

# How to 3D print a temporary dental bridge

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Netfabb Tutorial  
for SolFlex 150|170|350|650

This short tutorial seeks to offer basic information concerning the 3D CAD software Netfabb in regards to printing temporary dental bridges on SolFlex 3D printers. After completing the tutorial, you should be able to successfully print your first dental bridge and have a good impression of the digital workflow with Netfabb.

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*This tutorial was created using Autodesk Netfabb 2017 Premium on Windows, other Versions might behave slightly different.*

**Used stl-file:** Bridge.stl

*All settings shown are referring to our SolFlex 350 printer. Settings for all other printers can be found in the appendix.*

## 1. PREPERATION

To start off preparing the print, the W2P machine workspace has to be initialized using the **Load Machine Workspace** button located at the top-left of the window (Figure 1). After choosing **W2P SolFlex** from the drop-down menu, a **3D model** of a SolFlex printer should show up in the main view window.

The next point of interest is the so-called **Build Job** tab, where you can find some of Netfabb's main functionality (Figure 2).

### 1.1. SETTINGS

There, the first thing to do is to adjust your **Machine Settings**. This is done by clicking the **Settings** button on the **Build Job** menu to open a small window called **Machine Settings** (Figure 3) where you can adjust the general settings of your build job.

- For **Machine Type**, select the printer that you are going to use for the print.
- The **Layer Thickness** determines the level of detail of the print. For this application a layer thickness of **50 µm** is recommended.
- The **Support Wall Thickness** determines the strength of the support structures. For smaller prints, a thickness of **200 µm** is recommended.
- For the **Export Type** option select **PNG Image Export**.
- In terms of Material it is important to select the **exact** material you will be using for the print. For temporary dental bridges a material such as **SolFlex Prov** is recommended.

Once you are done, hit the OK button to continue.

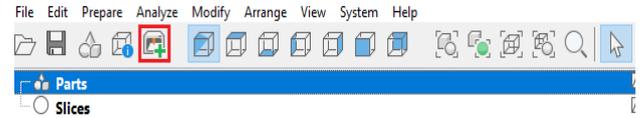


Figure 1: Load Machine Workspace

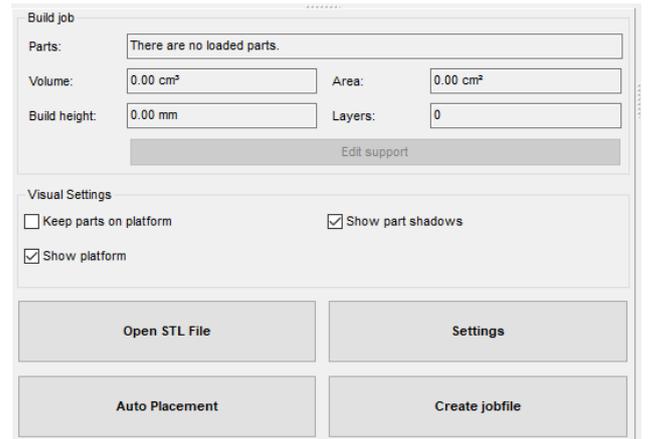


Figure 2: Build Job Menu

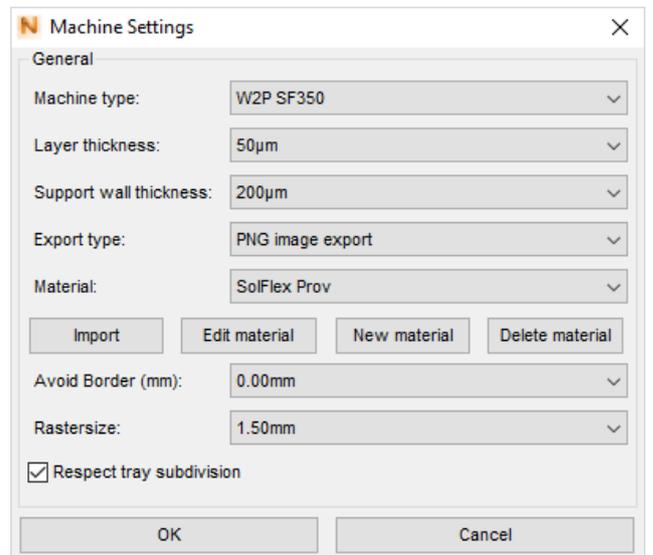


Figure 3: Machine Settings

### 1.2. IMPORT A STL FILE

The object to be printed will be stored as a **STL file** and needs to be imported into Netfabb, which can be done in two main ways:

- **Drag and Drop:** Simply drag and drop your STL-file from the file-explorer into the Netfabb-window.
- **Opening via File-Explorer:** Hit the **Open STL File** button and open the file through Windows Explorer (Figure 4).

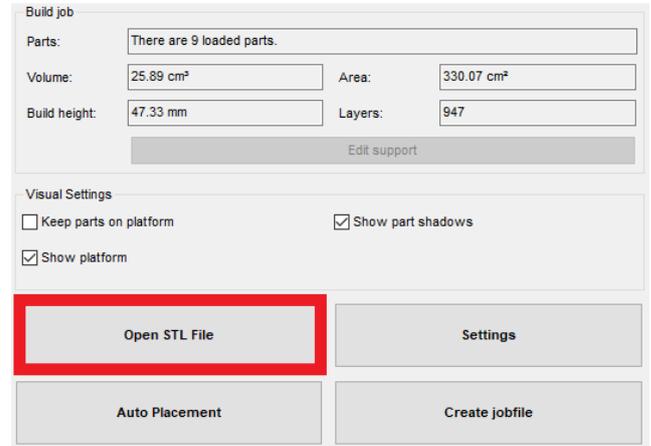


Figure 4: Open STL File

## 2. OBJECT ORIENTATION

Now that the object is imported into Netfabb, it needs to be positioned carefully to ensure correct printing.

### 2.1. NAVIGATE IN NETFABB

On the top-left of the screen, Netfabb’s **view options** can be found (Figure 5). These consist of one isometric and six directional view options which control the **viewing angle**. Use these options when positioning the object.



Figure 5: View Options

When using one of the six **directional view options**, you can only move the object in two dimensions. This can be extremely useful if an object needs to be reallocated while keeping the same distance from the building platform.

## 2.2. ROTATE PARTS

The **correct orientation** of the object is very important, since the outcome of the print depends on it. It should be oriented in a way that minimizes the amount of 'overhangs' and 'steep angles' which can be difficult for the printer to print. Thus, the ideal orientation of a bridge would be upside-down as shown in **Figure 6**.

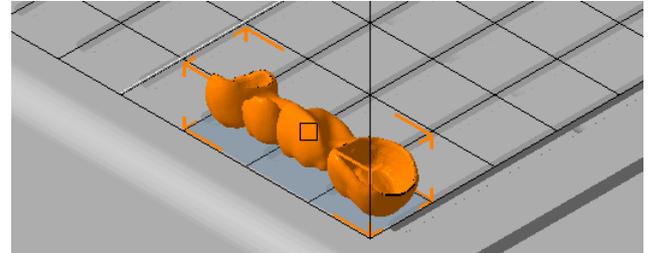


Figure 6: Bridge in Ideal Position

This can be done by hitting the **Rotate Parts** button in the top centre of the screen (Figure 7) which will open up a window labelled **Rotate Parts**. Here you can set the **axis** and **angle** of your rotation (Figure 8).



Figure 7: Rotate Parts

Hit the **Rotate** button to execute the rotation until the desired orientation is achieved.

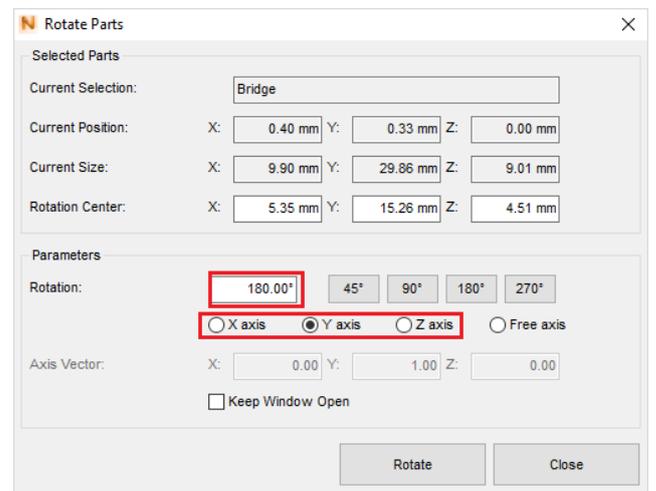


Figure 8: Axis and Angle of Rotation

### 2.3. MOVE PARTS

To improve print results the part should not be printed directly on the platform. Raise the object by navigating to the **Visual Settings** tab and uncheck **Keep Parts on Platform** (this step is crucial, as the following steps will not be possible otherwise).

Now hit the **Move Parts** button located in the top-centre of your screen (Figure 9).

This will result in a window opening up labelled **Move Parts**. Set the **Z-Translation** value to 5mm and hit the **Translate** button (Figure 10).



Figure 9: Move Parts

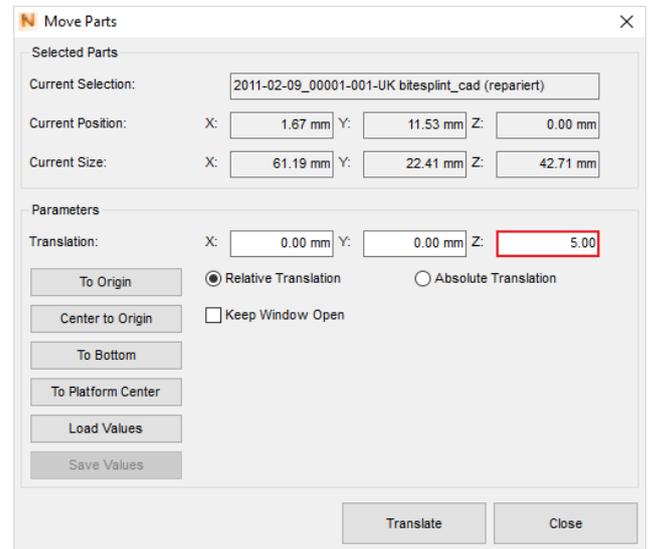


Figure 10: Z-Translation

## 3. SUPPORT STRUCTURES

### 3.1. ADD SUPPORT STRUCTURES

Even after correctly orienting and positioning the object, it can't be guaranteed to print properly. To further stabilize and improve the 'printability' of the bridge, **support structures** have to be added to it. This process is fairly easy when using one of the built-in **support scripts**:

- Click the **Edit Support** button on the **Build Job** tab (Figure 11)
- Navigate to the bottom-left of your screen and hit the **Run Support Script** button (Figure 12)

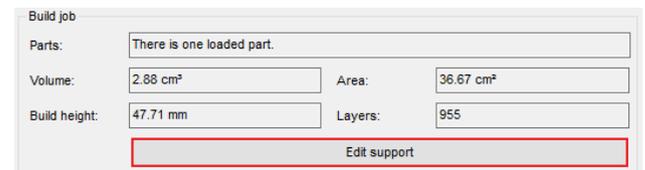


Figure 11: Edit Support



Figure 12: Run Support Script

This will result in a window opening up labelled **Choose Support Script** (Figure 13). Select a script suitable for bridges and hit **Execute**.

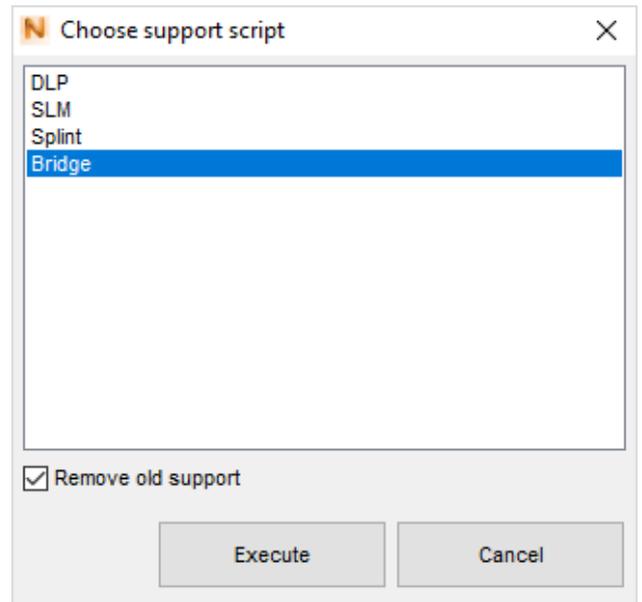


Figure 13: Choose Support Script

With the newly added supports the part should now look similar to the one shown in **Figure 14**.

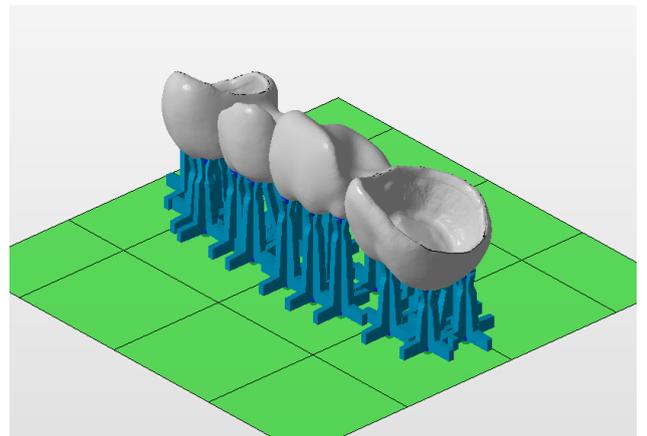


Figure 14: Support Structures

To end the process simply hit the **Apply Support** button located at the bottom-left of the screen (Figure 15).



Figure 15: Apply Support

### 3.2. DUPLICATE PARTS

This step is optional. If needed, parts can be duplicated easily to allow for higher print volumes.

To do this, first **right-click** the part and then navigate down to **Duplicate** (Figure 16). This will open up a window labelled **Duplicate Parts**.

There, the **Total Count** of duplicates can be set. The maximum number may vary depending on **the size of the model** and the printer in use. In this case, the SolFlex 350 printer supports 18 of our bridges (see the appendix for more printers).

Following that, navigate down to the **Placement** tab and make sure to only check the **X** and **Y** options. This will ensure that the duplicated parts will not be stacked on top of each other. Now also set the **count** of duplicates for each dimension and the **gap size** between the duplicates.

After you are done, simply hit **Duplicate** (Figure 17), which - if the settings were chosen correctly - will result in an array of properly positioned parts. However, if some them are coloured **yellow** or **red**, their exact positions need to be adjusted (Figure 18).

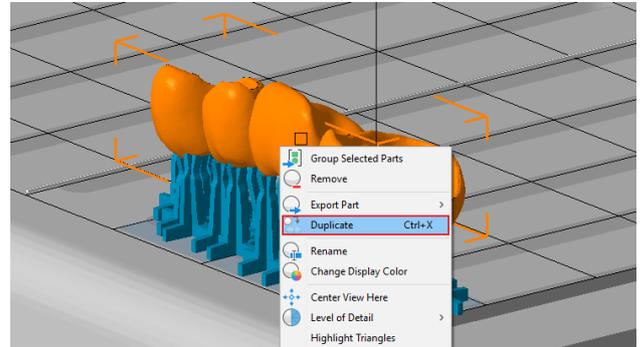


Figure 16: Duplicate Parts

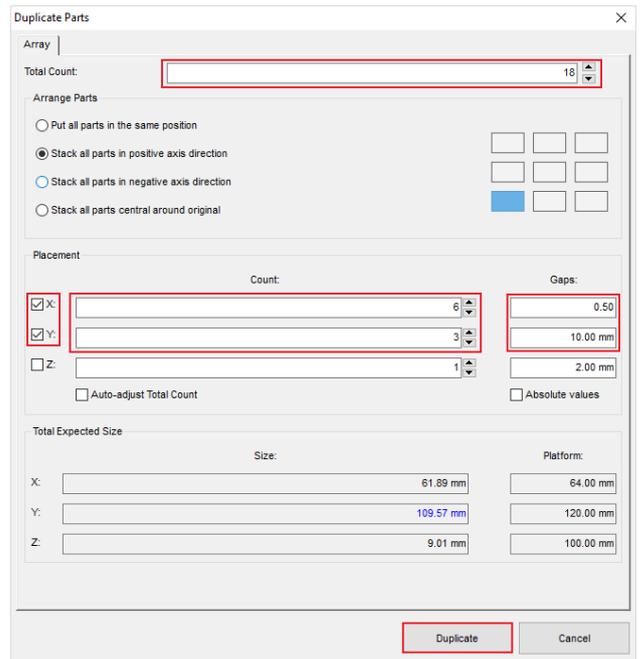


Figure 17: Duplicate Parts - Settings

### 3.3. ADJUST PART ALIGNMENT

Parts coloured **yellow** are touching the line separating the individual building platforms. Even though these parts will still be printed fine, there will be a visible seamline on them at these locations, thus it is recommended to readjust their position (Figure 19).

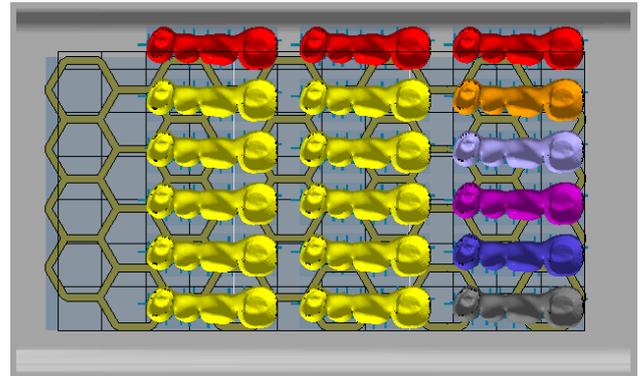


Figure 18: Critical Parts

Parts coloured **red** are partially not located on the **building platform**. If left like this the part will simply be printed without anything that is not on the platform. If there is **not enough space** to fit the part in, you might want to move all the parts closer together to create more space (Figure 20).

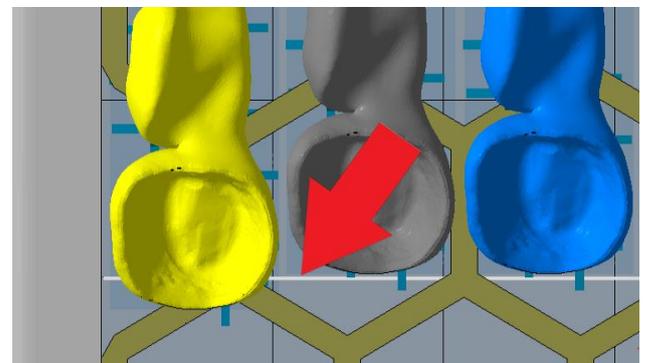


Figure 19: Parts Crossing the Line

For repositioning the parts, using the **directional view options** is highly recommended. Especially the **top view** option is very helpful in this situation (Figure 19).

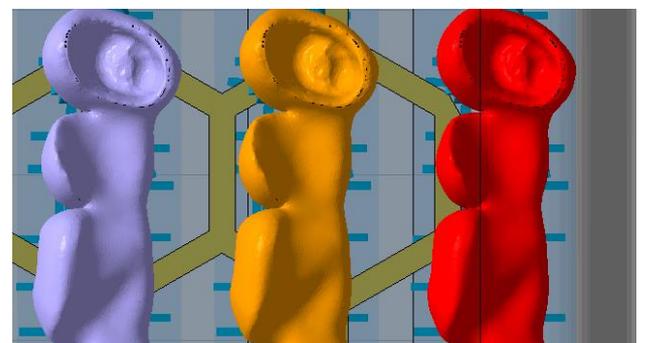


Figure 20: Part Outside the Building Platform

After having carefully moved the parts, your building platform should now look something like shown in **Figure 21**.

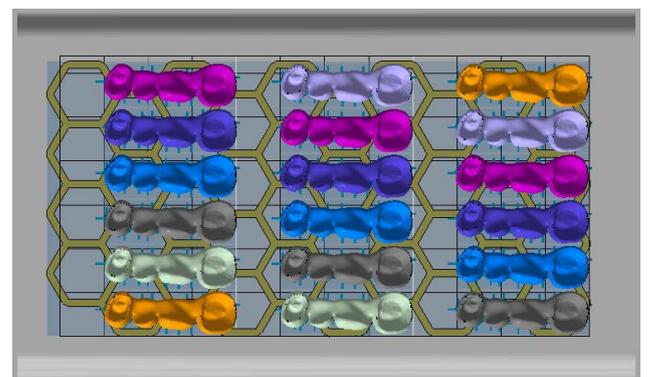


Figure 21: Aligned Parts

### 3.4.ADD A SUPPORT GRID

To ensure that all the parts are stable and fixed to the platform adding a **support grid** is recommended.

If you already have a STL file of a support grid you can simply import it into your Netfabb project as described in **1.2. Import a stl file** and ignore the following steps.

Otherwise you can create one yourself. To do so, first navigate to the **Part Library** button located on the top-left of your screen (Figure 22). Then enter the **Technical** tab and select the **Hexagonal Grid** (Figure 23).

Now you will be greeted with a **Pre-view** of the grid and a **Settings** tab. Simply adopt the settings from **Figure 24**. Note that the **Count of Holes** necessary in x- and y-direction may vary depending on the printer you are using (settings for other printers can also be found in the appendix).

To then bring the grid to your project simply hit the **Create Part** button (Figure 25).

After successfully adding a hexagonal grid, your building platform should look similar to the one shown in **Figure 26**.

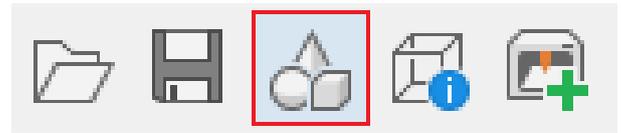


Figure 22: Part Library



Figure 23: Hexagonal Grid

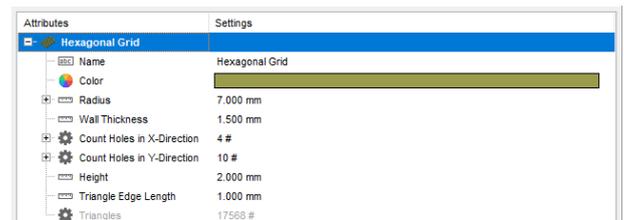


Figure 24: Grid Settings



Figure 25: Create Part

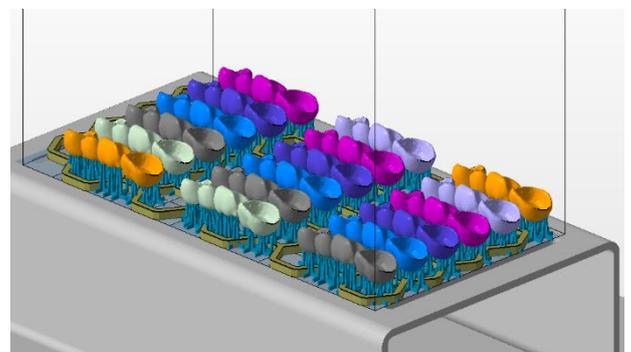


Figure 26: Bridges with Added Support Grid

## 4. CREATE A JOBFILE

The last step before you can finally print the parts is to create a **Jobfile**. To do so, navigate to the bottom-left of your screen and hit the **Create Jobfile** button (Figure 27).



Figure 27: Create Jobfile

This will result in an **explorer-window** opening up. Here you can choose a location where you want to save the file and name it.



To make handling a lot of jobfiles easier, it is recommended to use a naming scheme like this:

*'PrinterModel\_LayerThickness\_SupportThickness\_Material\_Description'*

Now your jobfile is being created. Note that this process may take up to several minutes depending on the **amount** and **size** of the parts and your computer's **CPU** (Figure 28).



Figure 28: Process of Creating the Jobfile

After the jobfile has rendered, you are done and can simply select it on your **SolFlex 3D printer** either from a **USB flash drive** or a **network connection**.

### REFERENCE FILES

**Netfabb project:** Bridge.fabbproject

**Jobfile:** 350\_50\_200\_SolflexProv\_Bridge.zip

## 5. APPENDIX

### SolFlex 650

In total, the SolFlex 650 printer can print 36 bridges using settings shown in Figure 29.

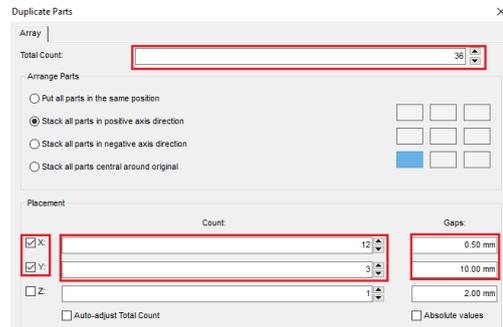


Figure 29: Duplicate 650

The correct grid settings shown are shown in Figure 30.



Figure 30: Grid Settings 650

### SolFlex 150

In total the SolFlex 150 printer can fit 6 parts as shown in Figure 31.

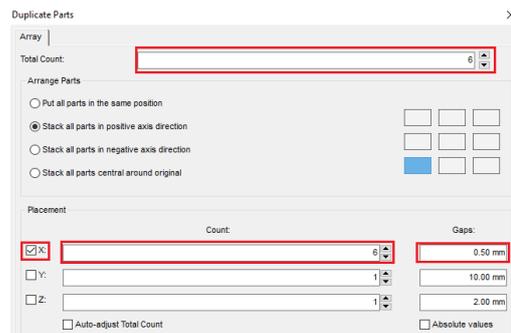


Figure 31: Duplicate 150

Correct grid settings are shown in Figure 32.

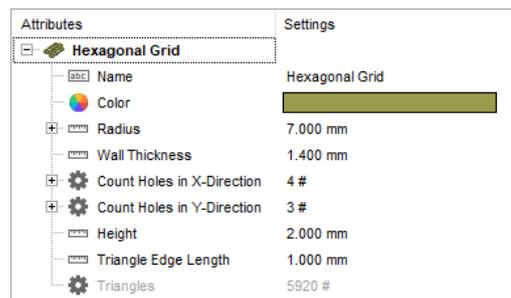


Figure 32: Grid Settings 150

### SolFlex 170

In total the SolFlex 170 printer can fit 8 parts as shown in Figure 33.

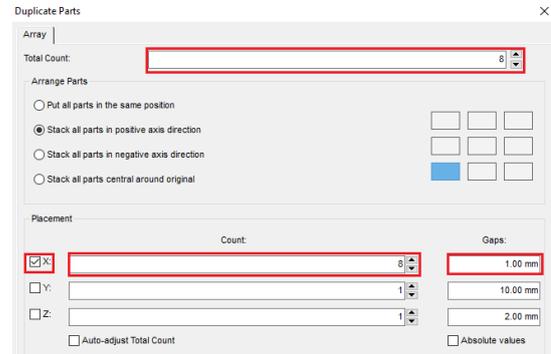


Figure 33: Duplicate 170

Correct grid settings are shown in Figure 34.

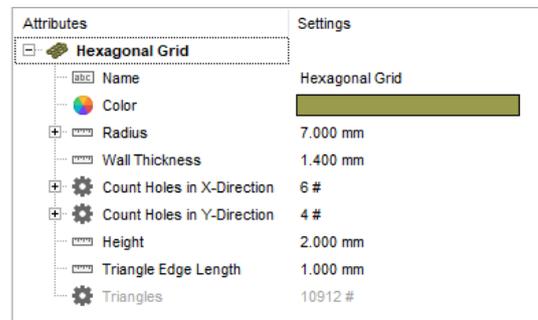


Figure 34: Grid Settings 170