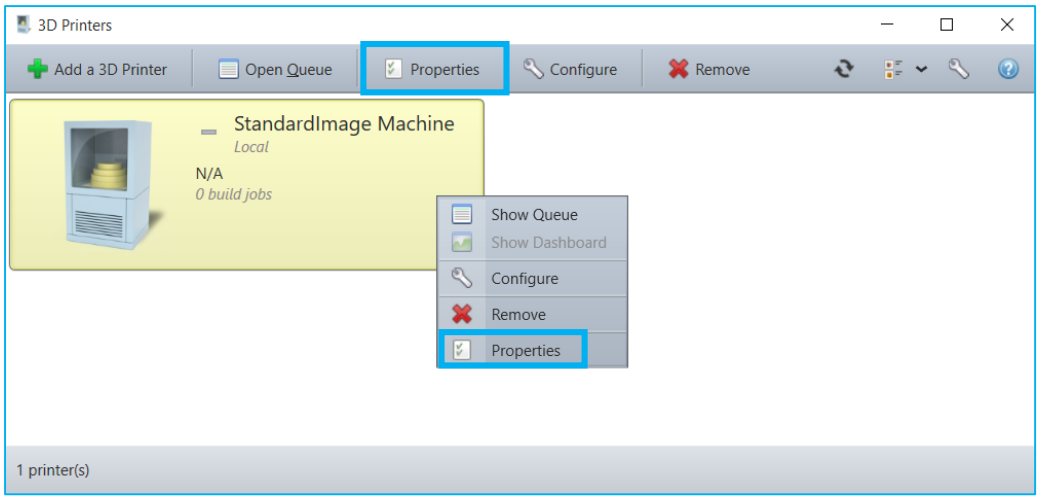
The Configure Printer window allows establishing a connection between the Standard Image BP and the Standard Image machine, as well as consulting the available profiles and parameters. More details can be found in chapter 5: Build Processor and Machine on page 24.



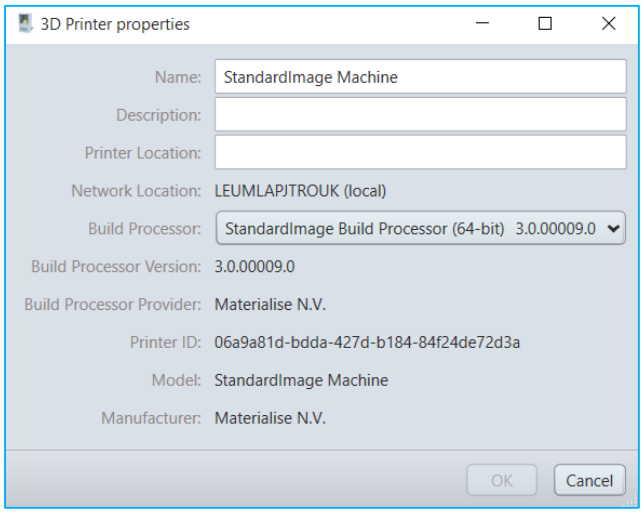
4.6. Access the BP Machine Properties

In order to enter the 3D Printer properties window, either

Select the desired printer and click the *Properties* button
Right mouse click on the desired printer and select the *Properties* option



The 3D Printer properties window contains all details of your Standard Image BP printer. The *Name*, *Description* and *Printer Location* field of the printer can be arbitrarily changed.

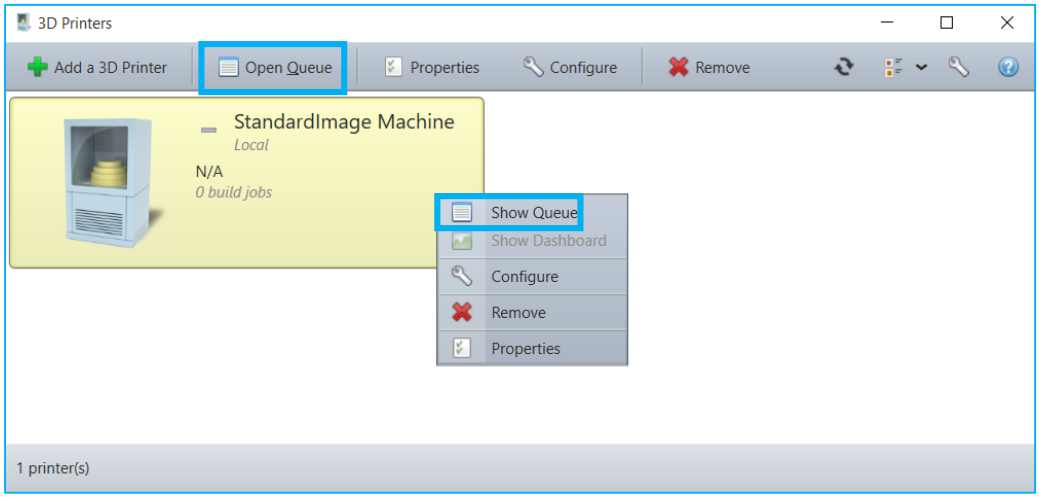


4.7. Access the BP Machine Job Queues

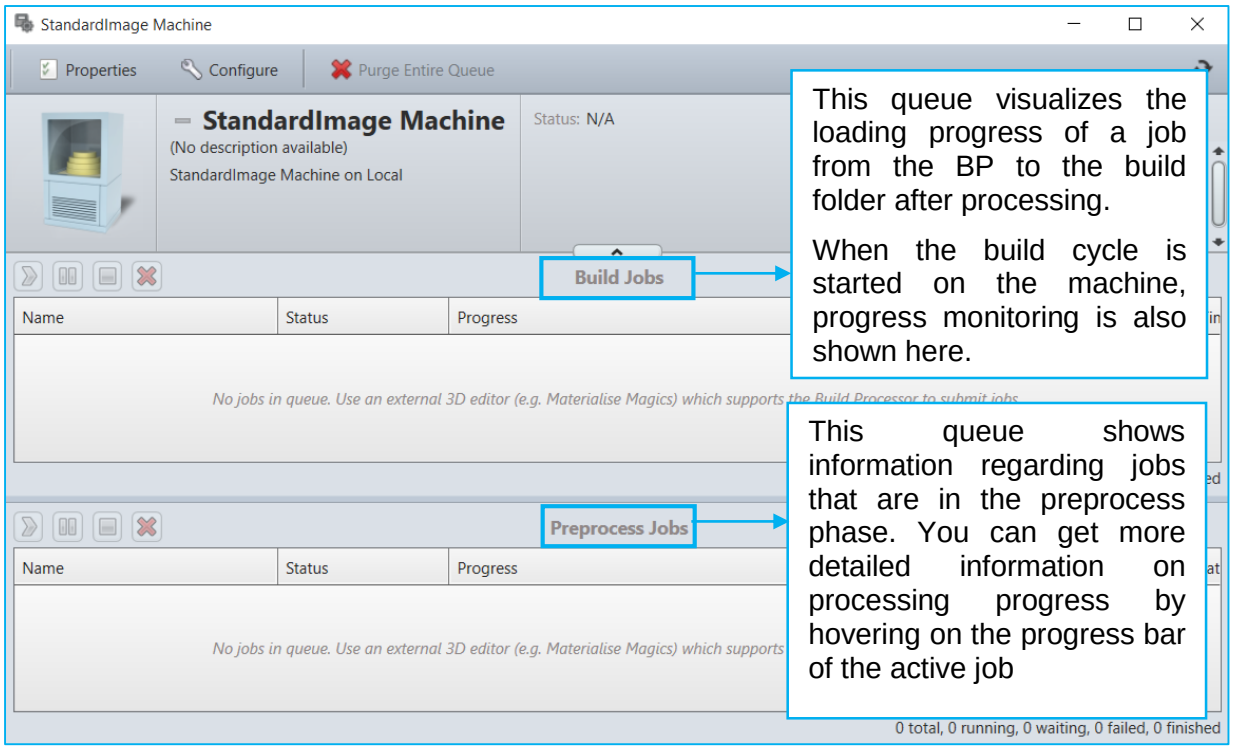
You can access the list of jobs associated with a given printer by either

Selecting the printer in the Build Processor Manager and then clicking **Open Queue** in the tool bar. The queue window will then show up
right mouse click on the desired printer and selecting the **Show Queue** option

double click on the desired printer



The 'Printer Queue' window gives an overview of all the jobs processed by the Standard Image BP Build Processor. There are two job queues: 'Preprocess Jobs' and 'Build Jobs'.



The columns of these job queues are customizable (through a right mouse click on the column headings) and can display different information for each job.

The right click options for each job are the following:

	*Start job*	(Re)start the job (after pausing)
	*Pause job*	Pause the job's current progress

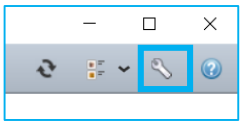
	Cancel job	Cancel the job's current progress
	Remove job	Delete job from the job queue, any relevant data from machine software side will remain intact.
	Remove job…	Forcibly — If a job hangs in *Cancelling* or *Deleting* state after asked to be removed (e.g. job owner is a remote client that is not available), this option removes the job regardless.
	Open Upload Folder	Open the folder where the processed job is sent to

Note that the Standard Image Build Processor has a 'passive role' once the job has been sent to the Standard Image machine. In other words: it does not have any influence on an active Standard Image build cycle. After uploading to the Standard Image Machine, only the corresponding BP job *entries* can be manipulated (not the actual job or build cycle on the Standard Image Machine).

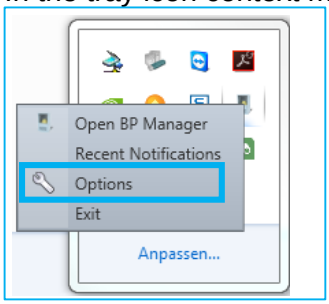
4.8. Change the BP System Storage Location

By default, the Build Processor System stores its configuration and temporary processing data in a specific directory located in the Windows® operating system partition. You may choose a different directory if you wish to. To do that, you need to bring up the options dialog first:

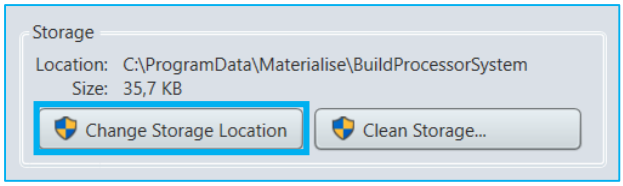
In the Build Processor Manager, click the tool icon:



In the tray icon context menu, select the entry *Options*:



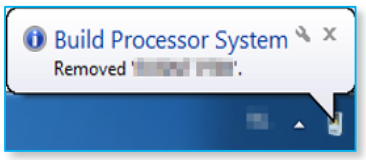
This will bring up the Options dialog. In that window, click *Change Storage Location*. A dialog will pop up, allowing you to change the Build Processor System storage location.

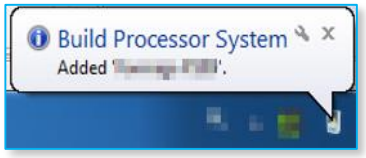


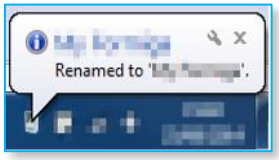
4.9. Configure Tray Notifications

Whenever the status of a build job or printer changes, you will be notified via tray callouts as shown below:

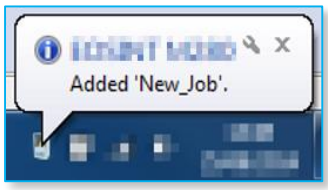
The Tray Icon is able to provide printer notifications:

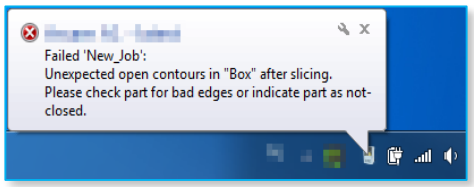


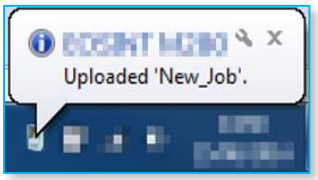




And job notifications:

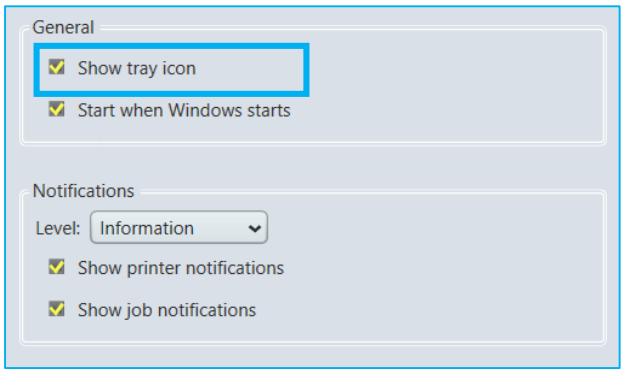






Clicking on these pop-up message will display the corresponding Build Processor window.

To configure the Tray Icon and its properties, go to the Build Processor System Options which is accessible via the BP Manager Toolbar via the right-click menu of the Tray Icon itself. See also section 4.8 on page 22 on how to enter the BP Options menu.



5 Build Processor and Machine

The Standard Image Build Processor is the component that bridges the gap between the Materialise Magics 3D print suite (including Magics and Streamics) and the machine. The architecture of this connection is illustrated below:

In the Build processor framework the machine representation is in most cases virtual and does not represent a real link with the machine however in some cases a real machine link can be present. In such a case the machine representation corresponds with a real machine and the build queue will represent the real progress on the machine.

Note

No uploading to a physical machine is envisioned in the Standard Image Build processor. Uploading a job to the machine/printer in the Standard Image build processor means moving the job from the preprocess to the build queue and copying the job folder/file to the upload directory specified in the Configure Printer dialog.

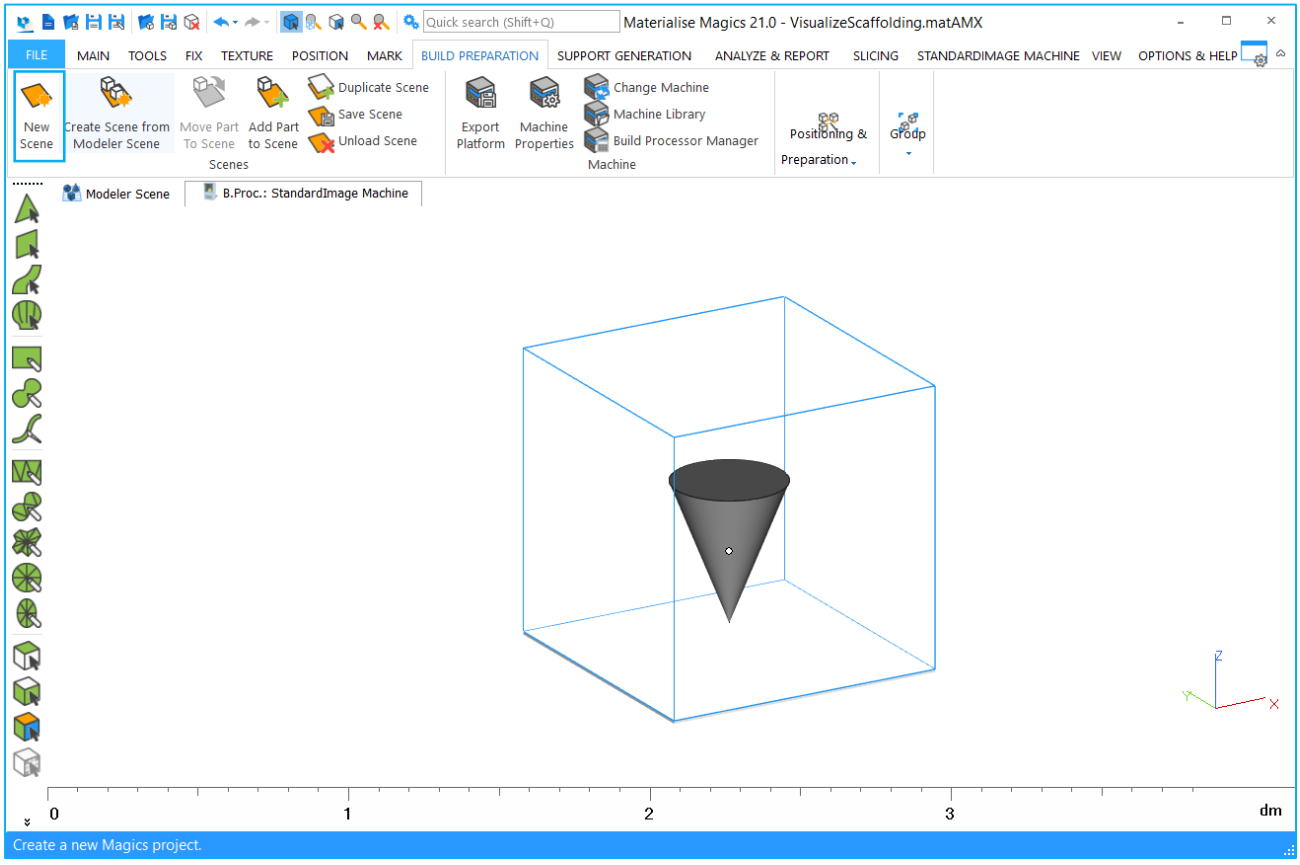
6 Build Processor and Magics

This section will guide you through a typical workflow, using the Materialise Magics software.

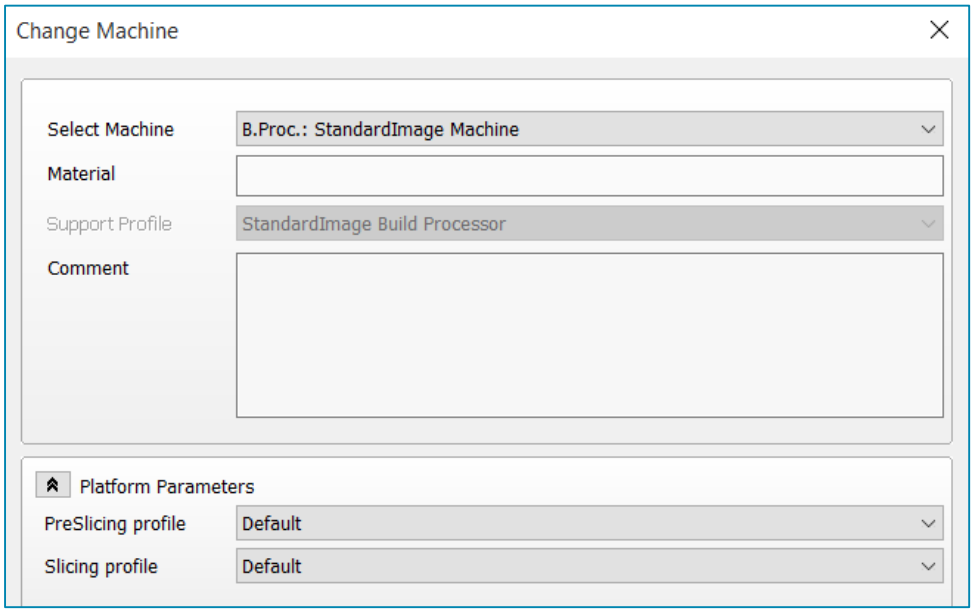
Note that it is required to have a Standard Image Build Processor Machine added (see Chapter 4 on page 13) and connected to the Standard Image Machine (see Chapter 5 on page 24) before proceeding.

6.1. Create a Standard Image machine scene

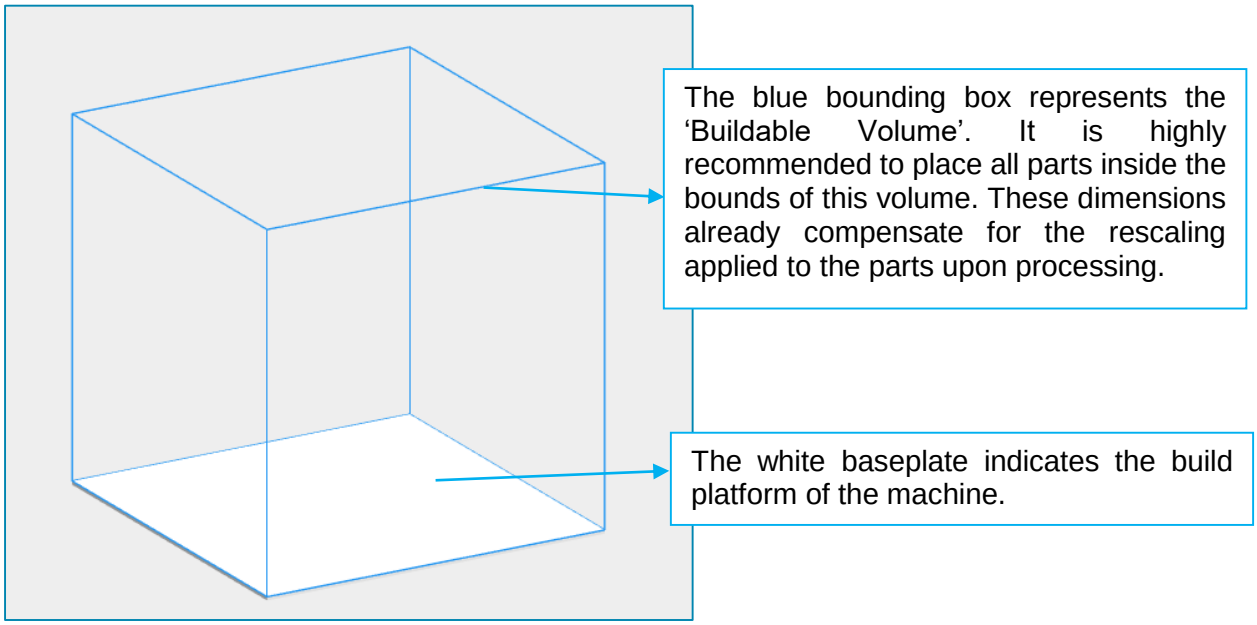
In Materialise Magics software, go to the Build Preparation toolbar and click New Scene.



A Change Machine dialog box will appear, where you can choose *B.Proc: Standard Image Machine Printer** to load a platform using your printer's Standard Image BP.



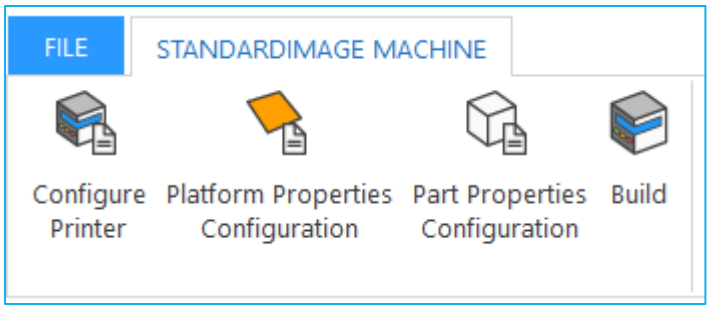
The platform will now appear in your Materialise Magics software workspace. Note that all platform sizes are automatically retrieved from the Standard Image Machine, and visualized as shown below:



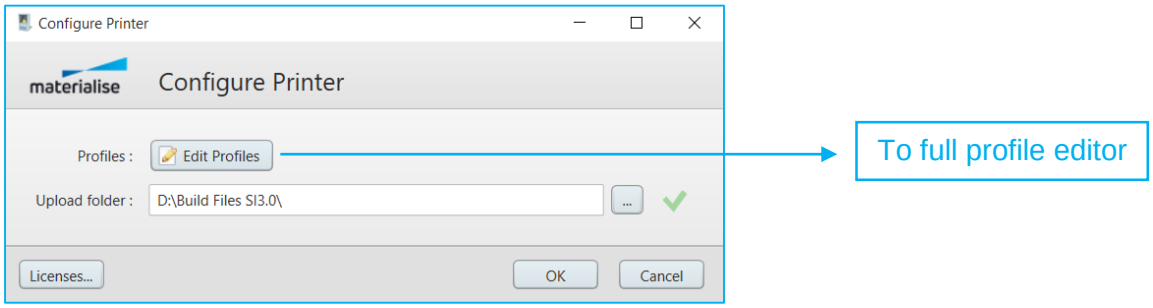
You can import, fix and orientate all necessary parts as you normally would, followed by the usual nesting operations.

6.2. The Standard Image Machine Toolbar

When working in a Standard Image BP scene in Magics, the toolbar shown below is made available:

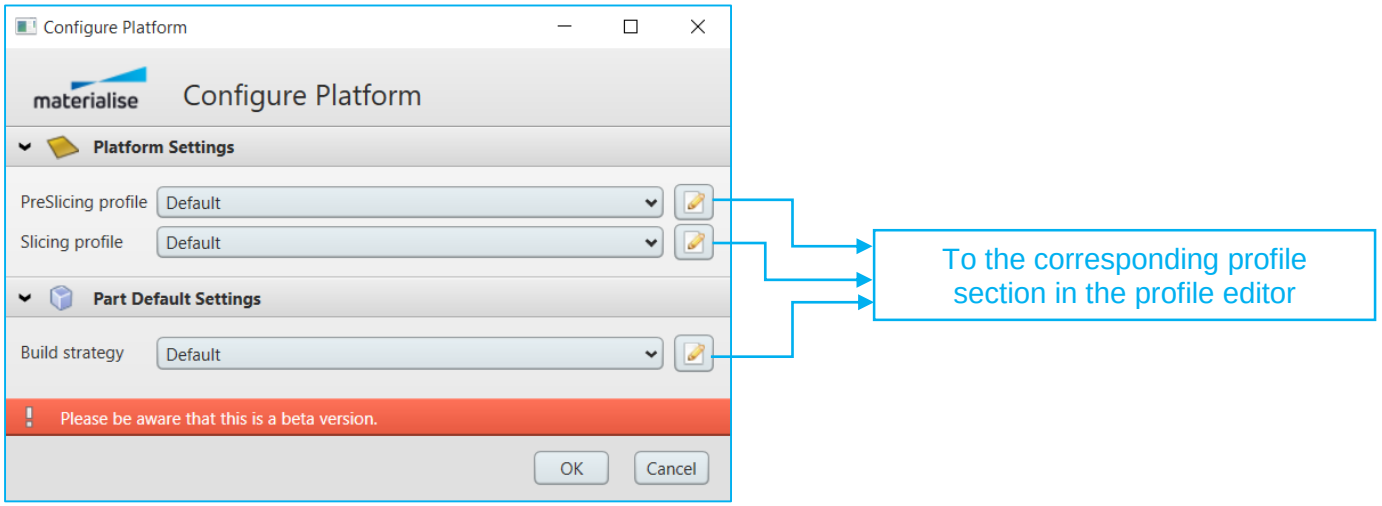


Configure Printer



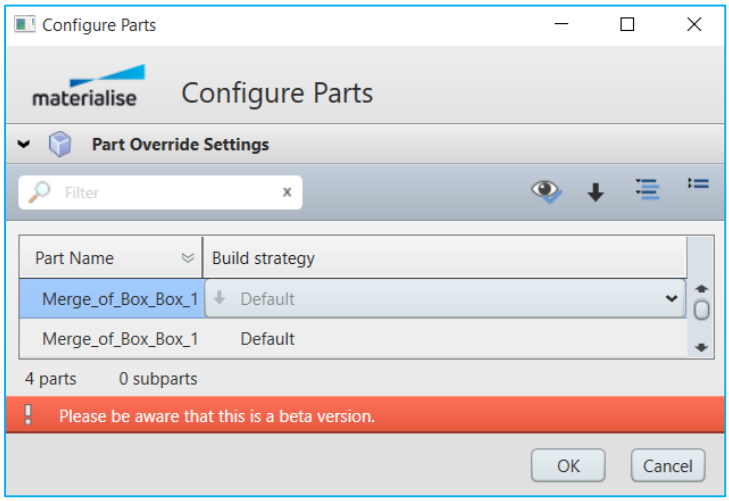
With the configure printer dialog you can navigate to the profile editor and the local license server. You can also assign an upload folder that will be used to store your build folder/file when a job is processed in 3D build mode

Configure Platform



Using the Configure Platform button, you can assign the Preslicing, Slicing and Build strategy profile to your current build platform. Note the available profiles and corresponding parameters are defined by the Standard Image Machine.

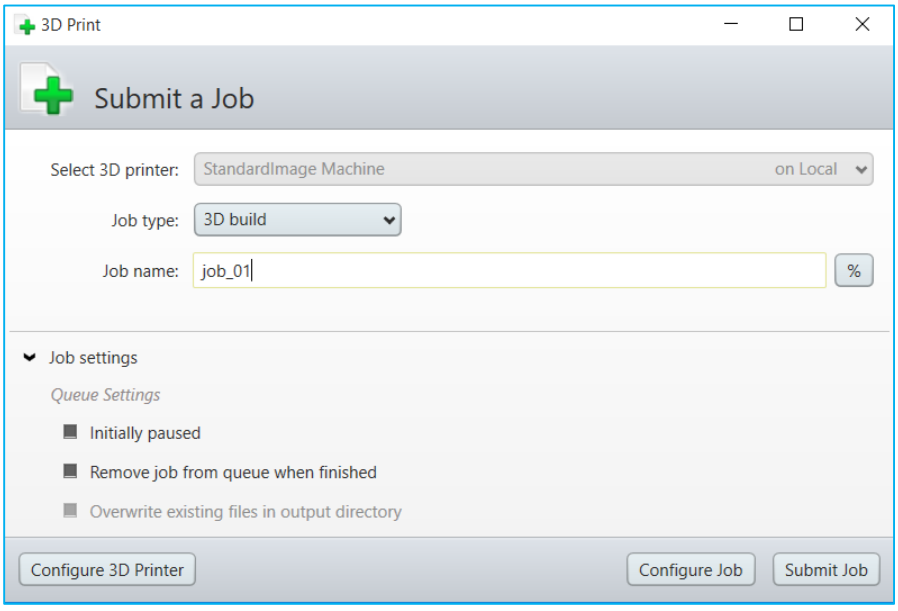
Configure Parts



This dialog provides the possibility to assign build strategy profiles to each part on the platform separately instead of assigning 1 build strategy for all parts on the platform.

Build

Use the 'Build' Button to launch the user interface for submitting a job from Magics to the Standard Image Build Processor (and subsequently the Standard Image Machine). You will be shown the following dialog:



This window allows you to set some general build settings, specific job settings and eventually submit your build job for further processing. The dialog consists of three different sections:

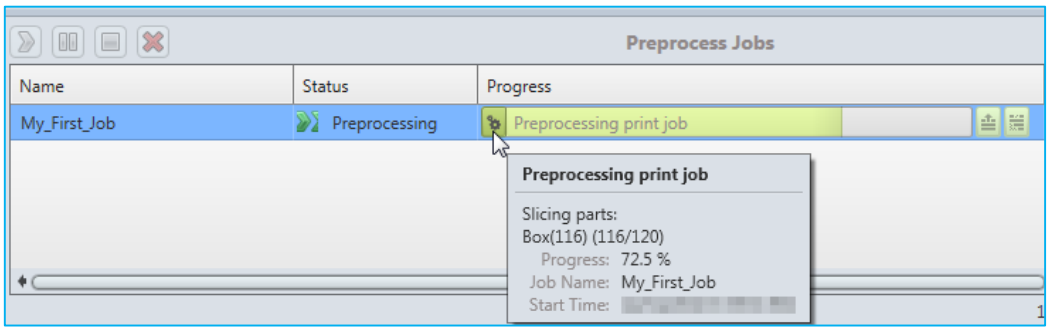
General build settings
Job settings
Control buttons

6.2.1.1 General build settings

Select 3D printer:		Shows the selected printer (typically limited to the one that was chosen when loading the platform)
Job type:	3D build	The build will be processed by the BP, followed by a job loading action directly to the Standard Image Machine (see section **Error! Reference source not found.** on page **Error! Bookmark not defined.**)
	Preprocess Only	Allows you to perform processing only and sending the output to a custom output folder rather than immediately to the Standard Image Machine.
Job name:		This name will be associated with this particular job throughout the rest of the workflow:
	%	This button allows adding tags to the job name (such as current date) which will be resolved upon job generation

6.2.1.1.1 Preprocess Mode

In preprocess mode the job will be processed and stored in location defined in the submit job dialog. The progress of translating the input build platform to a job folder/file is shown in the 'Preprocess Jobs' queue of the corresponding Standard Image Build Processor machine:

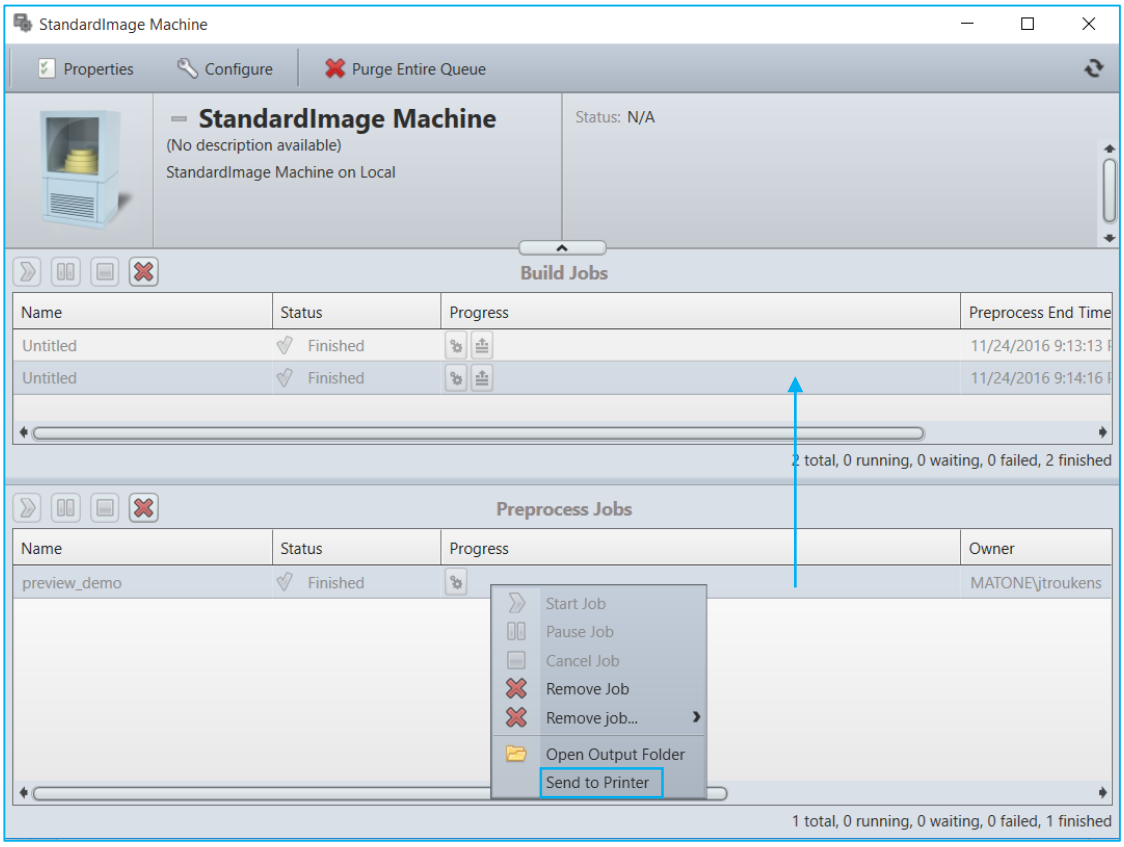


6.2.1.1.2 Build mode - Load to Machine

Once the job file has been calculated, it can be sent from the BP directly to the Standard Image Machine. This can be done via:

- The 'Send to Printer' option in the right click context menu of the 'Preprocess Job' entry
- Automatically in case the default '3D Print' job type has been chosen in the Submit Job window – job settings

This will promote the job entry from the 'Preprocess Jobs' queue to the 'Build Jobs' queue, where the Load and Monitor interaction with the Standard Image Machine is initiated



6.2.1.2 *Job settings*

The visibility of this menu can be toggled by clicking the ⌄ arrow button. It is hidden by default. These advanced settings allow adjust the way in which the BP starts or ends the processing operation of the job (eg: pause initially or remove after completion).

Control buttons

Configure 3D Printer — Window for the currently selected printer

Configure Job — Open a window that provides an overview of the current job configuration. It is still possible at this point to change these settings if necessary.

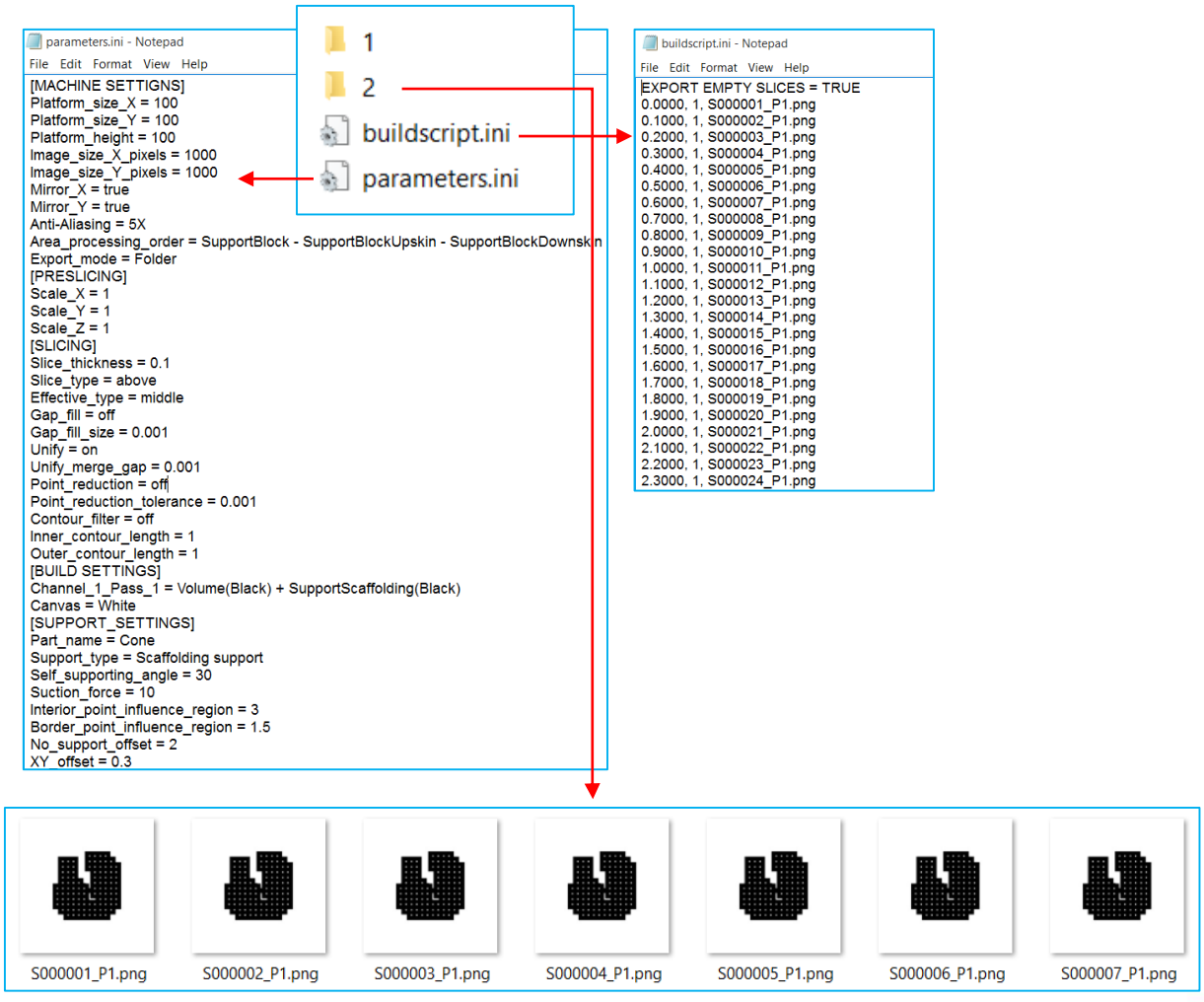
> **Note**
>
> Any changes made at this point will be taken into account when submitting the job, but will not be saved back to the Materialise Magics software session.

Submit Job — Submit the job to the Build Processor for processing and loading to the machine. A message will appear informing whether the job was successfully sent

6.2.1.3 The Build Output

The following folders and files are generated by the BP after successfully pre-processing the job.

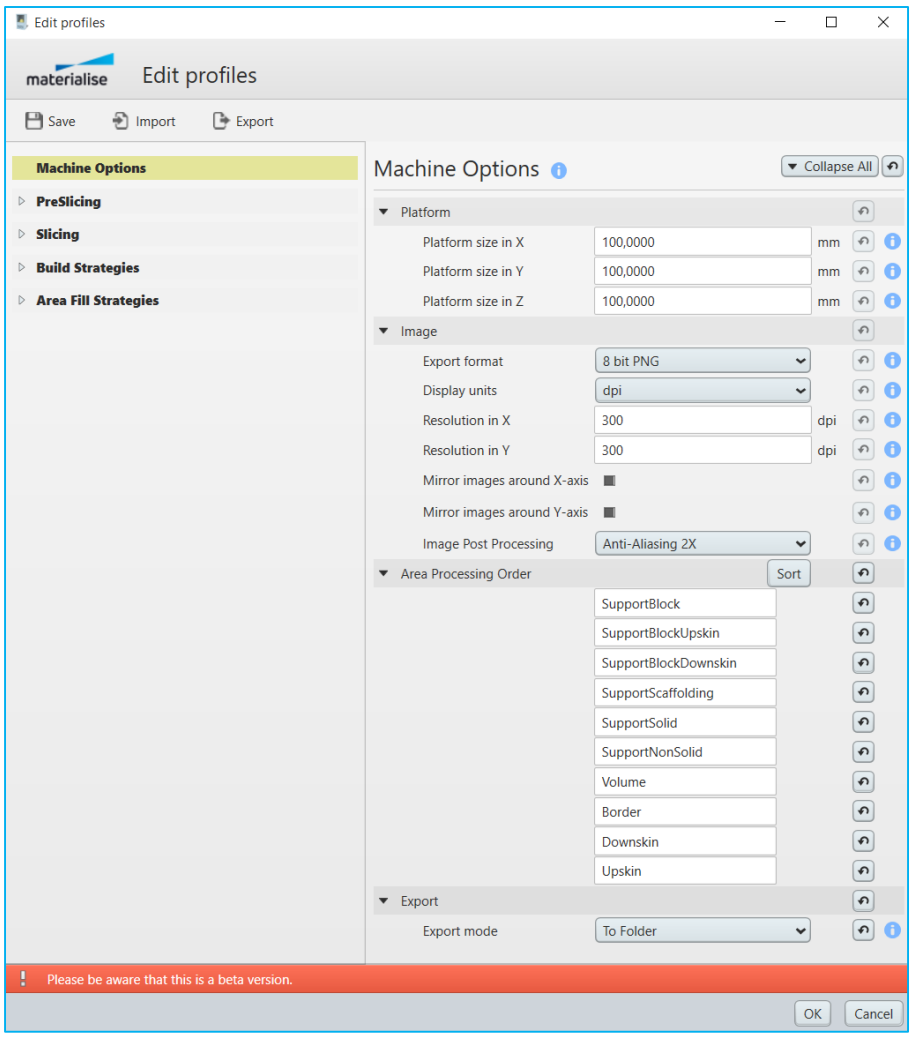
Job folder/file	Folder or zip file that holds all necessary files to build a part on an image based machine.
Channel folders	Folders that hold all images designated to a certain output channel
Image files	The image files that will drive the image device or the post processor for a channel/pass.
Parameter.ini	Summary of all settings used to process the input platform
Buildscript.ini	File describing which images need to be processed on which layer height and which pass.



7 Build Processor Setup - Profile Editor

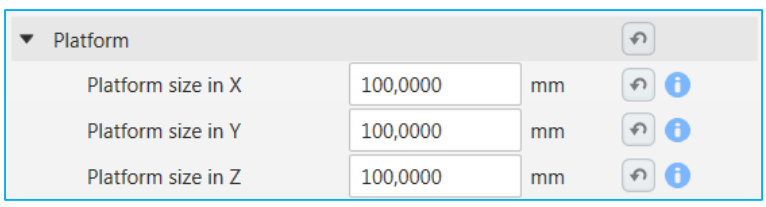
7.1. Machine Options

The machine options section groups all settings that are specific for a specific 3D printing machine. This section does not have profiles.



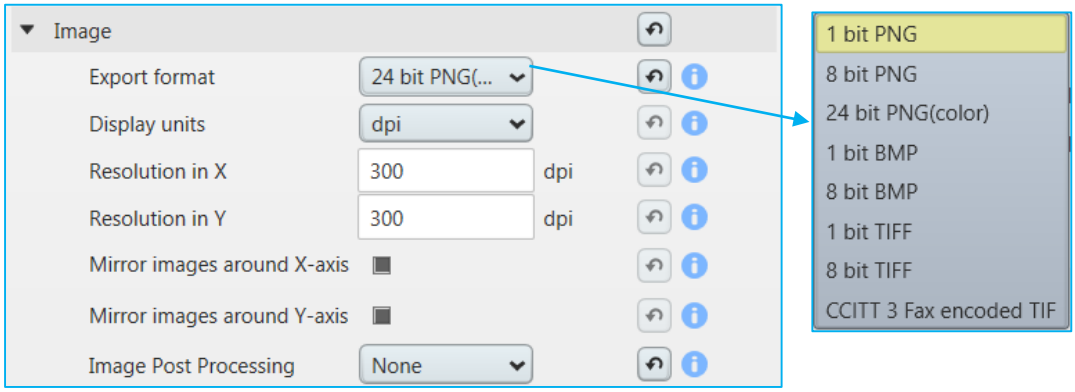
Platform

Under the platform section in the parameter list you can define the size of the build platform that you want to use for the machine you want to setup. When loading the machine scene in Magics a platform with the defined size will be visualized. The range in X, Y & Z is between 1-2000 mm.



Image

Under image section in the parameter list you can define all image related settings.



Export format

Dropdown that defines the image format of the exported images. Following image formats are supported:

1 & 8 & 24 bit PNG
1 & 8 bit BMP
1 & 8 bit TIFF
CCITT 3 Fax encoded TIF

Display Units

Drop down to select the method to define the image size you want to export. There are 2 options:

Pixels: Define image size with pixels
DPI: Define image size with resolution and platform size

Mirror images around X & Y axis

Checkbox to select if the export images need to be mirrored over the X centerline and/or Y centerline

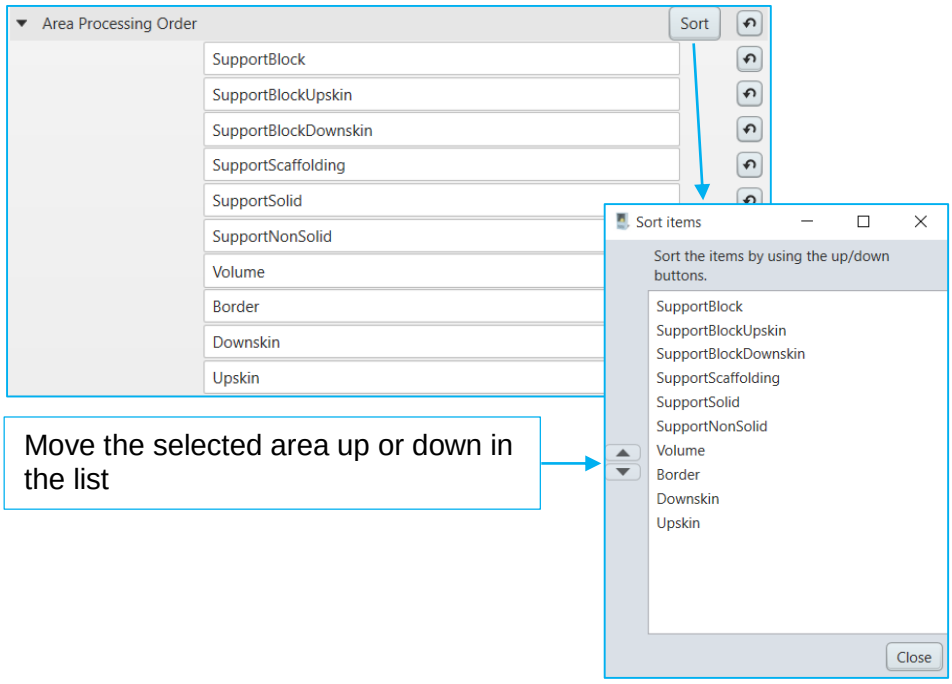
Image Post processing

With the image post processing dropdown you can define which post processing you want to execute on the image before exporting. Currently we have 5 options:

None
2X anti-aliasing
3X anti-aliasing
4X anti-aliasing
5X anti-aliasing

Area processing order

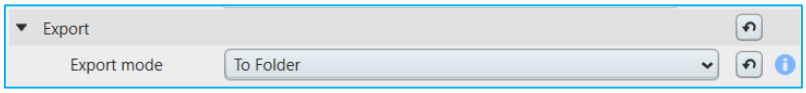
Under area processing order section in the parameter list you can define in which order the calculations are done in terms of generating independent areas during slicing. With the order button you can open a dialog that allows you to change the calculation order of the areas.



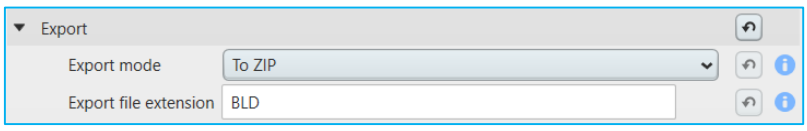
Export

Under the export section of the parameter list you can define in which form you want to export images together with the buildscript.ini and parameter.ini files. There are 3 options:

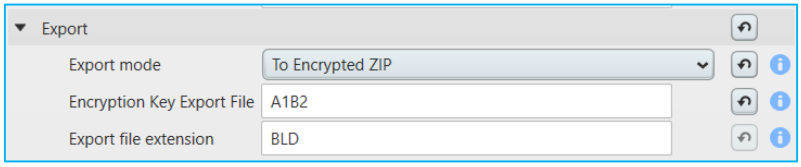
To Folder Export the image to a build folder *jobname_date_time*



To Zip Export to a build folder and compress it into a ZIP file *jobname_date_time* with a definable extension

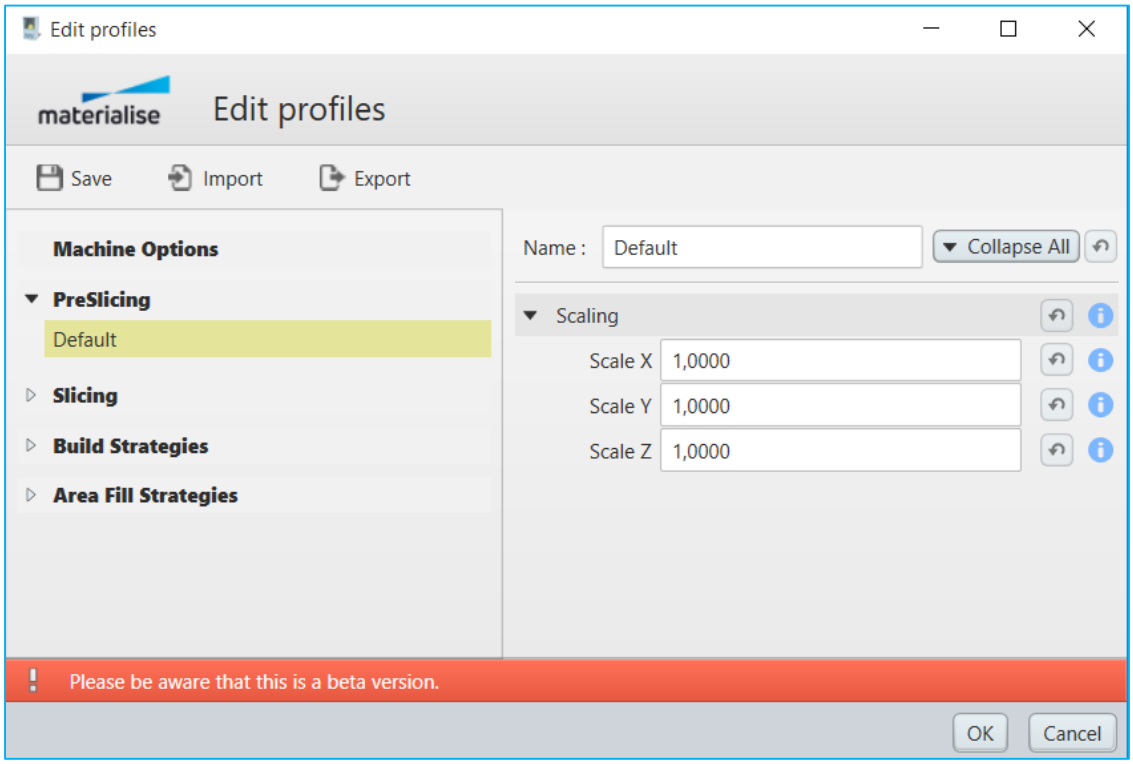


To Encrypted ZIP Export to a build folder and compress it into an encrypted ZIP *jobname_date_time* with a definable encryption key and definable extension.



7.2. Pre-Slicing

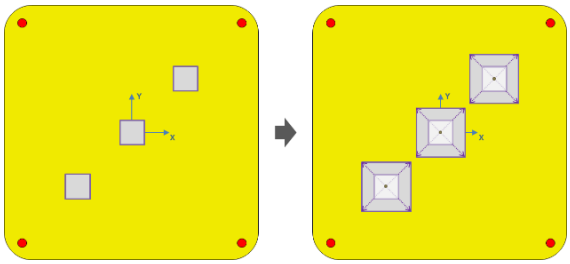
The pre-slice section groups all profiles related with operations done before slicing. Each profile defines a list of pre-slicing specific parameters.



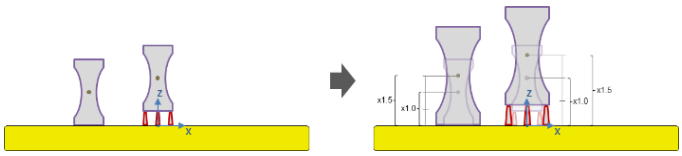
Scaling

Under the scaling section of the parameter list you can define how you want to scale the parts on the platform in X, Y & Z with scale factors (1 = 100%) Scaling is done in the X&Y direction from the center of the part and in Z from the bottom of the part.

Independent scaling in X, Y from center part

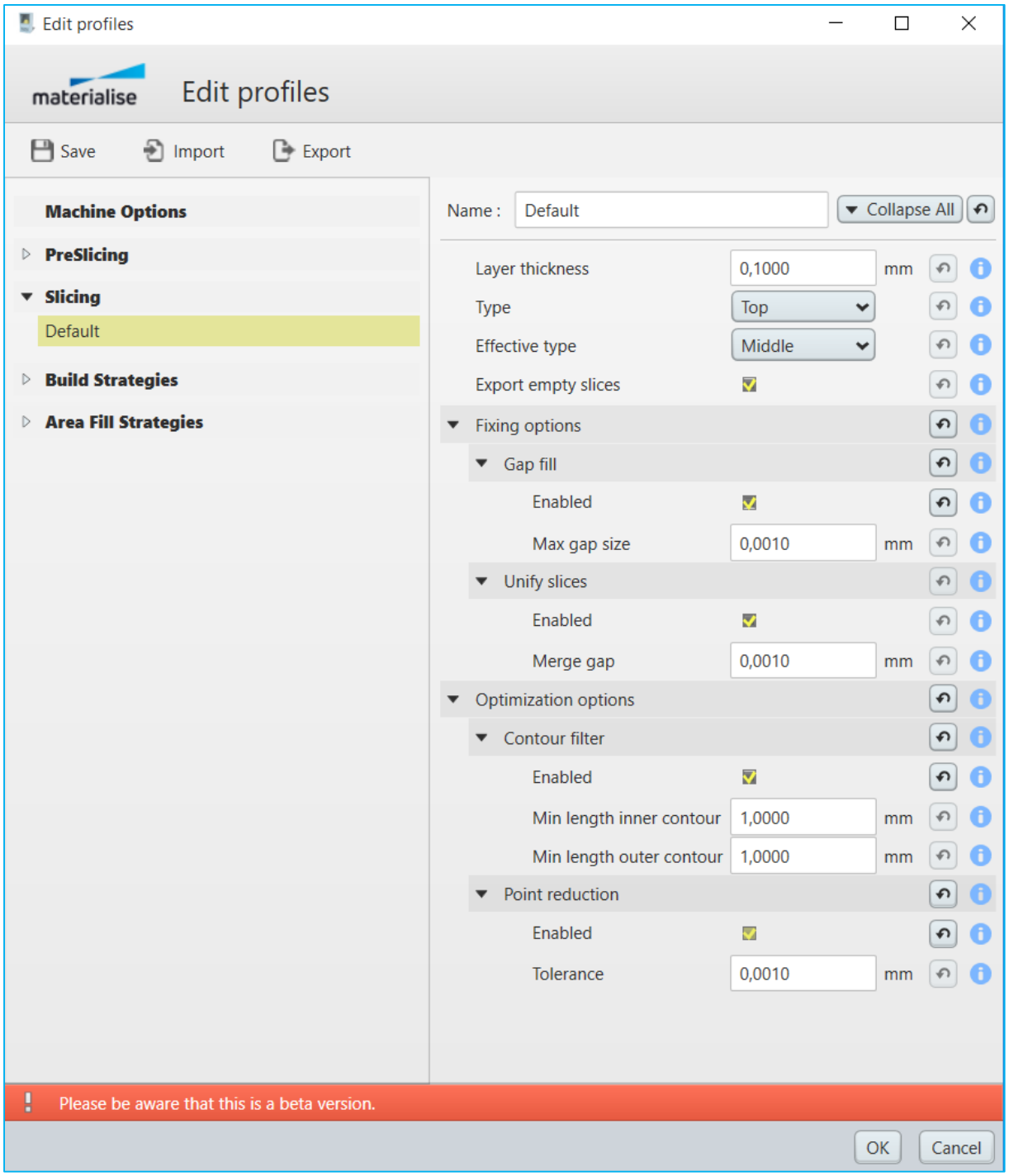


Independent scaling in Z from bottom part



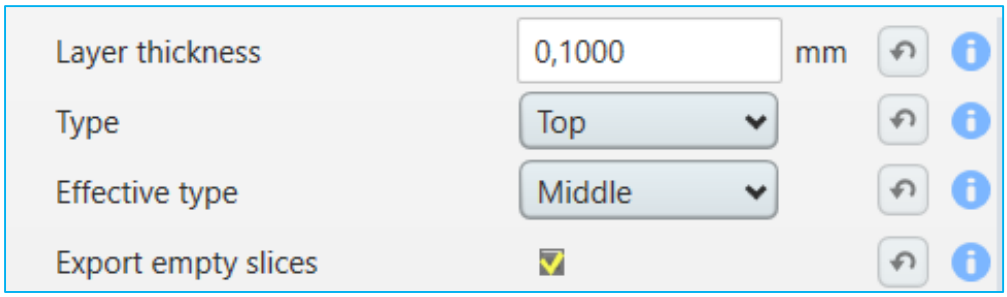
7.3. Slicing

The slicing section groups all profiles related with the slicing process. Each profile defines a list of slicing specific parameters

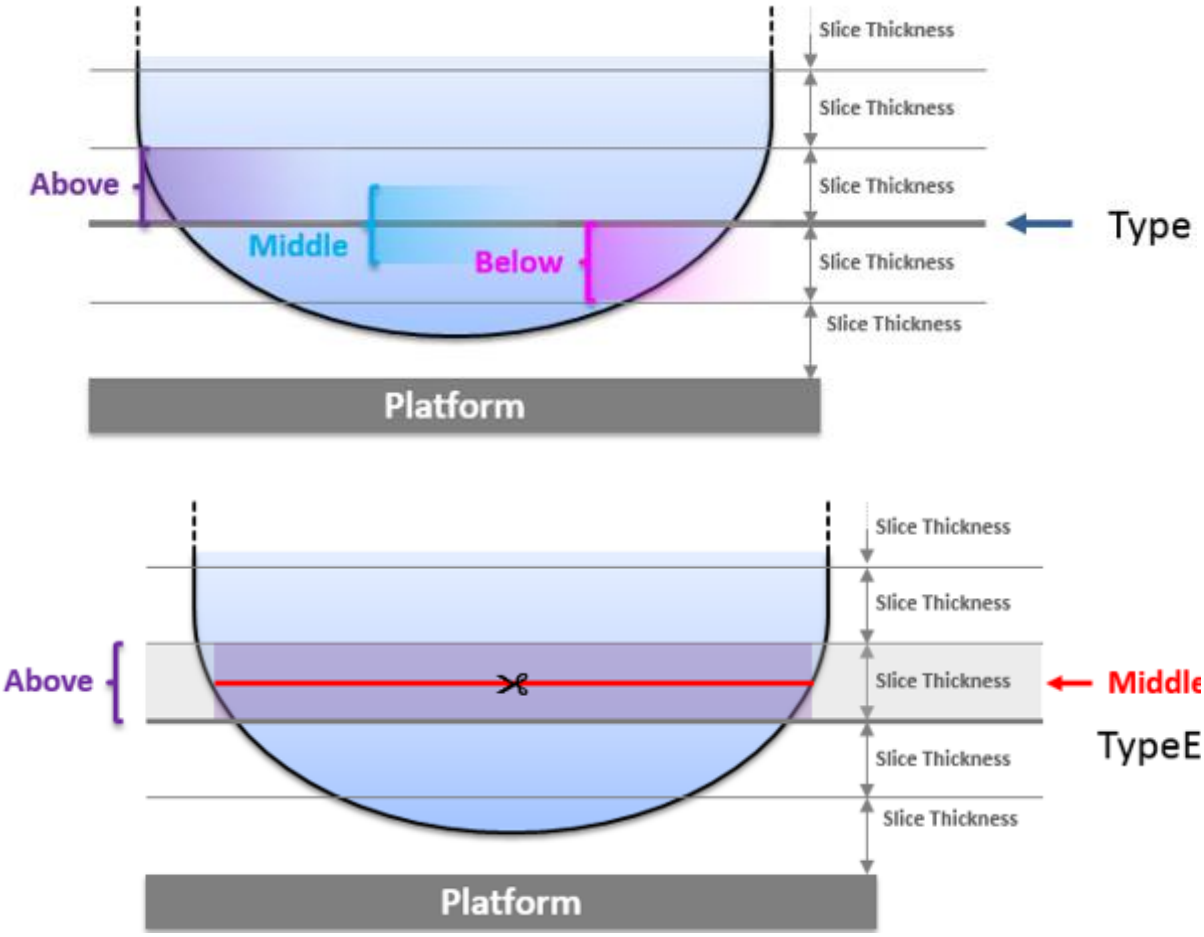


Slice settings

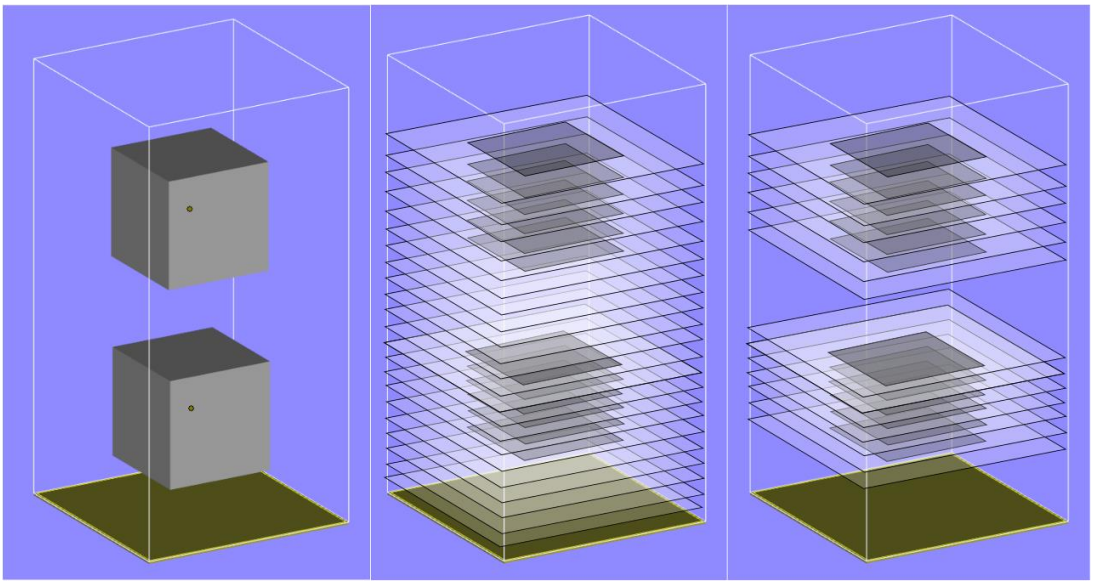
Under the slice settings of the parameter list you can define the parameters that control the actual slicing process.



Layer thickness	The slice thickness parameter defines the reference height of the slices
Type (Above – middle – below)	The slicing type drop down defines how the slice block is positioned relative to the reference line
Effective type (Top – middle – bottom)	The slicing effective type drop down defines on which relative height in the slice block the slice is taken.



Export empty slices Checkbox to define if we will export empty slices or not

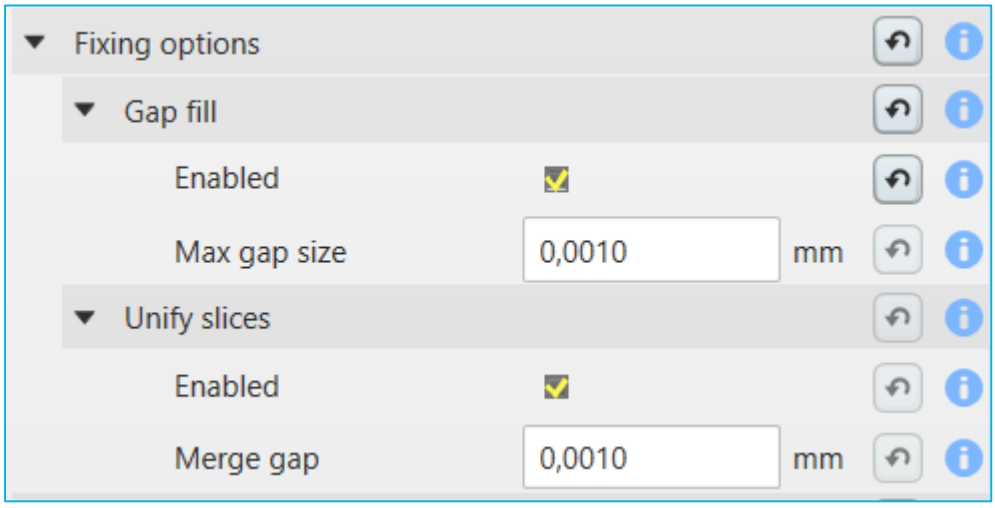


Notification

When slice parts only is enabled significant savings on processing time and disk space are possible. This option can only be executed on machines that support this build mode.

Fixing Options

Under the fixing options section of the parameter list you can activate some features that will repair certain errors in the slices.

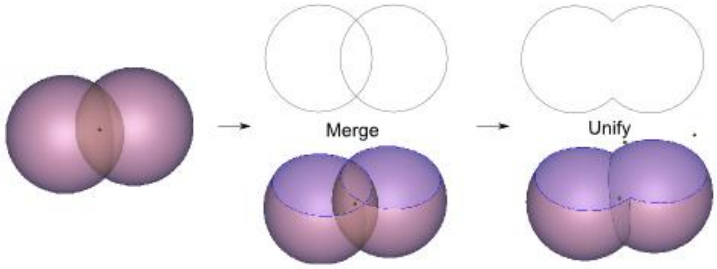


Notification

The fixing options require additional processing time. Please take into account that when the fixing options are enabled the processing time of the build processor will be longer.

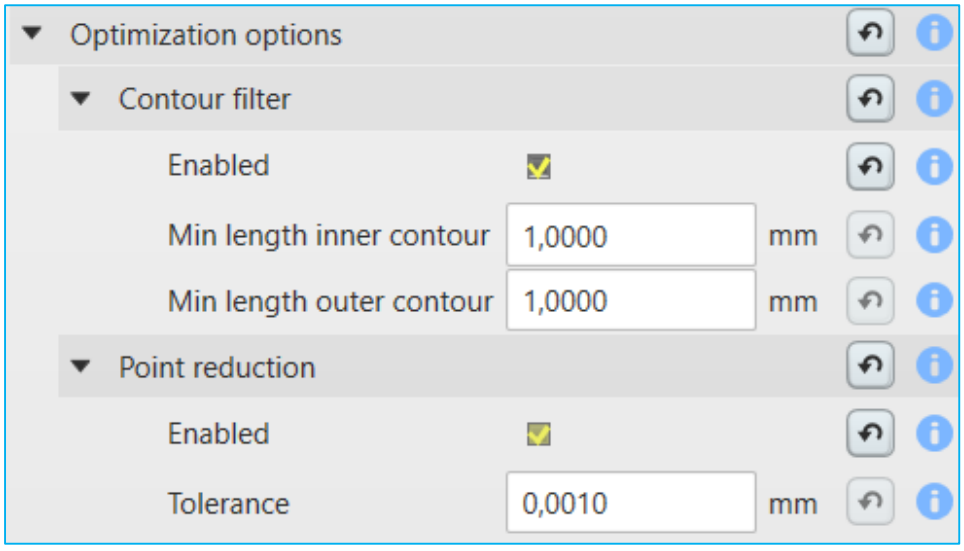
Gap fill The gap fill feature will closed gaps in the slice contour of a certain maximal size called the maximal gap size.

Unify slices The unify slices feature will combine 2 slices that have an overlapping distance of a certain maximum distance called the merge gap



Optimization Options

Under the optimization options of the parameter list you can activate some features that will adapt the slices in such a way that they are more suited for your output device.



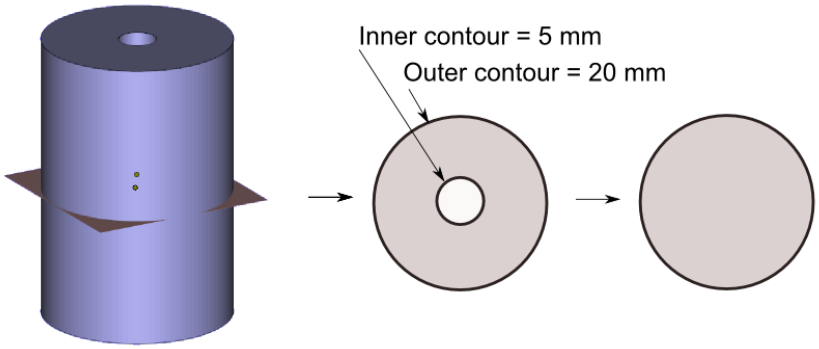
Notification

The optimization options require additional processing time. Please take into account that when the optimization options are enabled the processing time of the build processor will be longer.

Contour filter

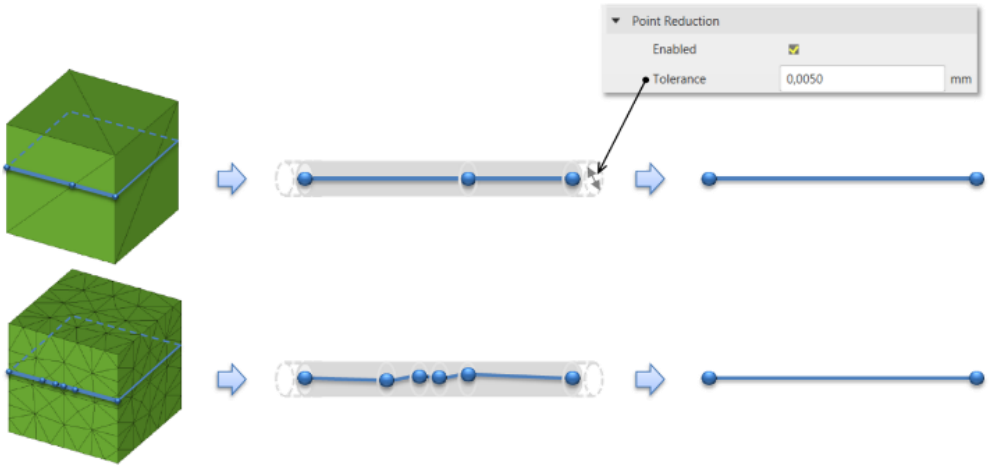
The contour filter feature will allow to filter out internal and external contours that are that are too small for the intended output device.

Min inner contour length = 6 mm
Min outer contour length = 10 mm



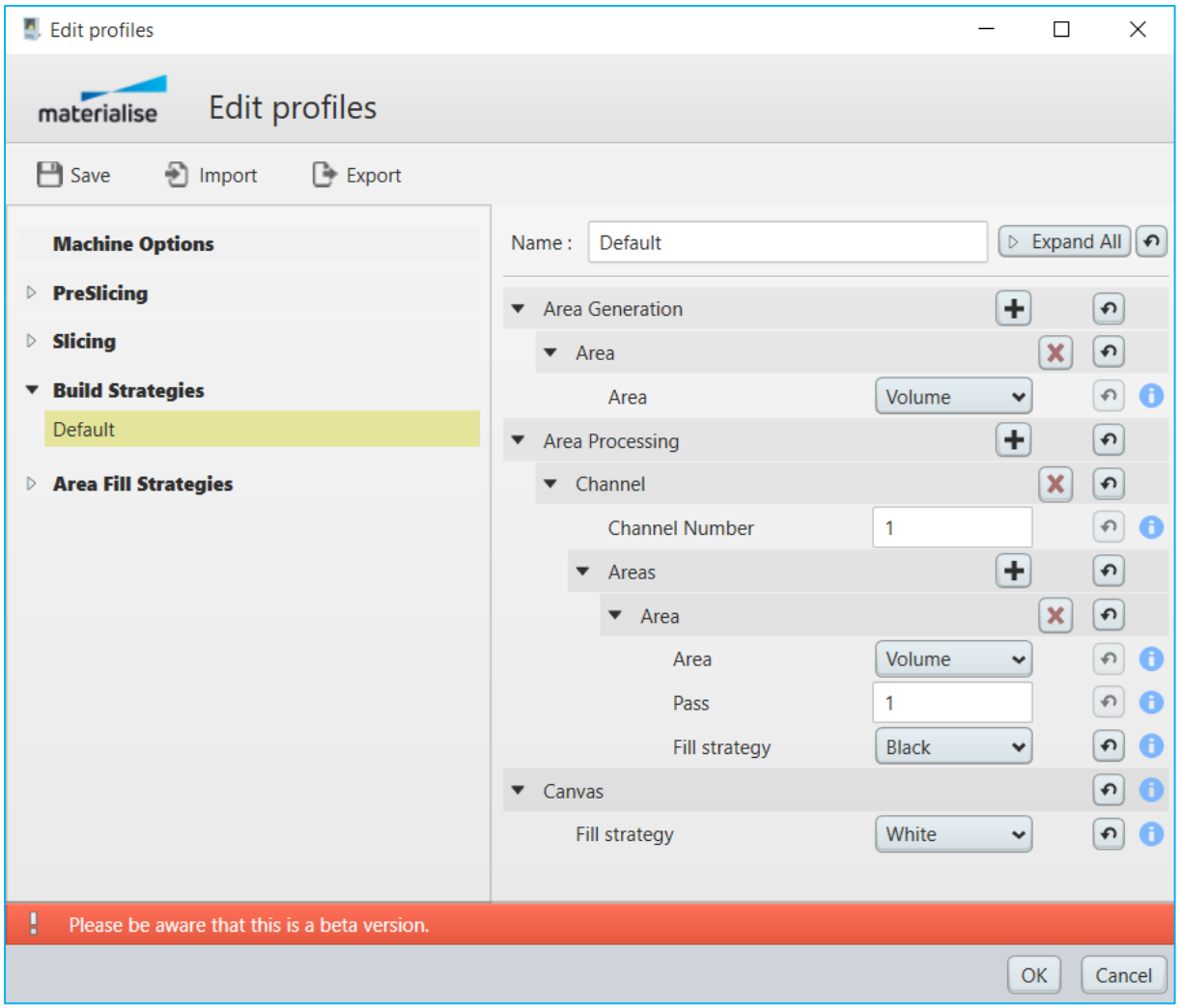
Point reduction

The point reduction feature will allow to reduce the number of vertex points in a contour to a minimum based on allowed deviation from the original contour defined by the tolerance parameter



7.4. Build strategies

The build strategies section groups all profiles related with how a part is built under an arbitrary profile. Each profile defines a list of build specific parameters.

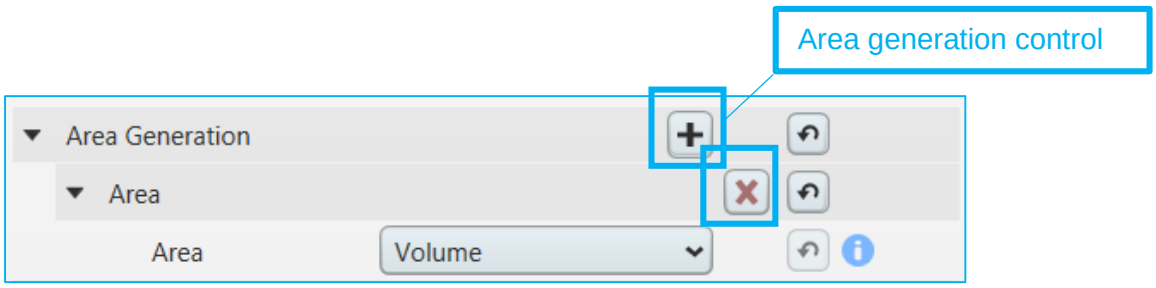


Area generation

In the area generation section you can add and define the areas you want to include in your build strategy.

7.4.1.1 Area generation control

This control allows to add and remove area sections that will define which areas are going to be generated and how.



The + button under the area generation section will allow to add an area section

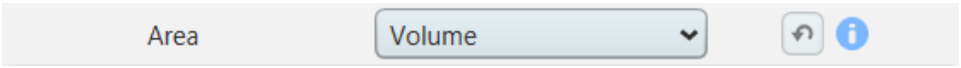
The X button under the area section will allow to remove the area section

Notification

Each area can only be selected once. If you select a certain area more than once an error message will pop-up indicating that you have multiple entries for the same area.

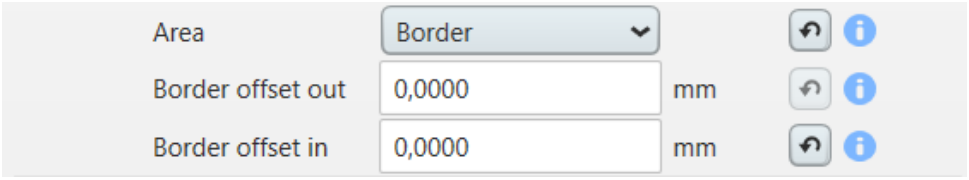
7.4.1.2 Volume Area

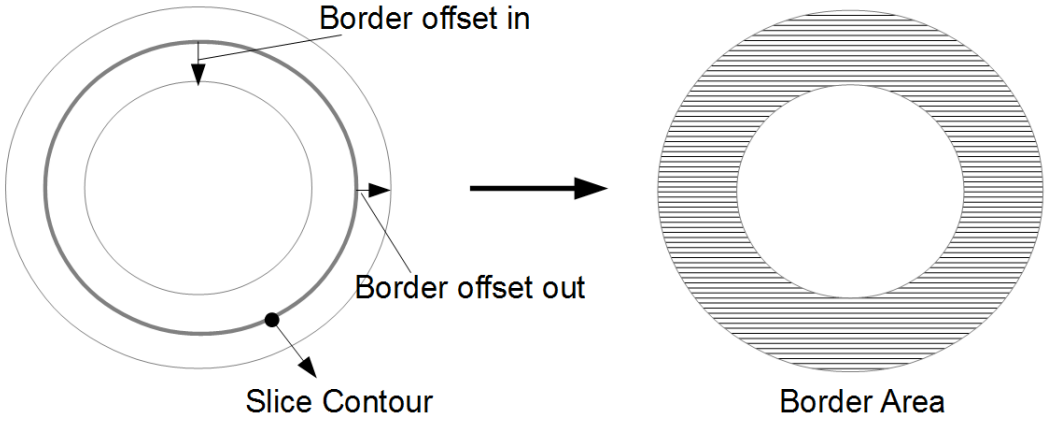
By default the volume area is defined as the area described by the slice contour of a part but how that area will look like exactly will depend on the non-overlapping areas calculations



7.4.1.3 Border Area

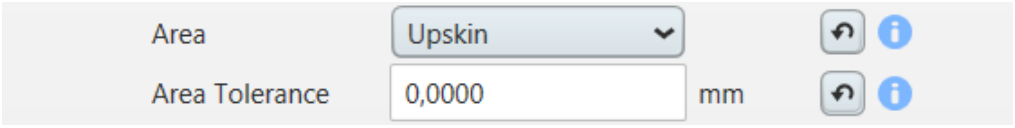
By default the border area is defined as the area described by the inwards and outwards offset of the slice contour but how that area will look like exactly will depend on the non-overlapping areas calculations.

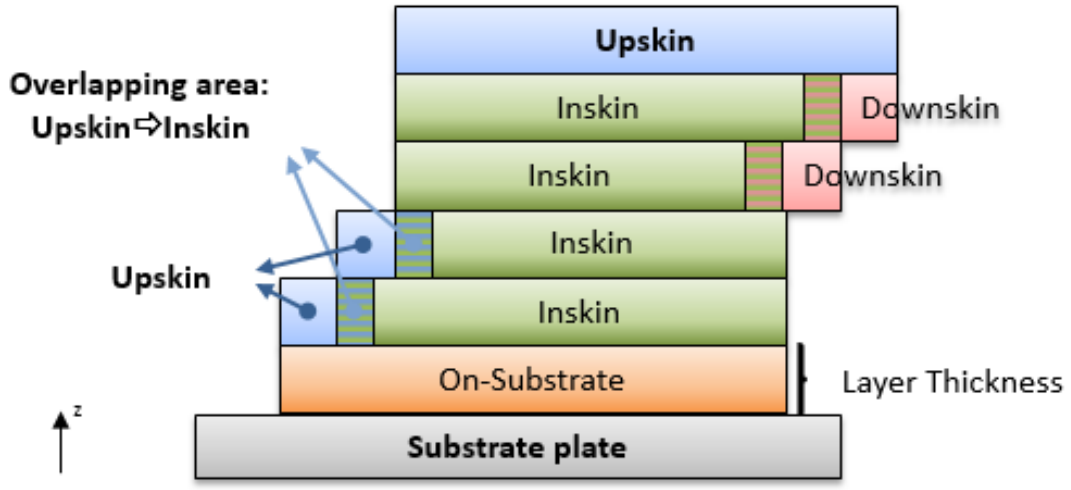




7.4.1.4 Up-skin / Down-skin Area

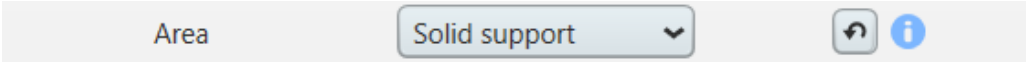
By default an up-skin / down-skin area is defined by the difference between the current slice area and the next/previous slice area with a certain offset (tolerance). If the result is a positive area the area is defined as an op-skin or down skin. How that area will look like exactly will depend on the non-overlapping areas calculations.

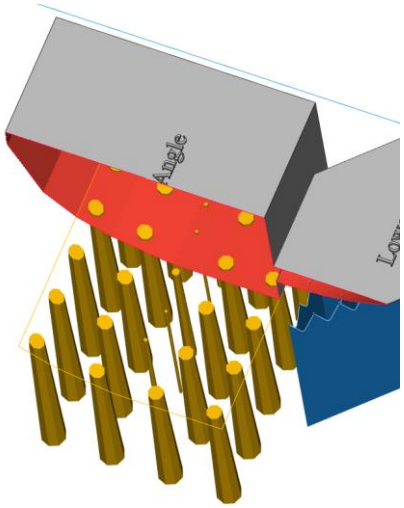




7.4.1.5 Solid Support Area

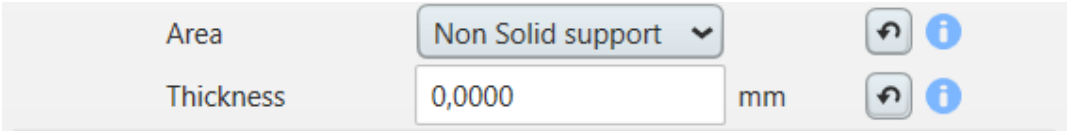
By default a solid support area is defined as an area that results from slicing solid supports created with the SG/SG+ tool in Magics. How that area will look like exactly will depend on the non-overlapping areas calculations. Solid supports in Magics have a volume.

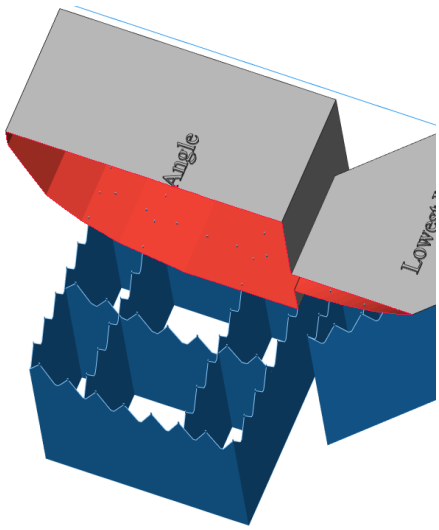


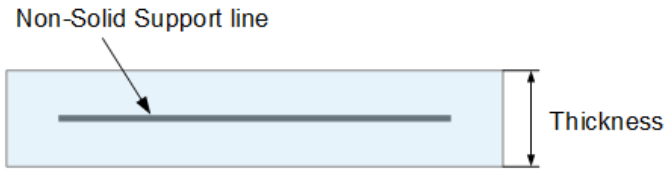


7.4.1.6 Non-solid Support Area

By default a non-solid support area is defined as an area that results from slicing non-solid supports created with the SG/SG+ tool in Magics and give it a certain thickness in the build processor. How that area will look like exactly will depend on the non-overlapping areas calculations. Non-solid supports don't have a volume or thickness and can as such not be processed.

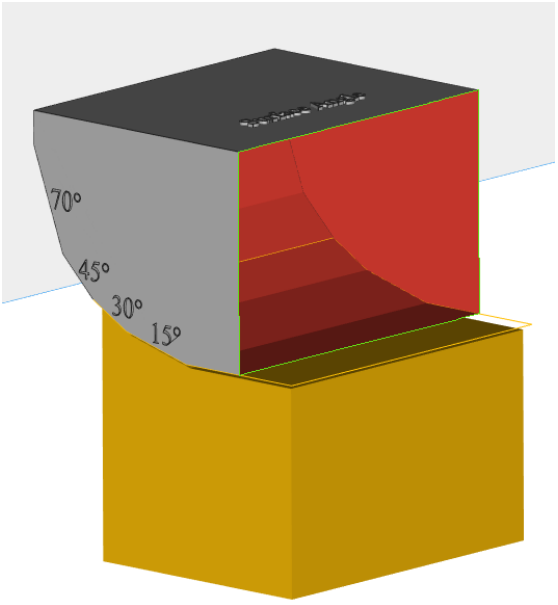




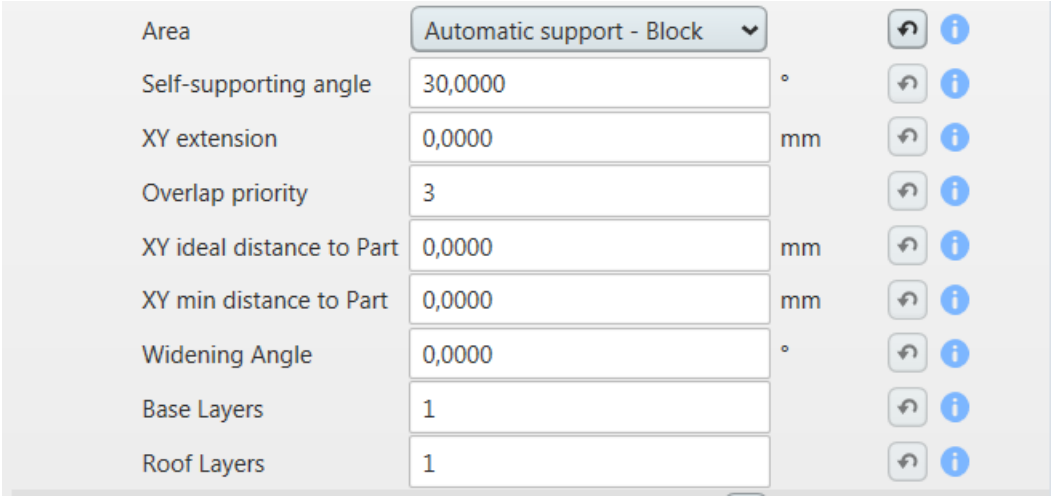


7.4.1.7 Automatic Support - Block

A block support type will generate a complete solid structure under each area on the part that has an angle lower than the critical angle. The block support structure makes it possible to build non-self-supporting areas of a model with Print & Cure Print technologies.

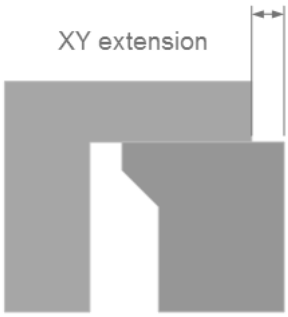


Following parameters define the automatic generation of a block support

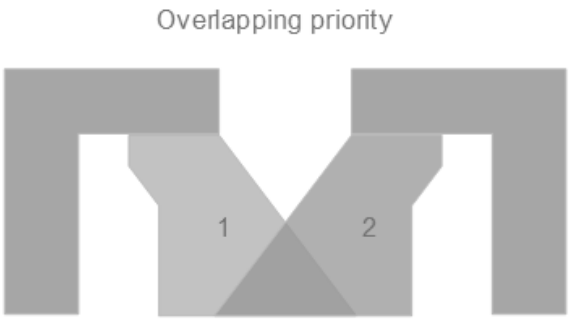


Self-supporting angle The critical angle will set the block support generator to support every surface of the model with an angle lower than the critical angle.

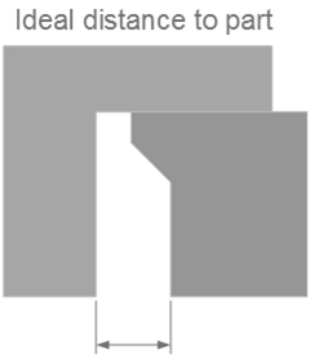
XY extension This is the offset of the block support in the X & Y direction



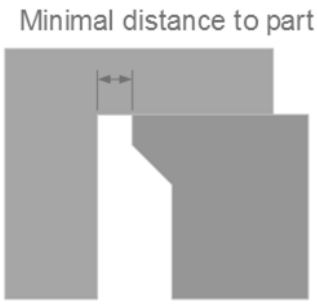
Overlapping priority Defines the order in which support blocks will be build



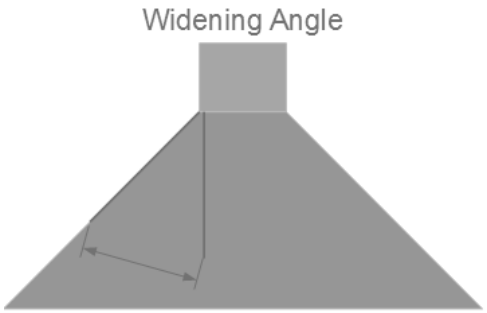
XY ideal distance to part Defines the distance between the part and support that would be seen as ideal without taking into account the bridging capacity of the material



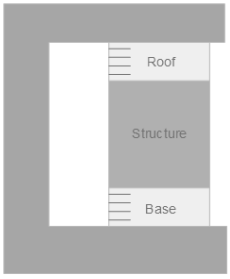
XY min distance to part Defines the distance between the part and support that takes into account the bridging capacity of the material



Widening angle The widening angle defines how to widen the base of a support

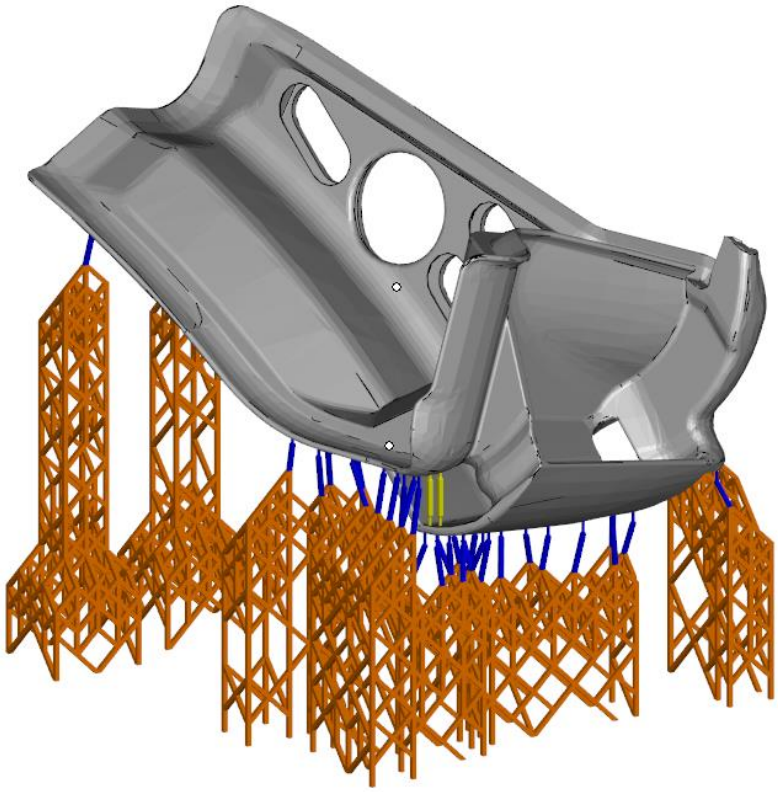


Base / Roof layers Number of layers in the base/roof section of the block support structure

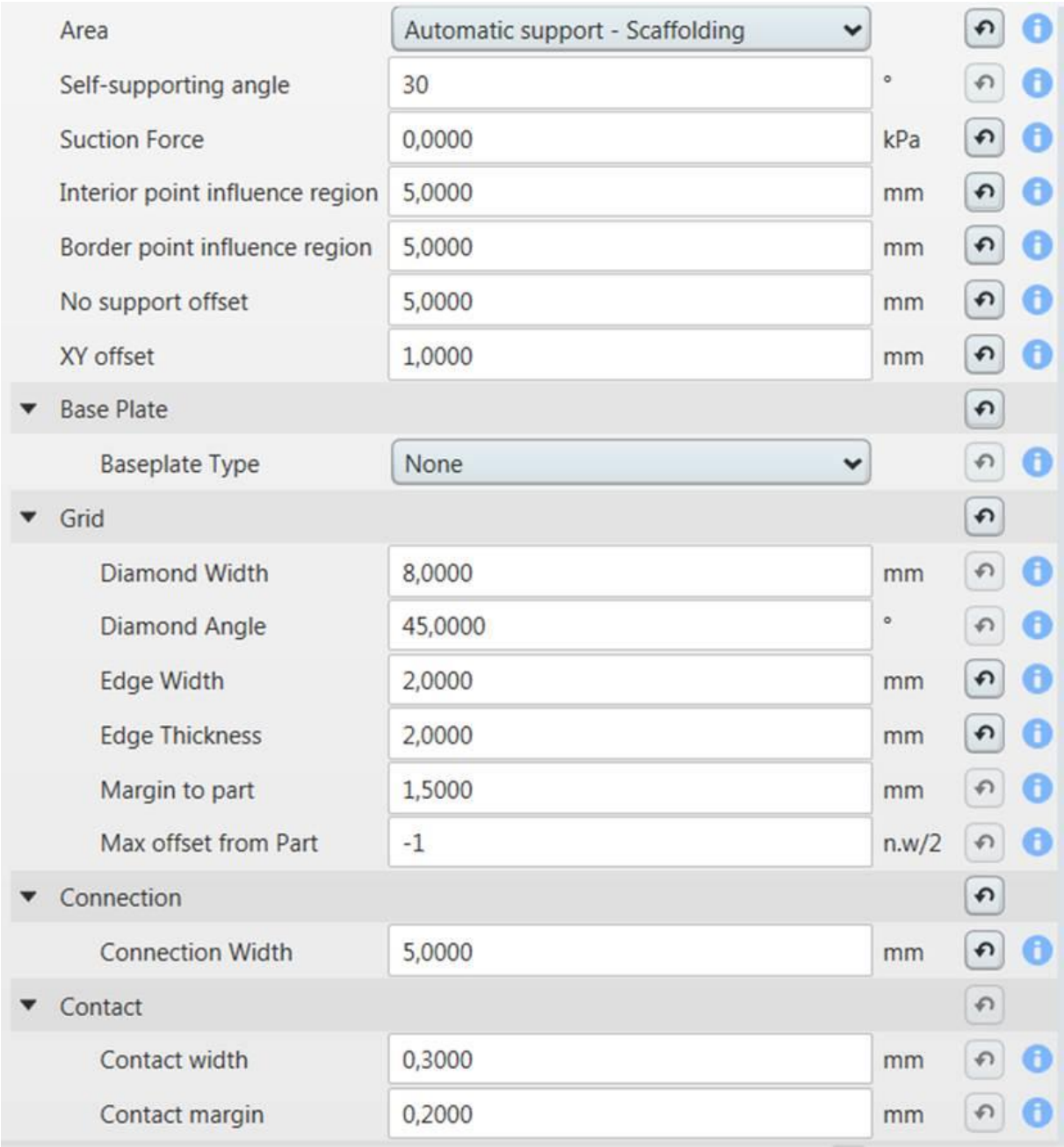


7.4.1.8 Automatic Support - Scaffold

A Scaffolding support type will generate a complete solid scaffolding structure that will support critical points in areas that have an angle lower than the critical angle. The scaffolding support structure makes it possible to build non-self-supporting areas of a model with direct cure print technologies (DLP/LCD)



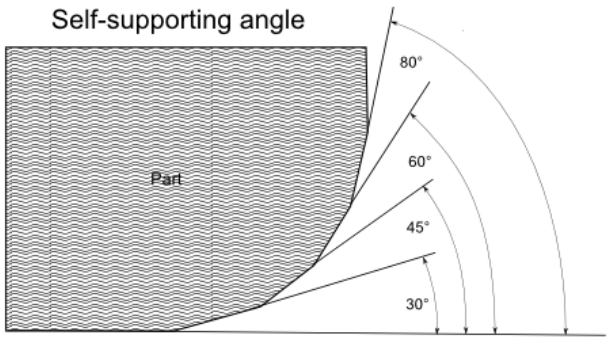
Following parameters define the automatic generation of a scaffolding support



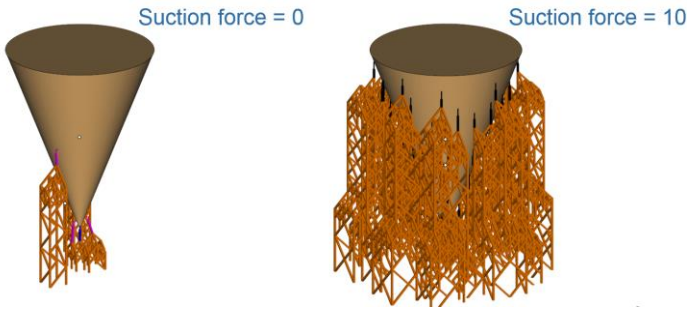
General settings

Self-supporting angle	30	°
Suction Force	0,0000	kPa
Interior point influence region	5,0000	mm
Border point influence region	5,0000	mm
No support offset	5,0000	mm
XY offset	1,0000	mm

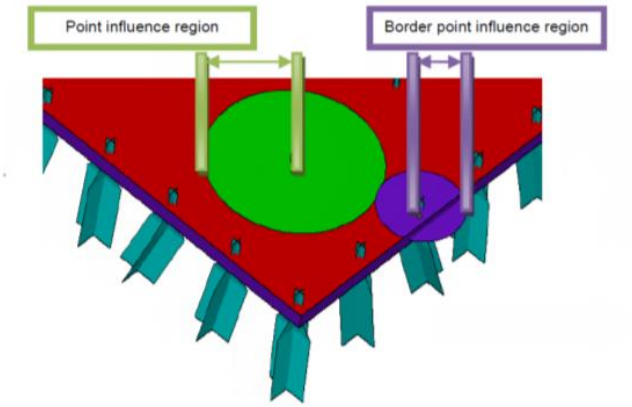
Self-supporting Angle The critical angle will set the scaffolding support generator to support every surface of the model with an angle lower than the critical angle.



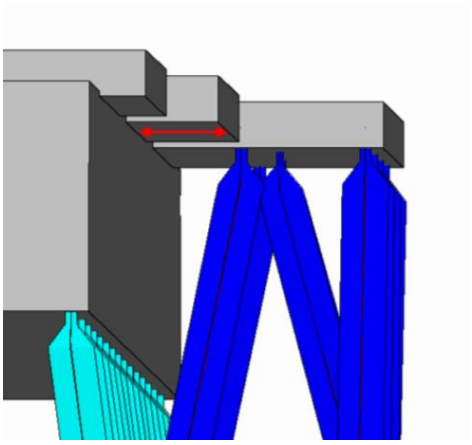
Suction force This is the suction force exerted on the part for which the support generator will generate enough supports to avoid breaking away of the part from the platform and/or supports



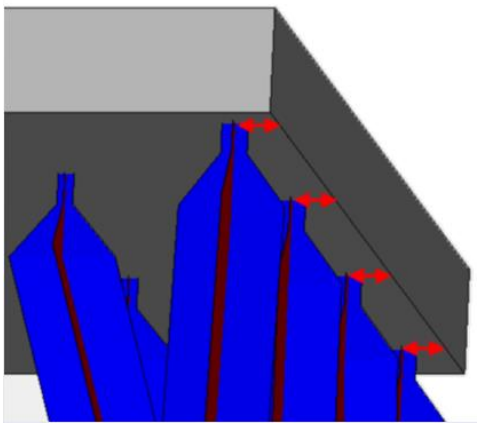
Influence region interior/border The radius of the circle around the point that will be supported by the point in the interior part of the support surface.



No support offset the overhang distance for which no support is needed

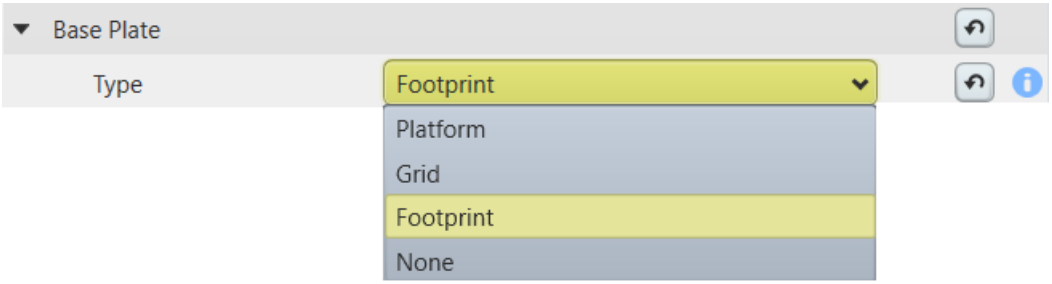


XY offset The distance between border points and the border



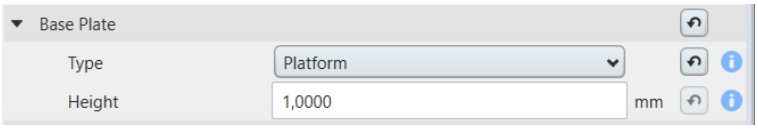
Baseplate

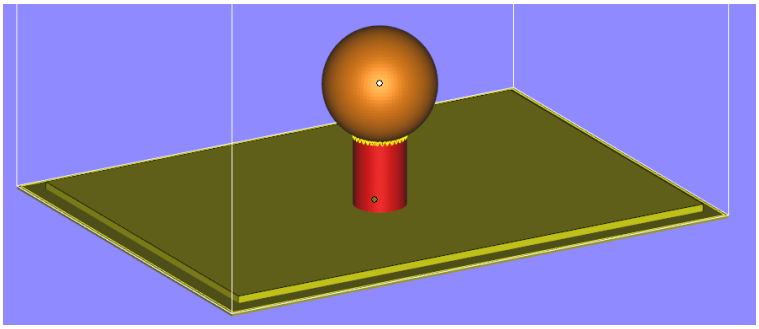
The baseplate section allows the user to define an adhesive structure with the build platform that will provide an improved attachment of the scaffold structure to the build platform



None No base plate will be generated

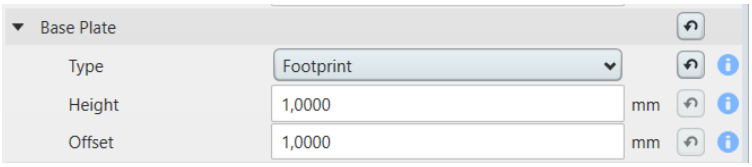
Platform A baseplate with the size of the platform and a certain height will be generated.

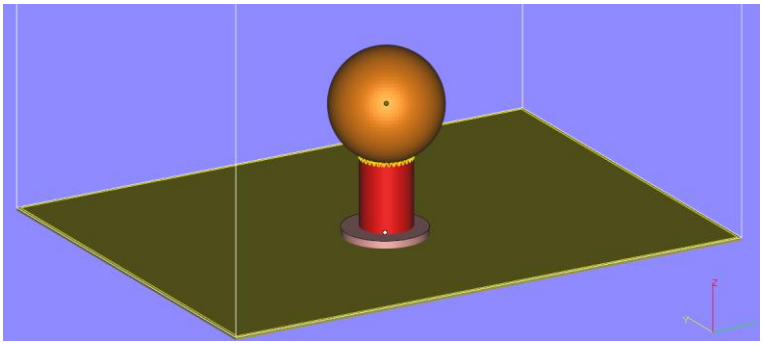




Height Defines the height van the baseplate and calculates the corresponding number of layers to reach that height

Footprint A baseplate with the size of the support footprint with a certain offset and height will be generated.

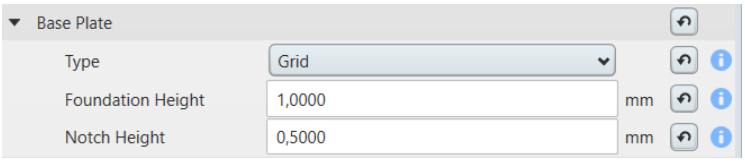


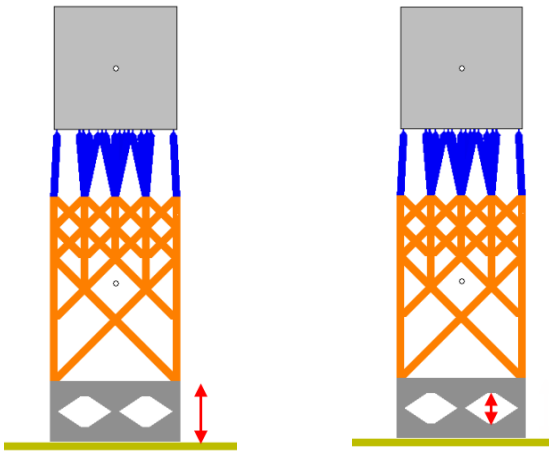


Height Defines the height van the baseplate and the corresponding number of layers needed to reach that height

Offset Defines the outward offset of the footprint contour

Grid A baseplate with the shape of the grid will be generated and defined by foundation height and notch height



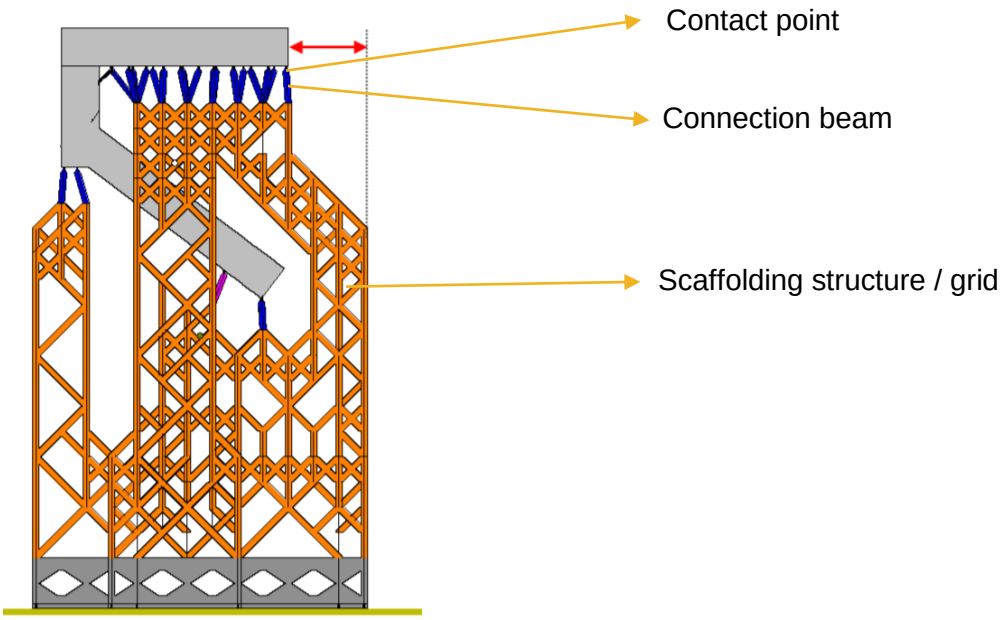


Foundation height Height of the grid base plate

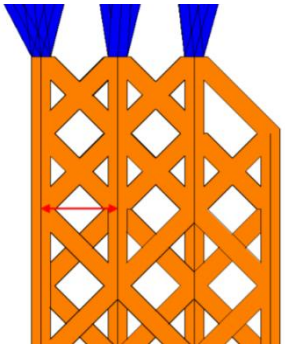
Notch height Height of the notch

Grid

Grid			
Diamond Width	8,0000	mm	
Diamond Angle	45,0000	°	
Edge Width	2,0000	mm	
Edge Thickness	2,0000	mm	
Margin to part	1,5000	mm	
Max offset from Part	-1	n.w/2	

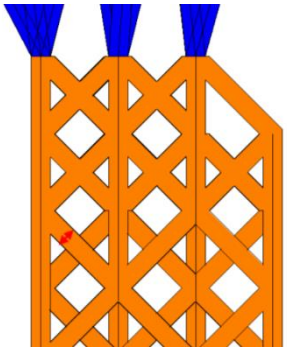


Diamond width will define the size of the diamond shaped scaffolding structure



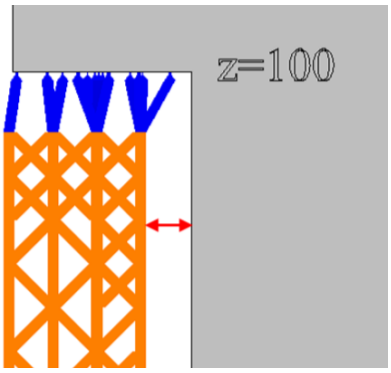
Diamond Angle Will define the angle of the diamond shape

Edge width will define the width of the beams in the scaffolding structure



Edge thickness will define the thickness of the beams in the scaffolding structure

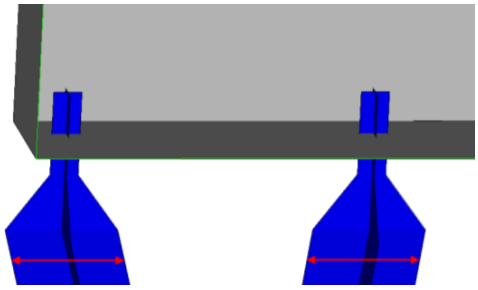
Margin to Part Will define the hold off distance of the scaffolding towards the part



Max offset from Part How far outside the contours of your part the support structure can be

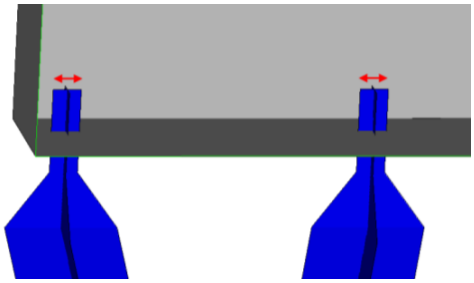
Connection

Connection width The critical angle will set the scaffolding support generator to support every surface of the model with an angle lower than the critical angle.

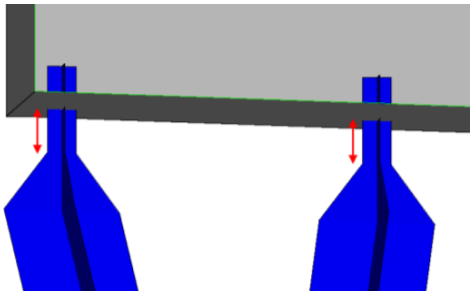


Contact

Contact width the width of the connection beam when it touches the part

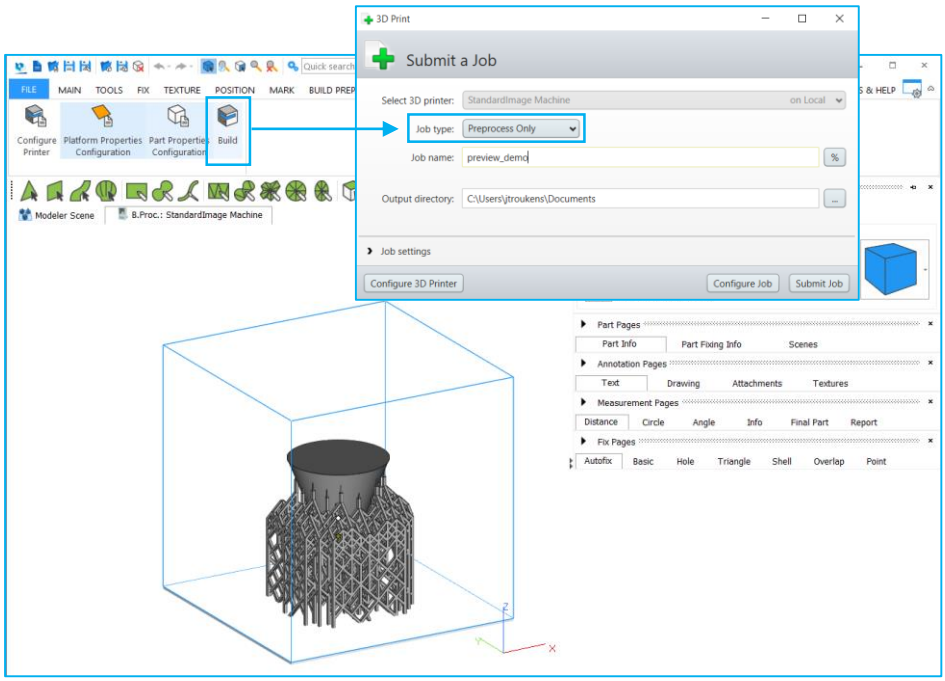


Contact margin the length of the contact point



Preview

Scaffold supports can be previewed before building by processing the job in pre-processing mode.

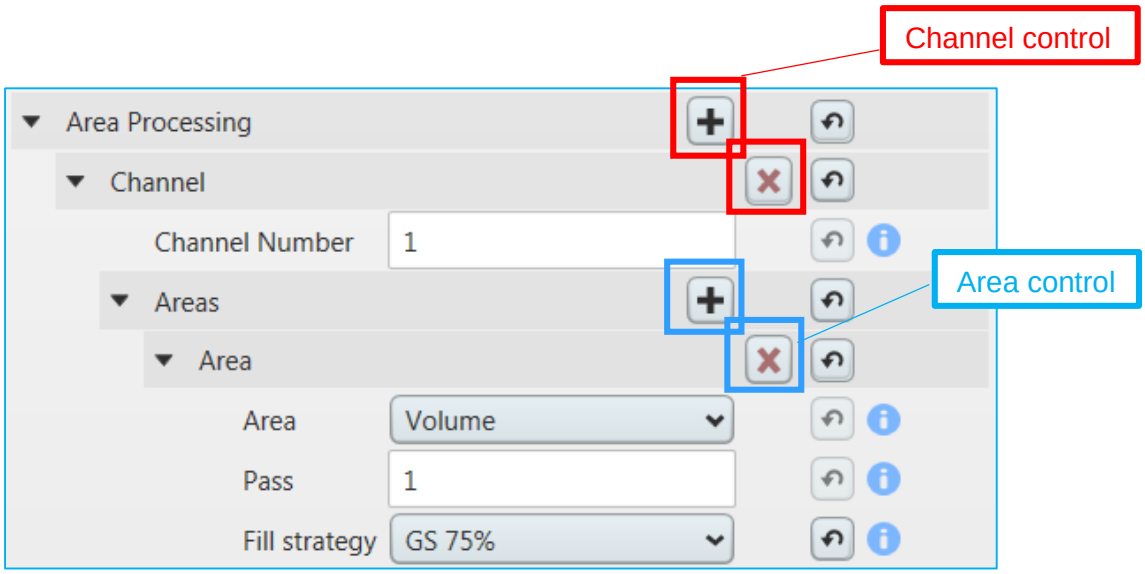


Area Processing

In the area processing section in the parameter list you can define how areas are filled with pixels (Area fill strategy) and to which output channel you want to assign it in which order.

7.4.1.9 Area processing control

This control allows the user to add/remove output channels to a build strategy and to add areas to a channels. For each area we can define how it will be filled with pixels (Fill strategy) and in which order it will be processed (Pass)

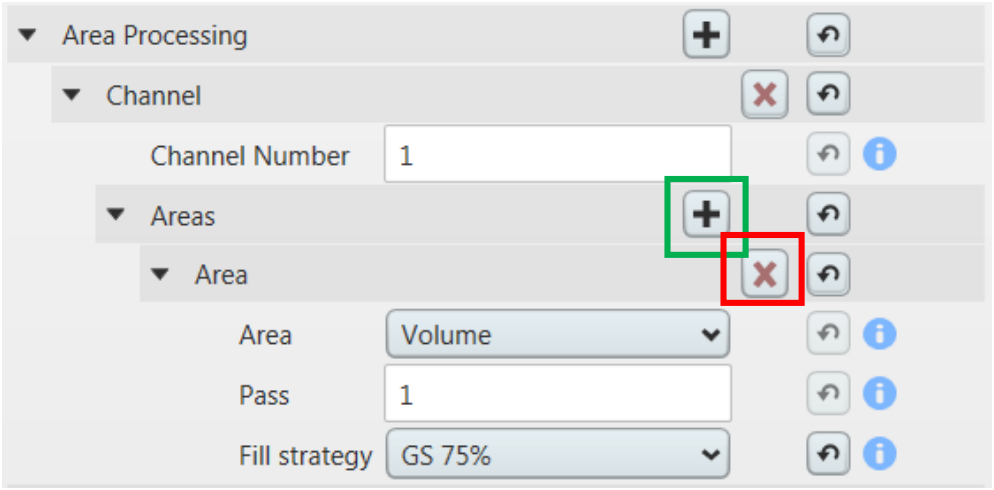


7.4.1.10 Adding and Removing a Channel

With the **+** button in the Area processing section the user can add a channel to the build strategy. With the **X** button in the channel section the user can remove a channel from the build strategy. Only the last channel section can be deleted

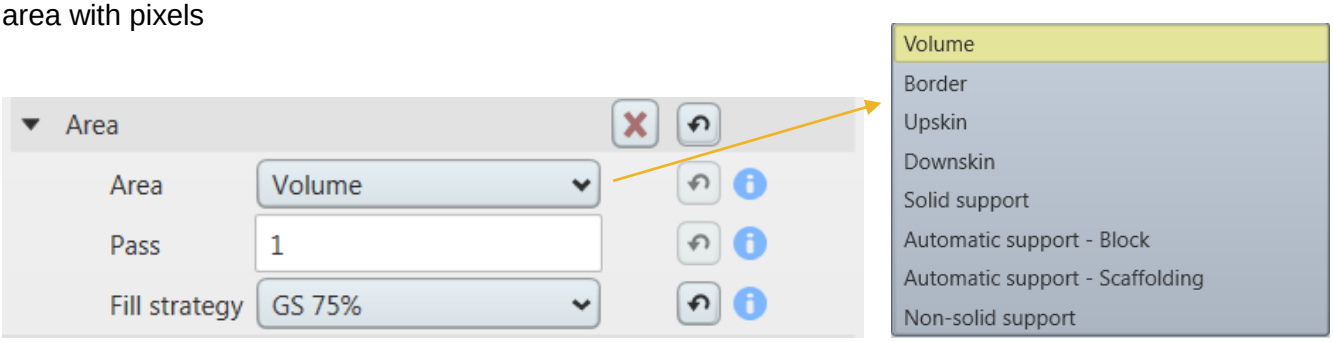
7.4.1.11 Adding and Removing an Area

With the **+** button in the areas section the user can add a channel to the build strategy. With the **X** button in the corresponding area processing section the user can remove an area processing section from the corresponding channel. The user can number the channels by himself however each channel need to have a different number



7.4.1.12 Defining an area / pass / fill strategy

When you add an area section under a certain channel you can select from a drop down which area you want treat, in which order you want to output it and how you want to fill the area with pixels

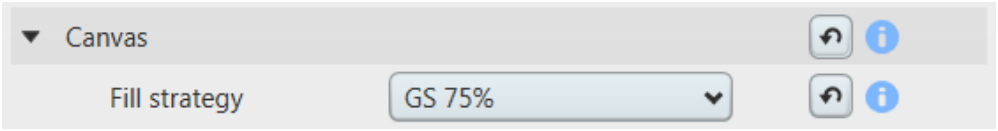


7.4.1.13 Area duplication

You can use each area multiple times in different passes in the same output channel or in the same passes in different channels. This is called area duplication.

Canvas

In the Canvas section in the parameter list you can define how the background of all generated images is filled with pixels (fill strategy)

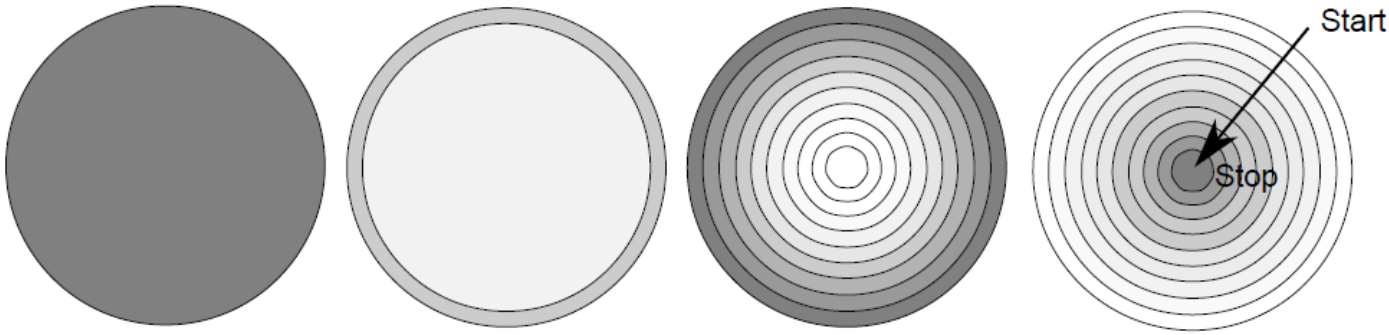


7.5. Area fill strategies

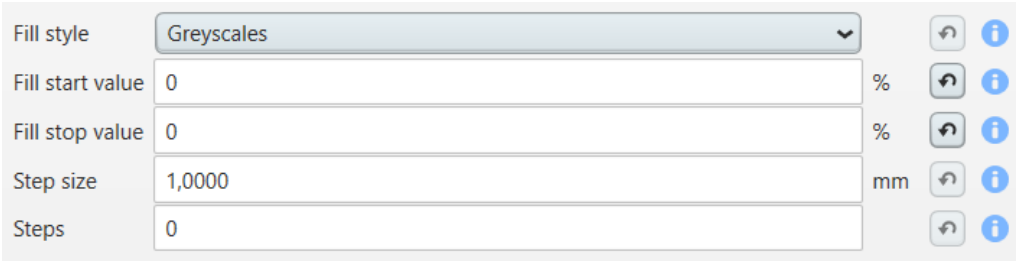
The area fill strategies section groups all profiles related with how a certain area is filled with pixels. Each profile defines a list of fill specific parameters defined by the fill style

Greyscale fill style

With the greyscale fill strategy you can fill an area with 8 bit greyscale pixels in a gradient manner



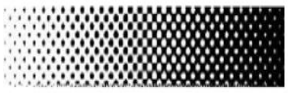
With following parameters you can setup a greyscale fill strategy.



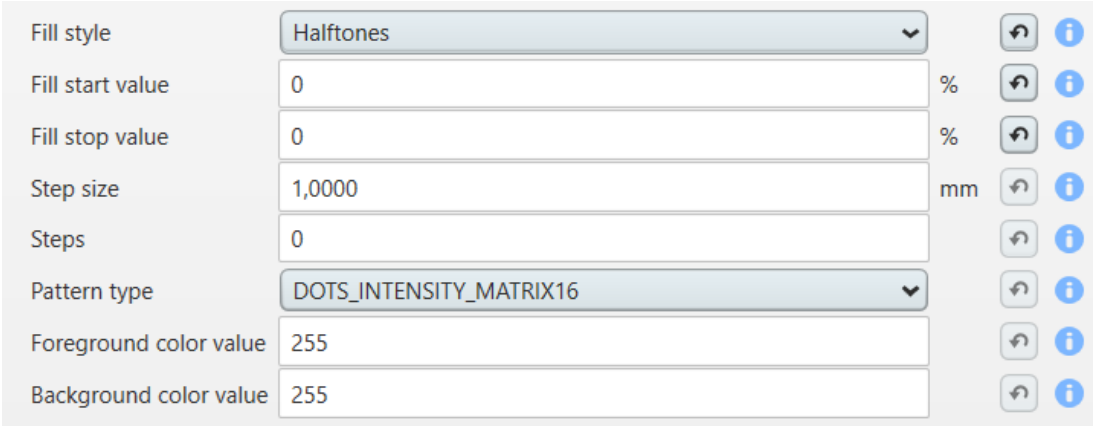
Fill start / stop value	The greyscale value in % that will be used as the start/stop color for the gradient. The gradient is always constructed as an inwards contour offset.
Step size	size of the offset when constructing the gradient
Steps	number of steps in the gradient

Halftone fill style

With the halftone fill strategy you can fill an area with 8 bit halftone patterns in a gradient manner identical as with greyscales



With following parameters you can setup a halftone fill strategy.

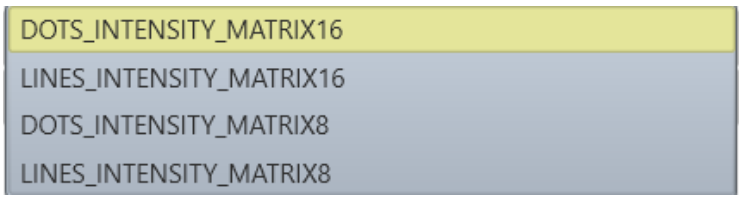


Fill start / stop value The greyscale value in % that will be used as the start/stop color for the gradient. The gradient is always constructed as an inwards contour offset.

Step size size of the offset when constructing the gradient

Steps number of steps in the gradient

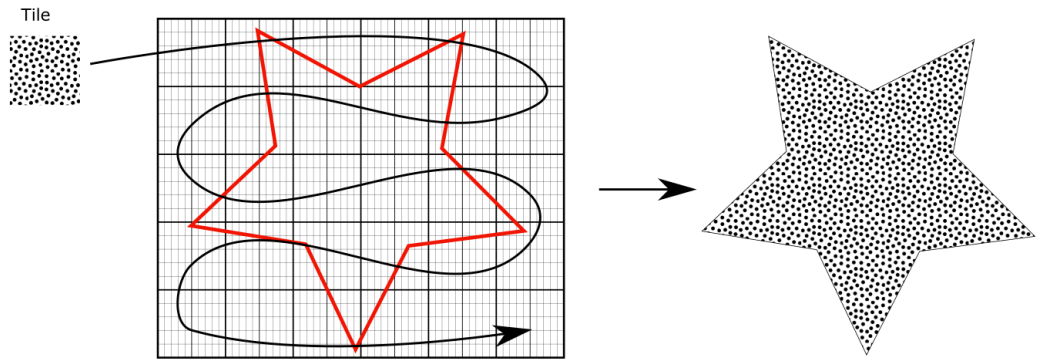
Pattern type

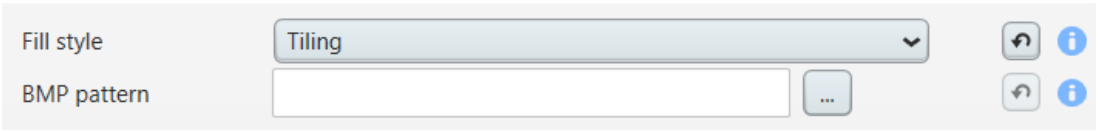


Fore/background color value Fore or background color of the halftone pattern in greyscale values

Tiling fill style

With the Tiling fill style you can fill an area with an 8bit bitmap pattern

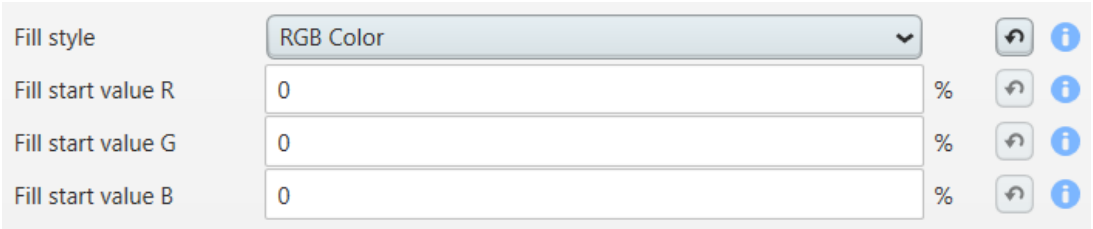




RGB Color fill style

With the color fill style you can fill an area with a 24bit RGB color

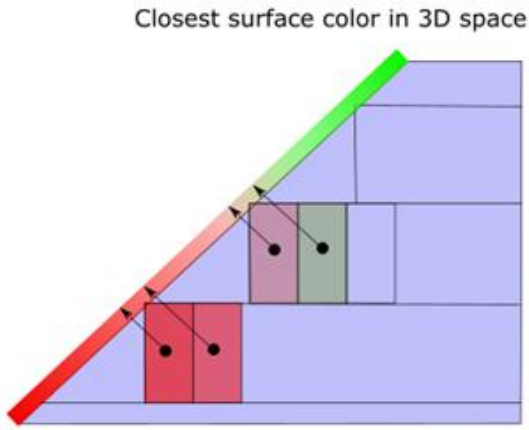
With following parameters you can setup the RGB color fill style.



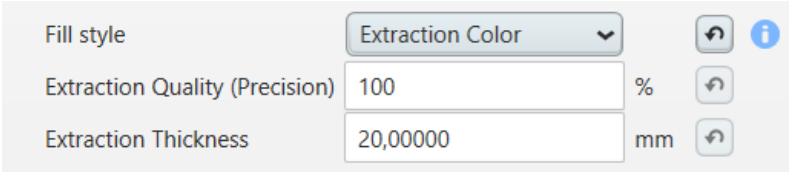
Fill start value R/G/B The greyscale value in % in RGB.

Extraction color fill strategy

With the extraction color fill strategy you can fill an area until a certain depth with the color of the closest point on the surface from that pixel.



With following parameters you can setup the Extraction color fill style.



Extraction Quality	How precise is the closest point from a certain position determined. Defines the color accuracy of the reproduction.
Extraction Thickness	How depth in a certain area will we perform an color extraction

8 Slice Based Operations

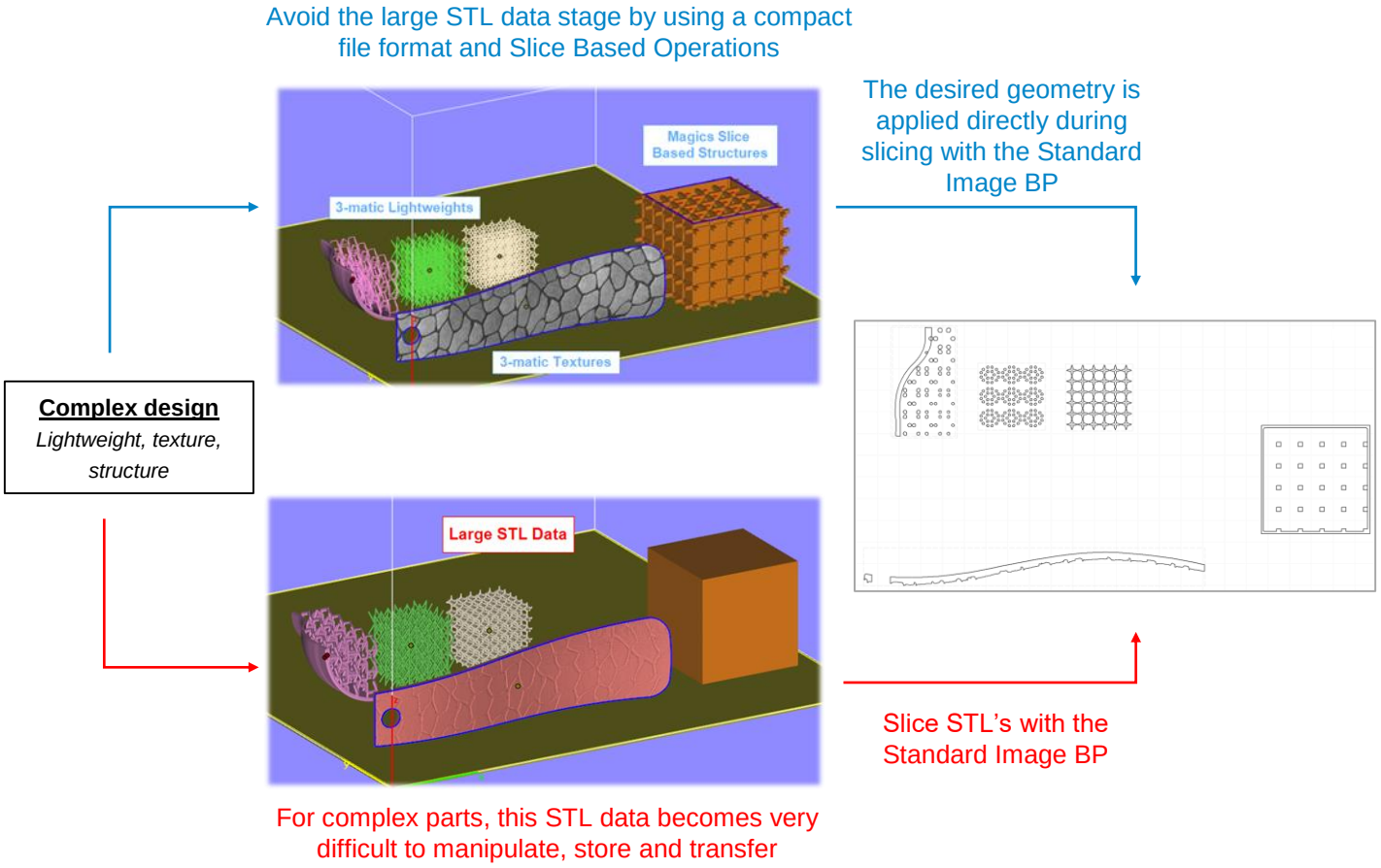
8.1. Why

Applying textures or structures to a model can easily result in very large STL files which become difficult to manipulate, store and transfer. Materialise has developed a technique to **skip the intermediate STL file stage** by generating the desired geometry directly into the slices using the Standard Image BP.

8.2. How

Materialise 3-matic^{STL} software models containing metadata about textures (texture bitmap, location and size of texture, white and black offsets) or structures (area, graphs, thickness of graphs) can be loaded into Materialise Magics software and placed on the build platform. The Standard Image BP will then automatically apply the textures or structures directly into the generated slices.

Materialise Magics software version offers a module to generate Slice Based Structures straight from within Materialise Magics software.



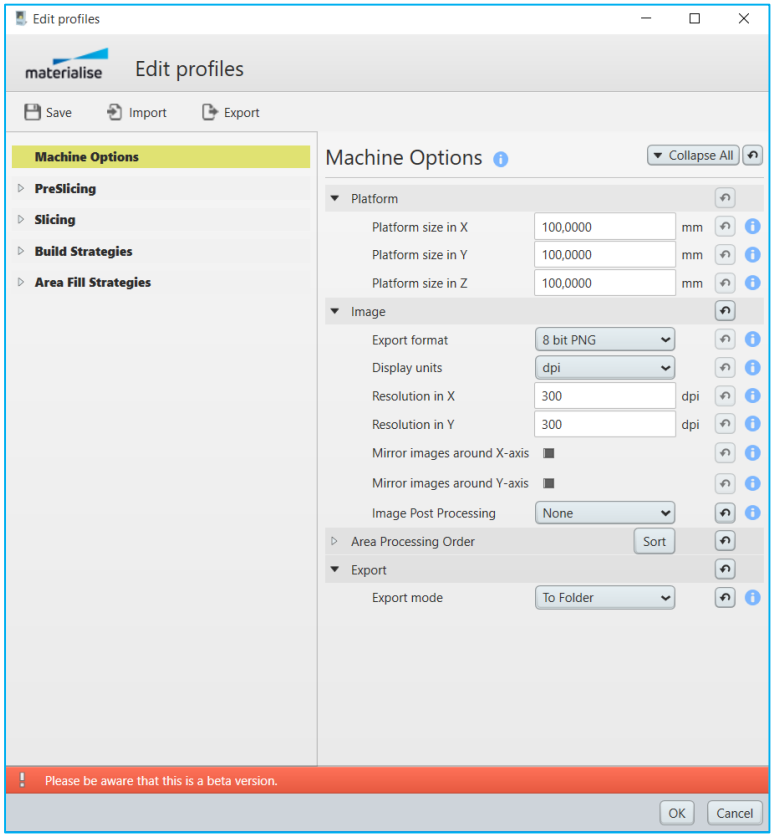
For more information on how to access slice based operations please visit
http://software.materialise.com/making-complex-designs-printable

9 How To

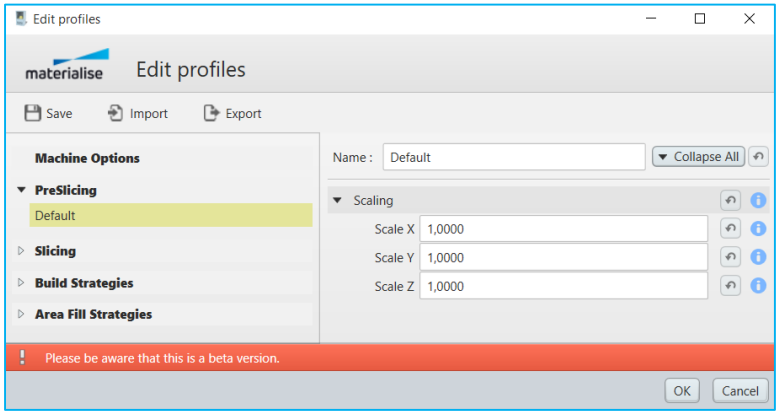
9.1. How to setup your build processor for Print & Sinter applications

With Print & Sinter applications we are controlling the absorption and reflection of IR light of the plastic powder bed by selectively applying special inks. By controlling the absorption and reflection of the plastic powder bed we can selectively sinter the plastic by IR illumination. Due to the powder bed setup these applications don't need any support technology during building. Typical to create a good thermal contrast between the volume slice and the surroundings the volume is printed with absorbing ink and a small outside border is printed with reflective ink with a little space between volume and border to compensate for the bleeding of the ink. A typical setup for Print & Sinter applications will look like this

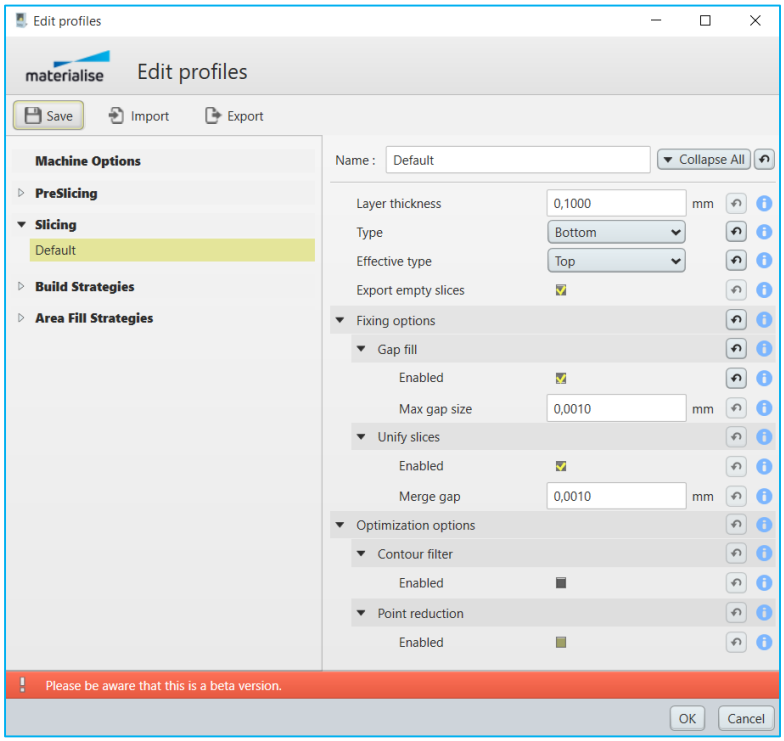
Machine Options



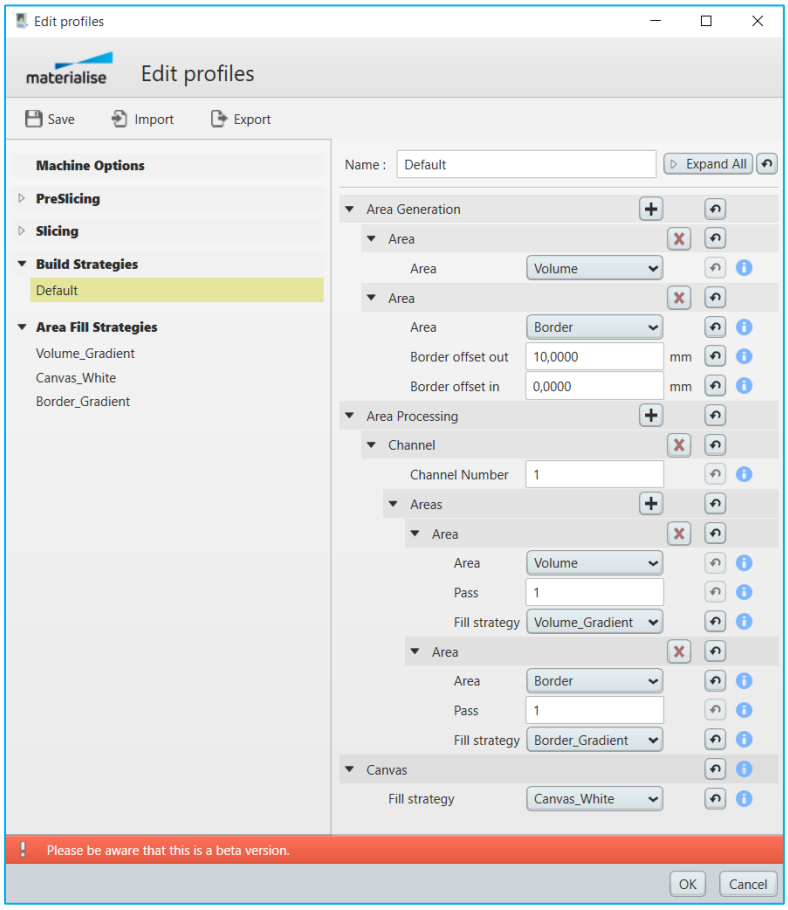
Pre-Slicing



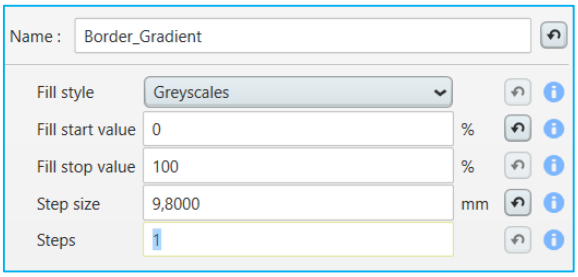
Slicing

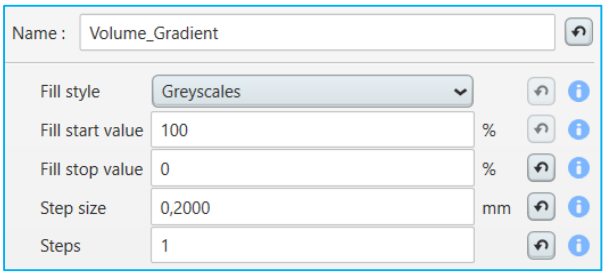


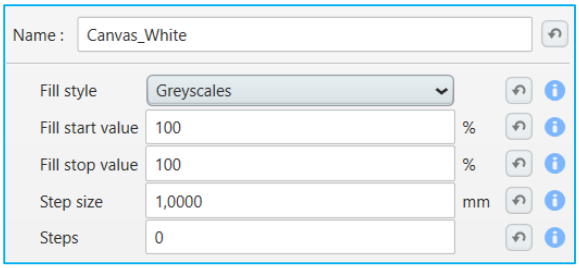
Build Strategies



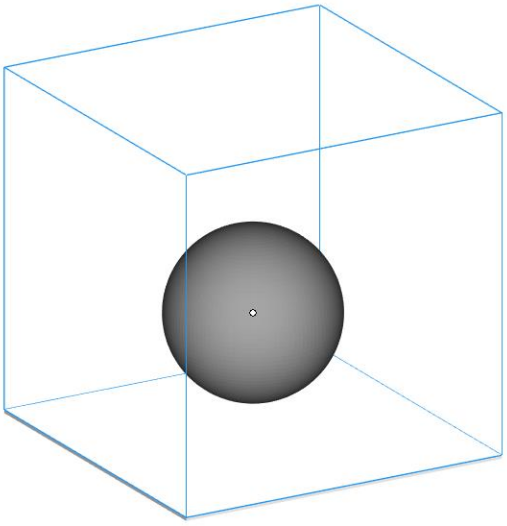
Area Fill Strategies



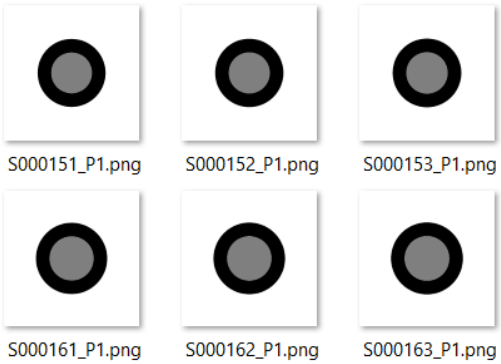


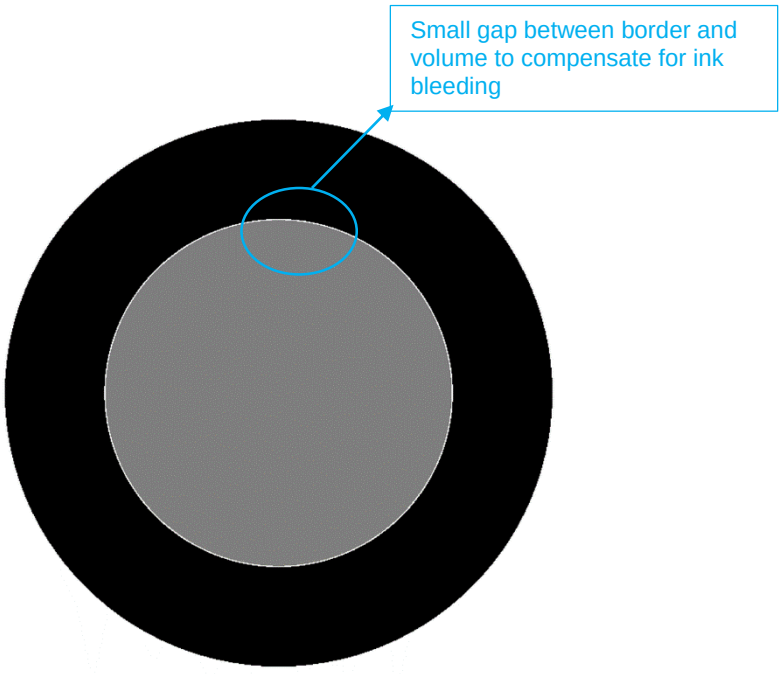


Magics



Export



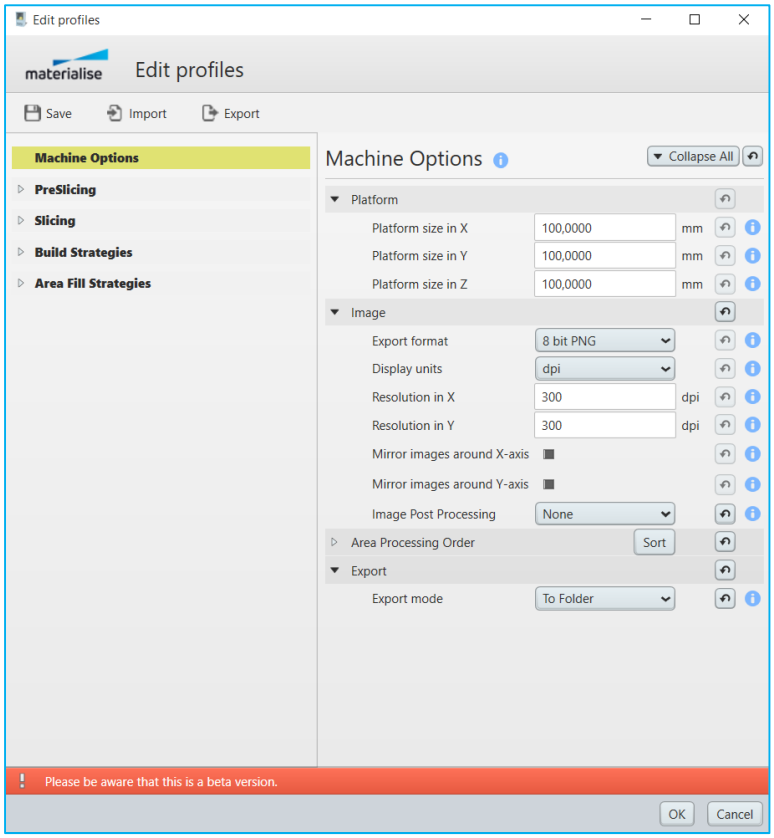


For purpose of clarity we combined border and part volume in a single image. In practice both areas are assigned to different channels and as such consist of separate images. The part volume channel will apply absorptive ink and the border channel will apply reflective ink.

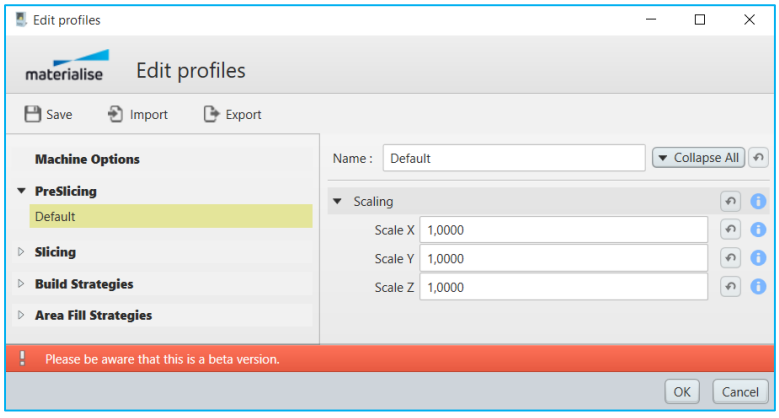
9.2. How to setup your build processor for Print & Cure applications

With Print & Cure applications we are applying droplets of ink that are hardened under the influence of UV light and as such building up a part droplet by droplet. Due to the nature of the technology support is needed during printing of all overhanging areas of the part. The support technology used for Print & Cure applications are block supports. A typical setup for Print & Cure applications will look like this

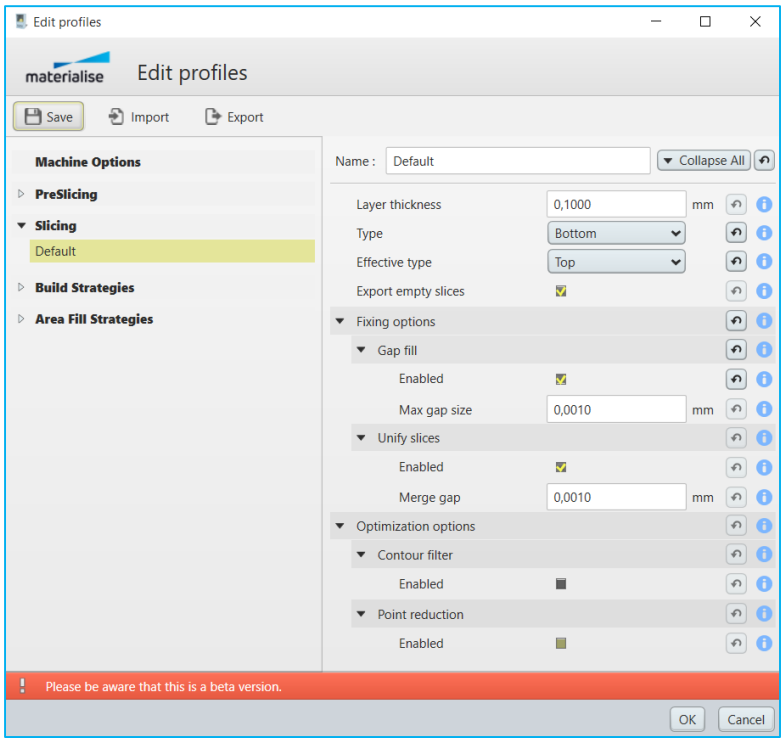
Machine Options



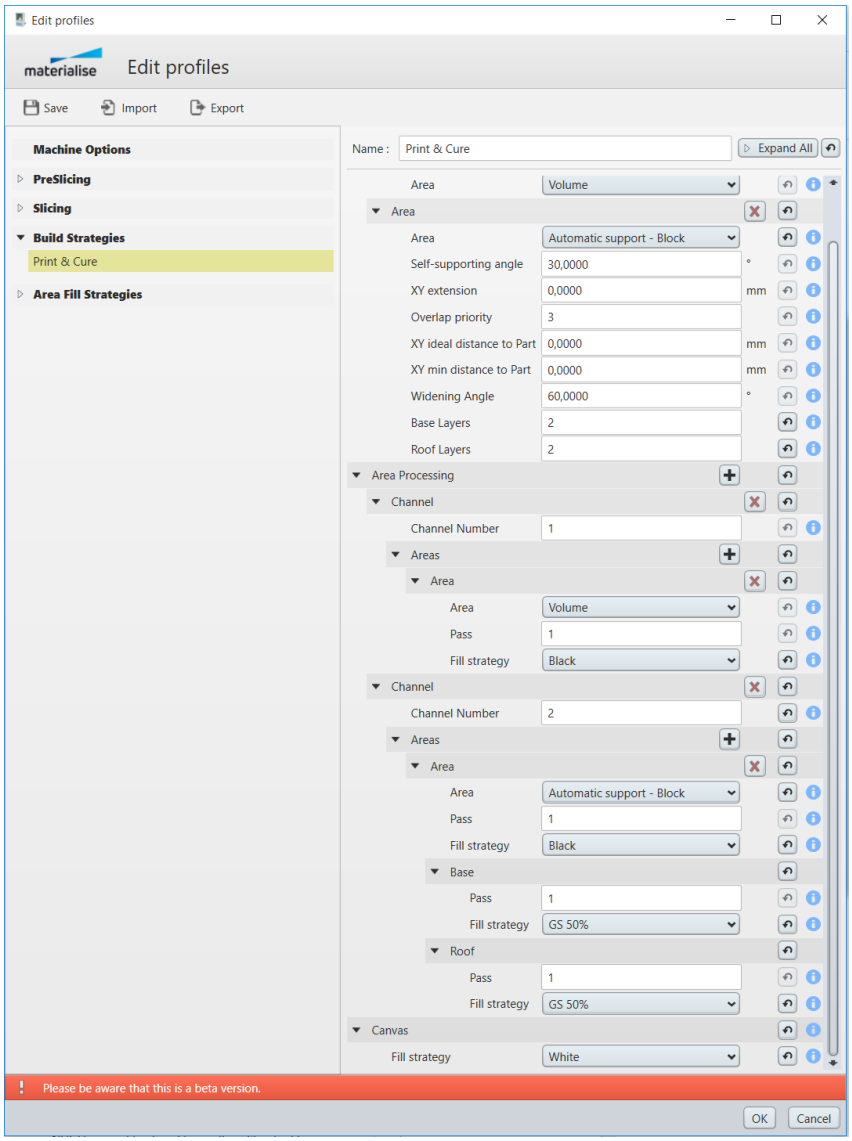
Pre-Slicing



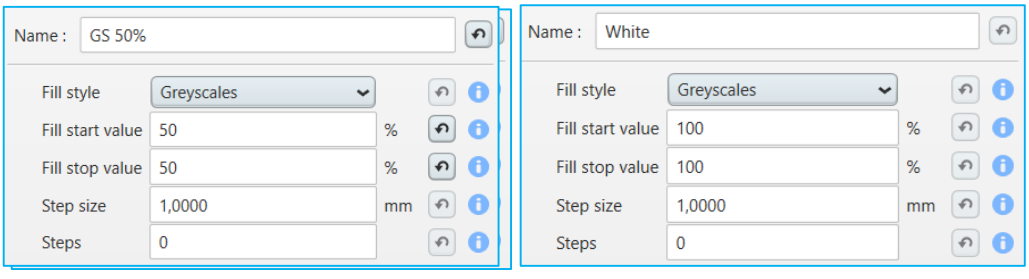
Slicing


Edit profiles
materialise
Edit profiles
Save
Import
Export
Machine Options
PreSlicing
Slicing
Default
Build Strategies
Area Fill Strategies
Name :
Default
Collapse All
Layer thickness
0,1000
mm
Type
Bottom
Effective type
Top
Export empty slices
Fixing options
Gap fill
Enabled
Max gap size
0,0010
mm
Unify slices
Enabled
Merge gap
0,0010
mm
Optimization options
Contour filter
Enabled
Point reduction
Enabled
Please be aware that this is a beta version.
OK
Cancel

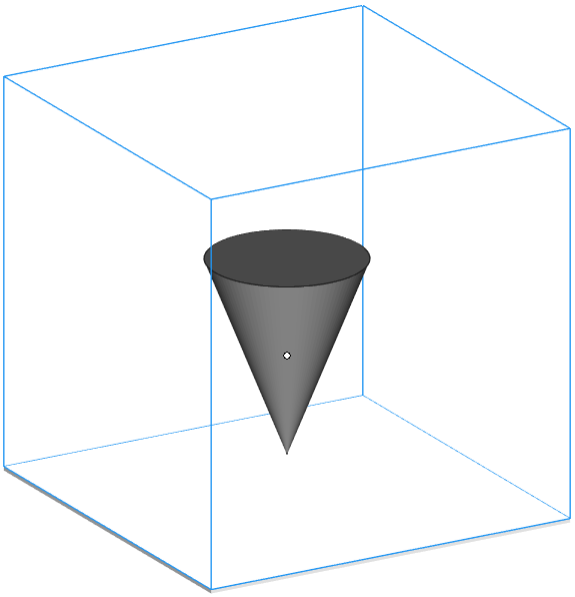
Build Strategies



Area Fill Strategies

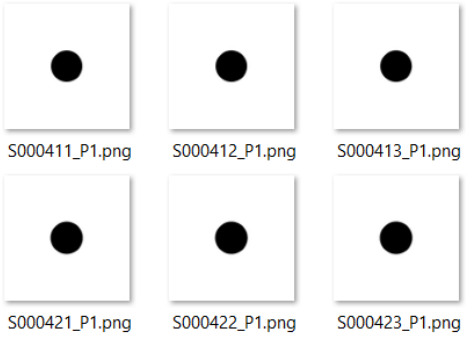


Magics

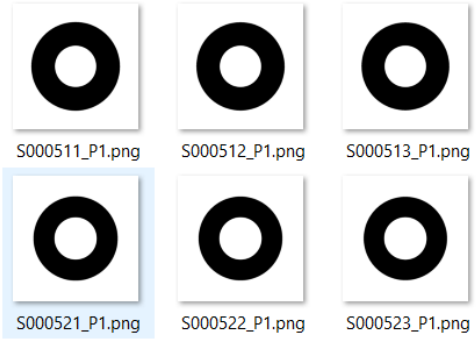


Export

Channel 1 = Volume Part



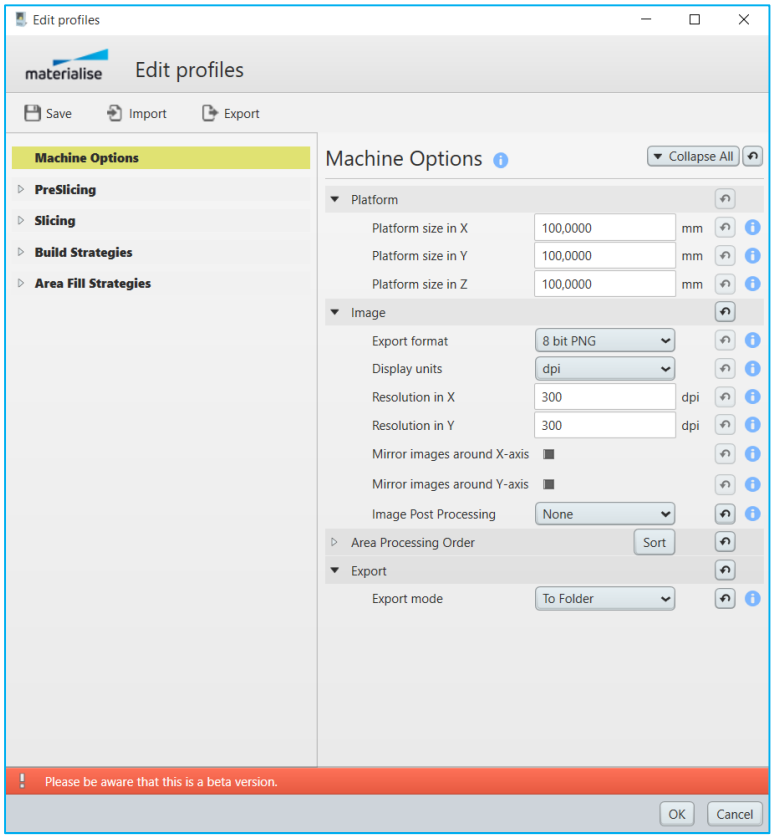
Channel 2 = Volume Block support



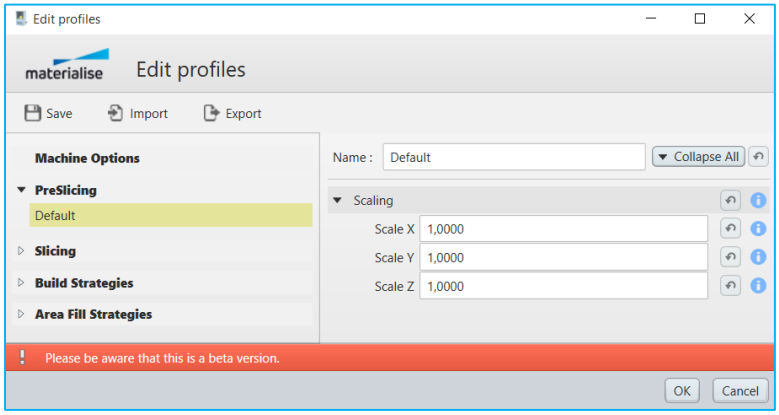
9.3. How to setup your build processor for Print & Bind applications

With Print & Bind applications we are selectively binding sand particles together by applying ink selectively on a sand bed. The binding process can be based on a 2 component system where the sand particles are coated by 1 component and the ink is the second component. When combined together they glue the sand particles together. Or the ink can act as a glue in a single component system. Typically this print technology does not need support structures and parts are in most cases build as a hard shell with a soft core (Hull & Core) to save on ink consumption. A typical setup for Print & Bind applications will look like this

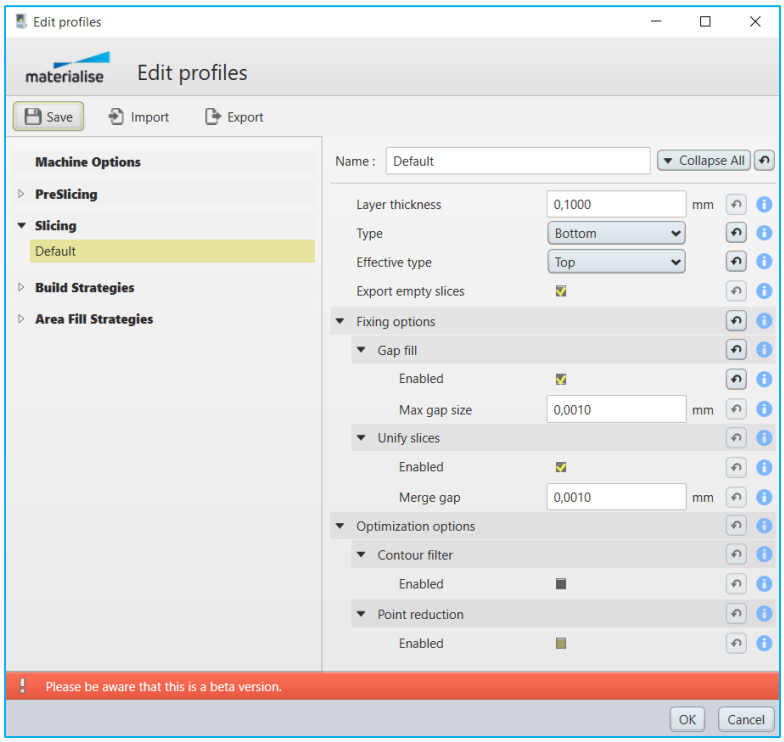
Machine Options



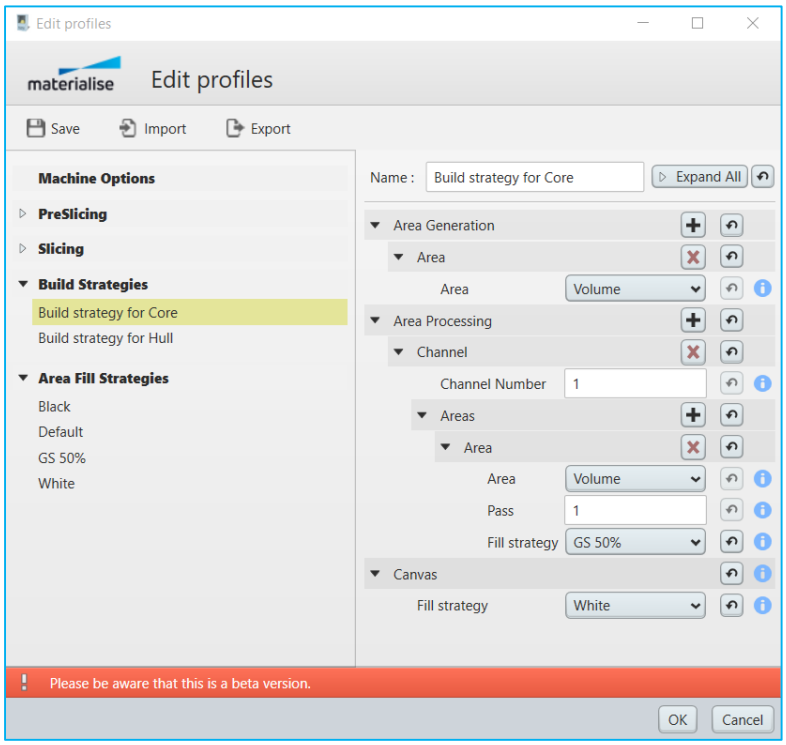
Pre-Slicing

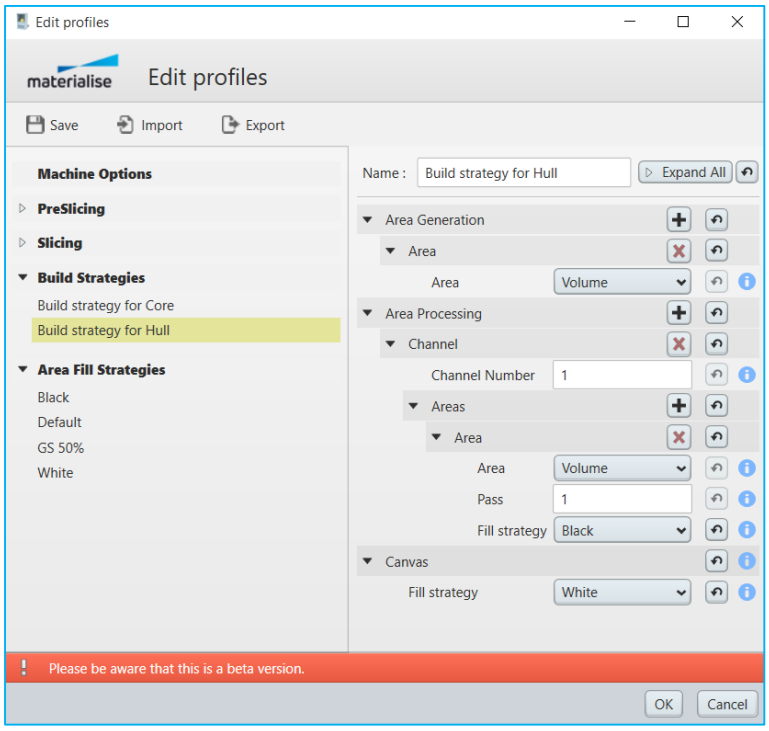


Slicing

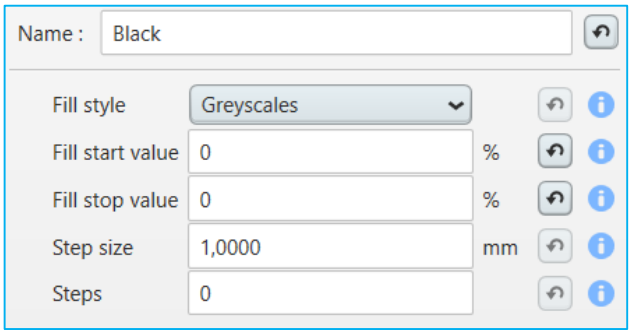


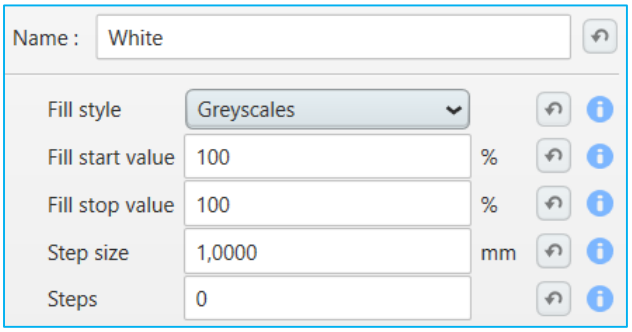
Build Strategies

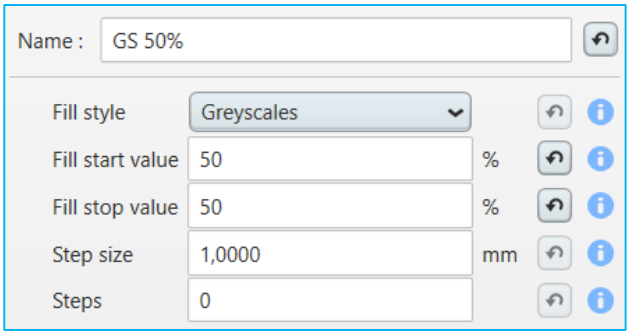




Area Fill Strategies

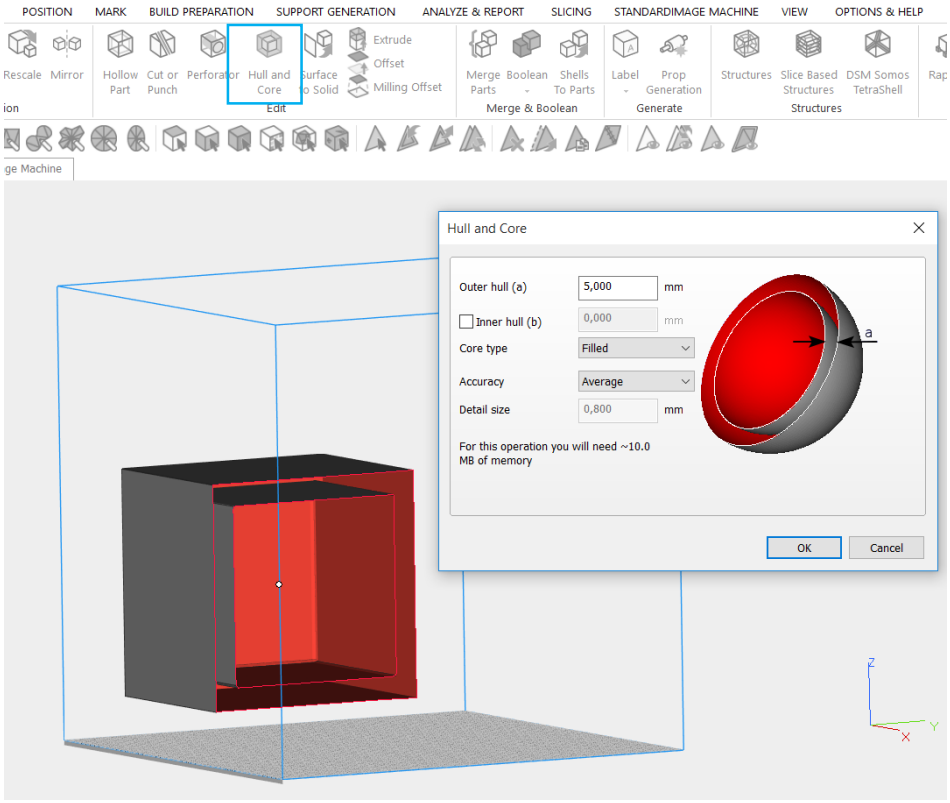






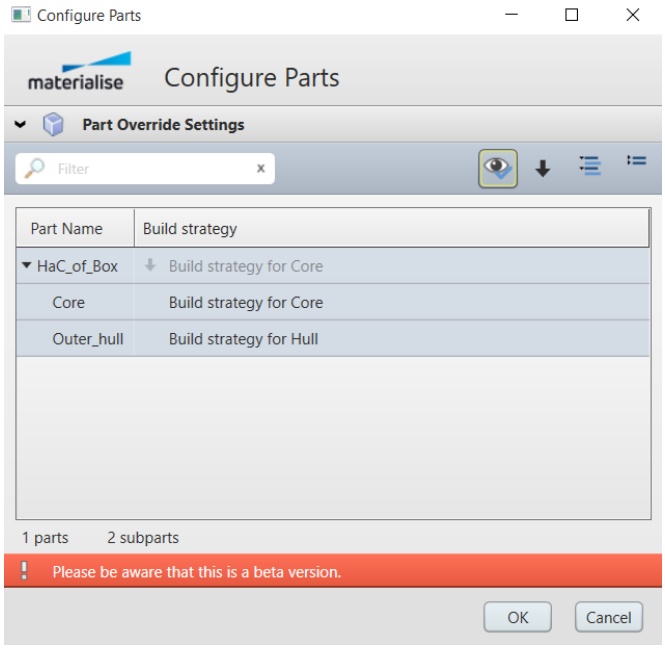
Magics

Perform a hull & core operation on your part(s)



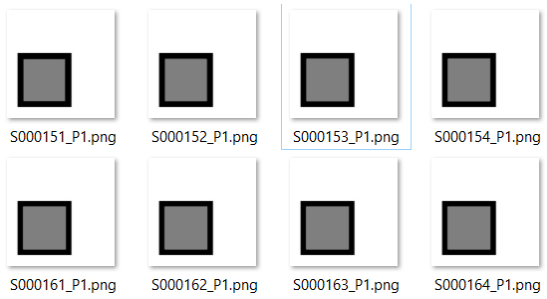
Part Configuration

Assign 2 different build strategies to your hull & core subparts



Export

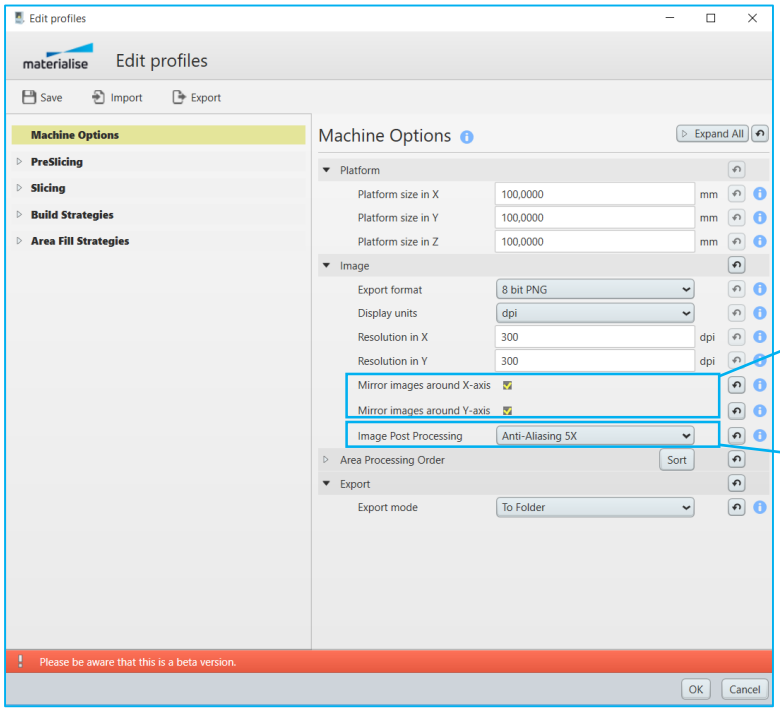
Channel 1 = Volume Core + Volume Hull



9.4. How to setup your build processor for Direct Cure applications

With Direct Cure applications we are selectively curing resin layer by layer by UV projection or UV masking. Typically this print technology needs point support generation. For bottom-up systems the suction forces acting on the parts during building need to be taken into account to generate enough support structures so that the support can withstand the forces acting on the part and the support structure during building. A typical setup for Print & Bind applications will look like this

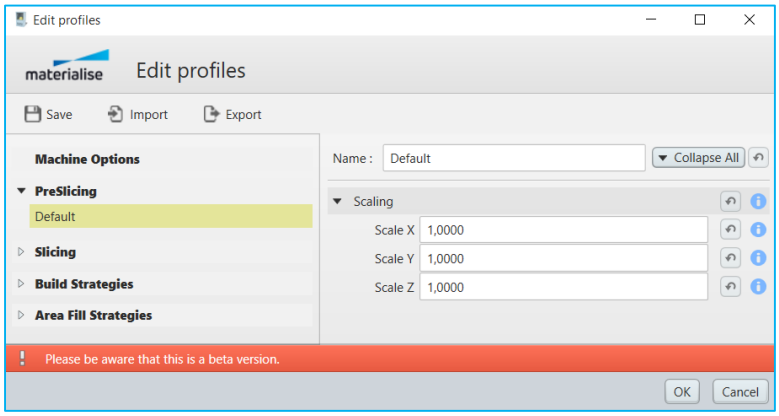
Machine Options



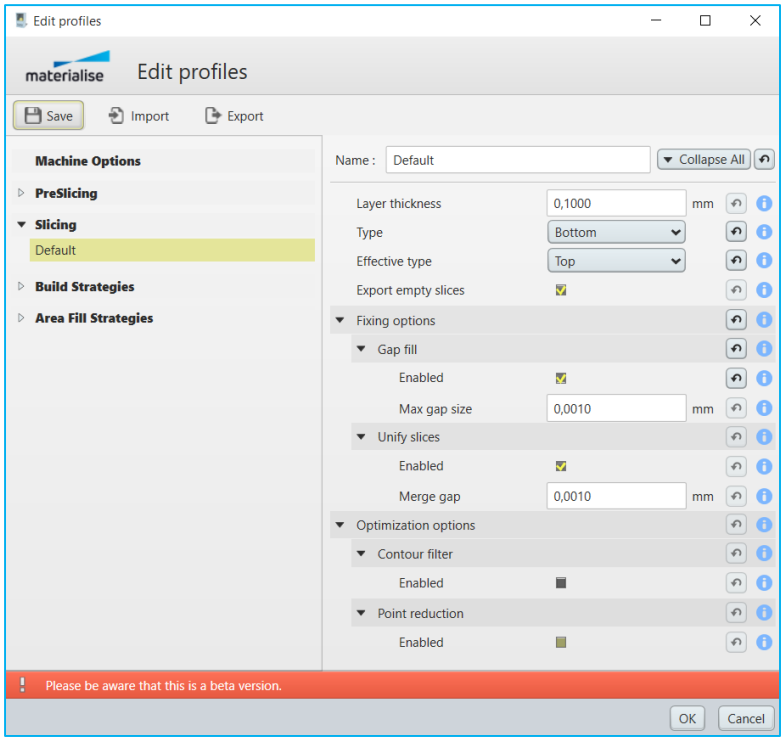
- Mirroring in X&Y for bottom–up projection systems.
- No Mirroring in X&Y for top-down projection systems
- Mirroring in X and/or Y for bottom-up mask systems depending on the orientation of the mask

- Anti-Aliasing can improve the surface quality for a types of direct cure applications by smoothing out the edges of a layer

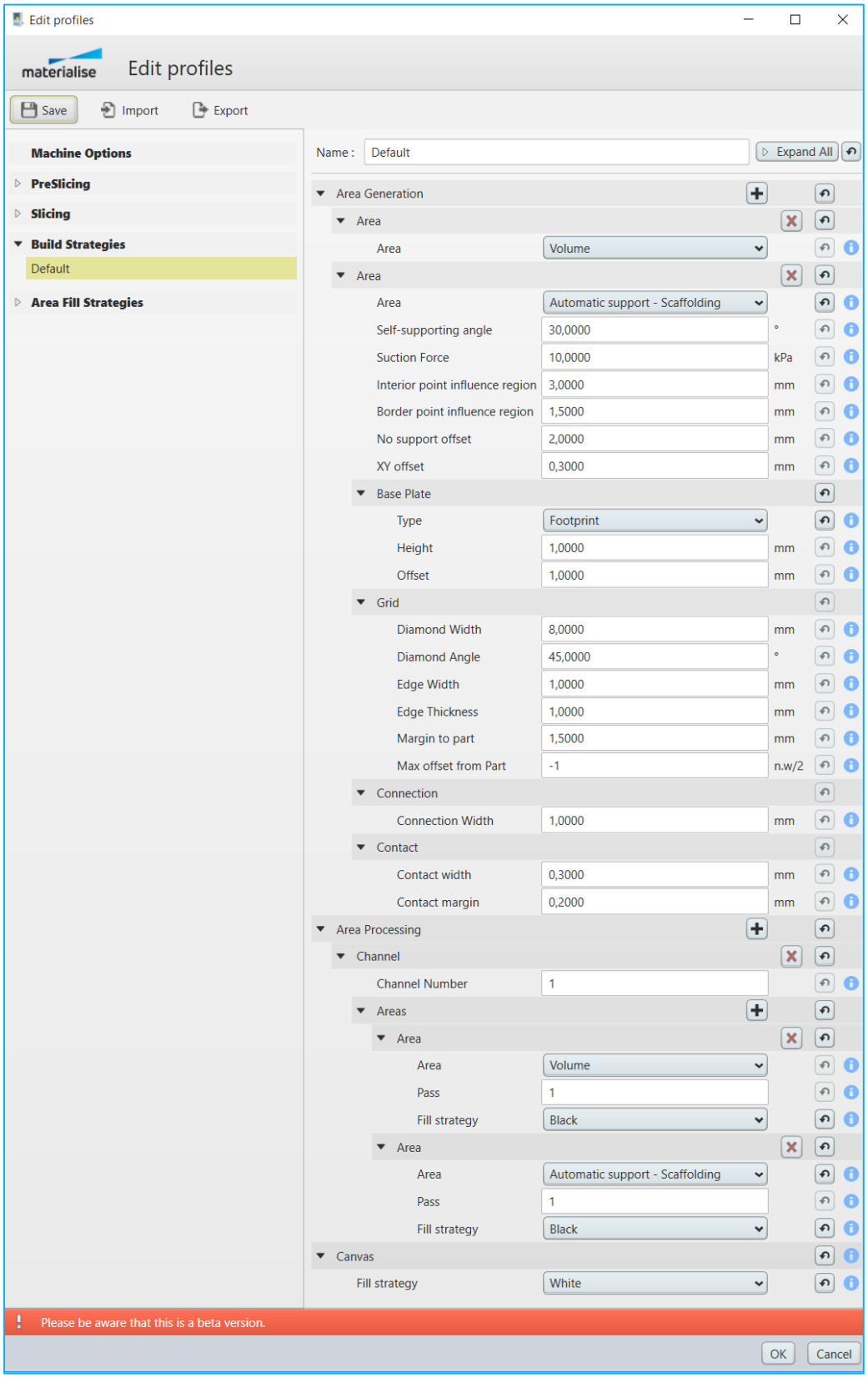
Pre-Slicing



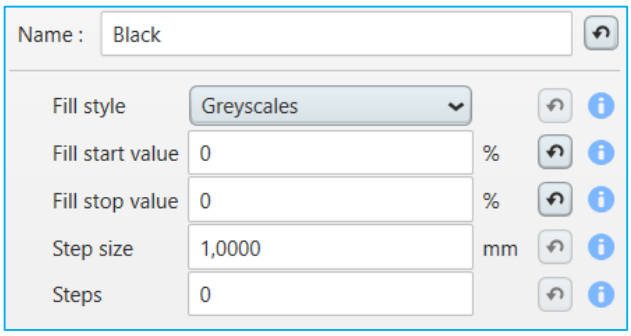
Slicing

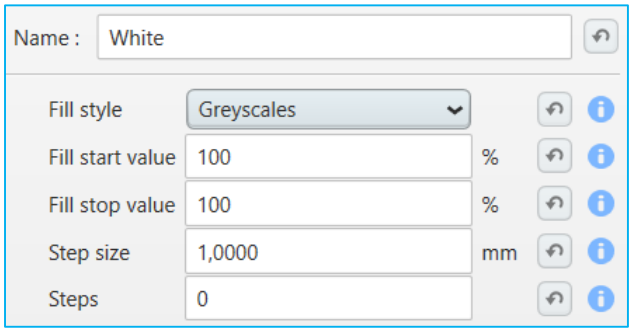


Build Strategies

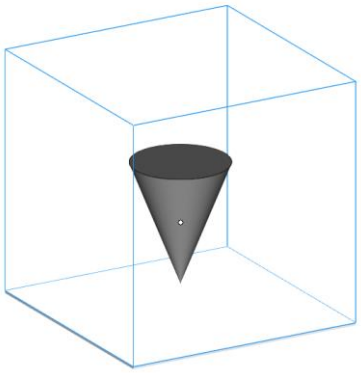


Area Fill Strategies

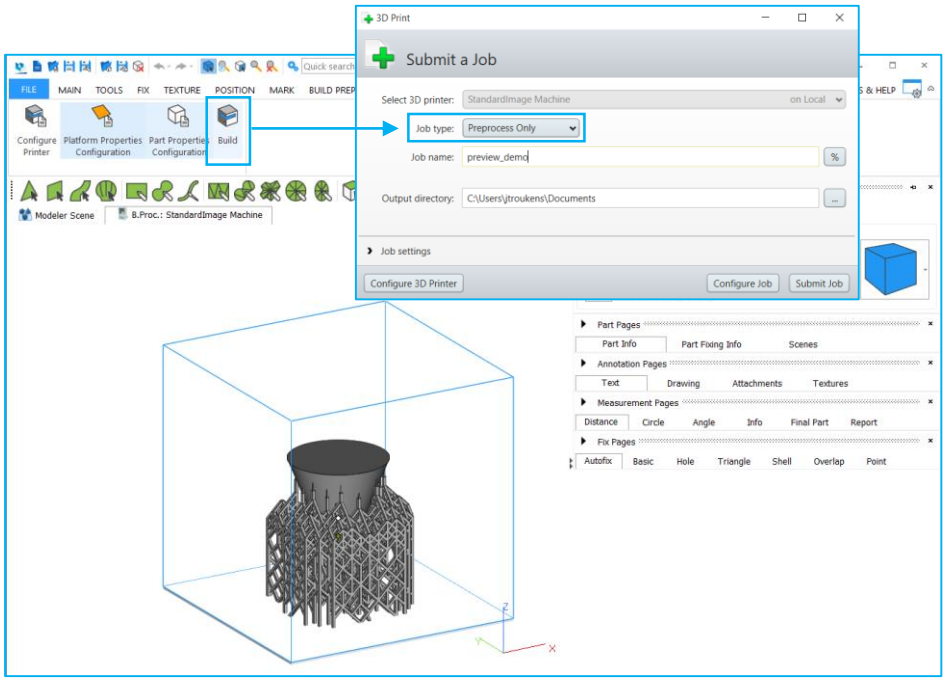




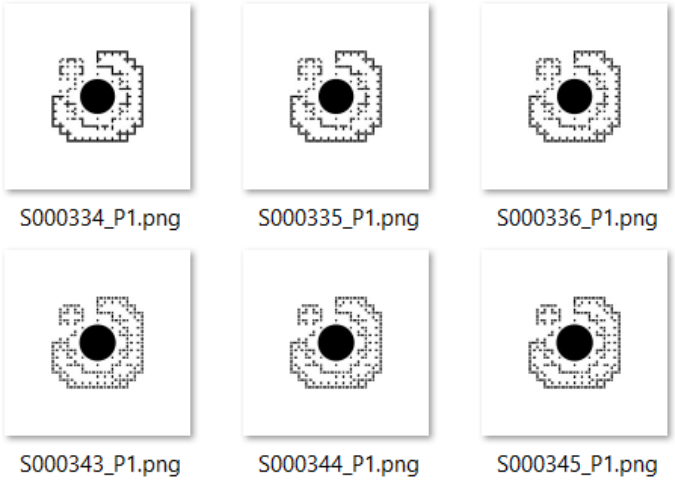
Magics



Preview scaffold supports in Magics by building in preprocess mode



Export


S000334_P1.png
S000335_P1.png
S000336_P1.png
S000343_P1.png
S000344_P1.png
S000345_P1.png

10 Frequently Asked Questions

10.1. How do I activate my Materialise Software?

Please refer to section 3.3 Licensing for more information.

10.2. How do I access the Standard Image Build Processor in Magics?

The Standard Image Build Processor toolbar is available in Magics, when working in a Standard Image Build Processor scene. Please refer to Chapter 6: Build Processor and Magics for step-by-step instructions.

10.3. How do I access the profile editor?

The profile editor can be accessed by:

- Edit profiles button in the configure printer dialog
- Edit profile button beside each profile selection box in the configure platform dialog. Only the corresponding profile section is editable at that time.

10.4. Can I view the generated Build Processor output?

Yes, the generated images files in the build folder can be viewed in the Windows file explorer as thumbnails and in Windows photo viewer as the complete image. The generated buildscript.ini and parameters.ini file can be viewed by any text editor on your computer.

10.5. Can I see what settings were applied to my processed job?

Yes, in your build folder you will find the parameters.ini file that gives a summary of all parameters applied when the job was processed

10.6. How can I automatically nest different parts inside my build volume for Print & Sinter and Print & Bind applications

There is a dedicated Magics module available called the ‘Sinter Module’ which includes a powerful 3D Nester toolbox. For more information, please refer to http://software.materialise.com/magics-sinter-module.

11 Typical Error message

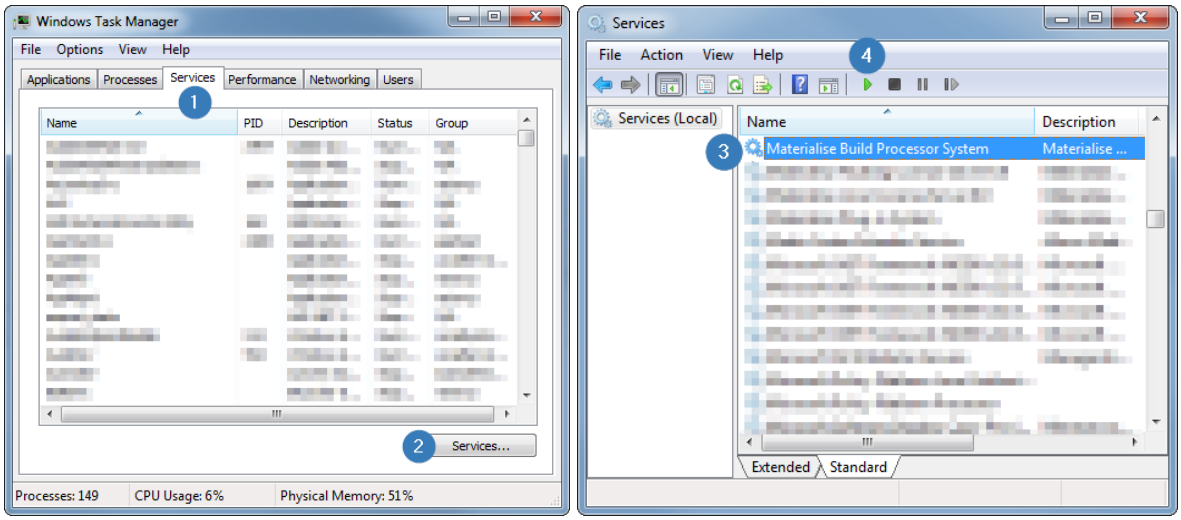
11.1. Error message: ‘Failed to generate scaffolding support’

This error indicates in most cases that the clearance between the part(s) and the platform is too small for generating a scaffolding support structure. Increase the space between the part(s) and the platform and try again.

11.2. Error message: ‘Check if the BPS service is running’

This error indicates that the Build Processor System service has stopped running. To start it again, go to Windows Task Manager and:

(1) locate the Services Tab
(2) Click Services button to open the Services dialog,
(3) Locate the ‘Materialise Build Processor System’ service
(4) Press the play icon to start it again



11.3. Error message: ‘Incorrect xxx profile for "Platform". Please check profiles assignment.’

This error message means that one or more of the profiles that are assigned to this job on platform level do not exist anymore in the profile editor. Please (re)assign the profiles on platform level and submit the job again.

11.4. Error message: Incorrect build strategy profile for part xxx. Please check profiles assignment.

This error message means that the profiles that are assigned a part do not exist anymore in the profile editor. Please (re)assign the profiles on part level and submit the job again.

11.5. Error message: ‘Unexpected open contours in xxx during slicing’

This error message means that the indicated input part contains errors that result in open contours during slicing. Such errors indicate that there are errors present in the original digital model. It is highly recommended to fix these in Materialise Magics software, where you have a large set of dedicated fixing functions and visual feedback available.

11.6. Error message: ‘The part exceeds the build envelope's bounds after rescaling.’

This error message means that on or more parts on the build platform are placed completely or partially outside the build platform before and after scaling. Reposition your parts so that they will fit the build platform taking into account rescaling.

12 Support

12.1. Contacts

We want you to have a smooth user experience when working with Materialise Magics software and the Standard Image Build Processor. If you do encounter any issues, please always try to save your work and restart your system first. Should the problem persist, you may contact Materialise Support. The technical support will be able to help you with technical problems you have when working with Materialise Magics software and the Standard Image Build Processor.

For more information on how to reach us, please consult:

http://software.materialise.com/customer-service

12.2. Create a Report File

In case of unknown errors the technical support of Materialise needs more detailed information of what has happened with the Build Processor or Build Processor System.

This information can be provided by the Build Processor System by creating a report file collecting data which might be useful to detect the error.

Notification

Please do the actions described below as soon as possible after the error appears.

1. Op the 'Build Processor Manager'
2. Click on the 'Help' button in the top right corner and click on 'Troubleshooter'
3. Press 'Generate Report' to collect all data
4. Save report.cab to a temporary folder

More details on the above can be found in section 4.1: Access the Build Processor Manager on page 13.

Notification

No personal data will be collected. The collected data are logs of the Build Processor, information on the system environment and parameter files.

Before sending the report file to Materialise it is advised to open the report.cab to check the collected data. Make sure no data are enclosed which might be in conflict to the security policies of your company.

5. In order to send the report file successfully to Materialise the file must be zipped and password protected in order to pass the Materialise firewall.

6. Send the zipped file together with the password and a good error description to the technical support of Materialise.