

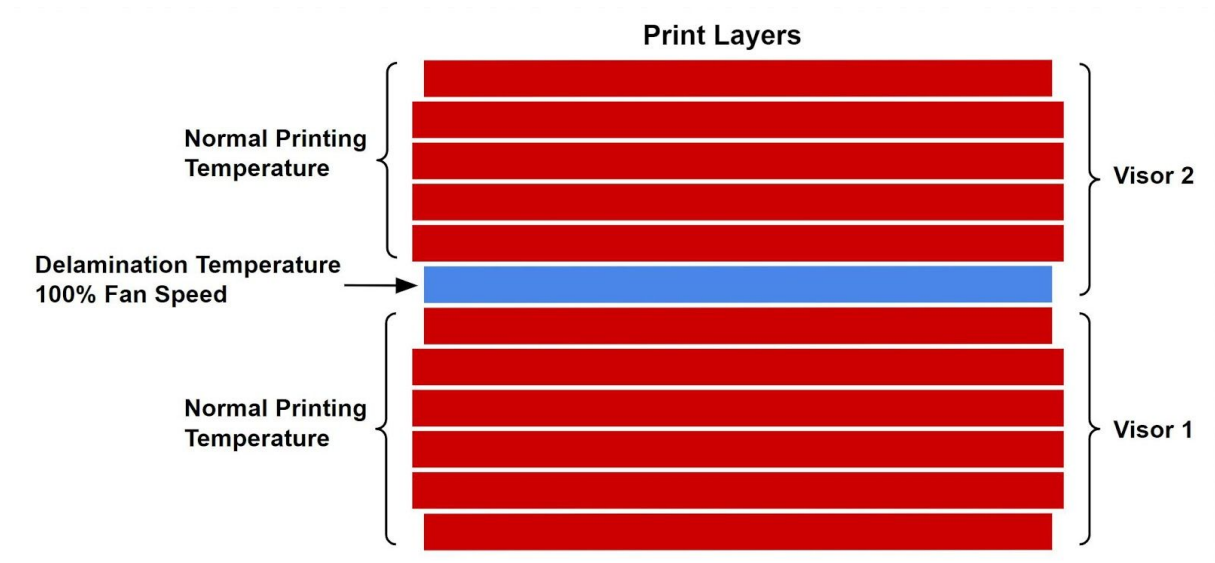
Printing Stacked Prints with Single Nozzle

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Method

This might not be a new idea but I remembered that whilst I was printing PETG at 240C, I had horrible delamination problems between layers and had to turn up to 250C to get reliable prints. So considering that we wanted to stack prints, I wondered why not use this to our advantage.

Here's a depiction of what I'm thinking:



This method really depends on how well you are able to control the hot end temperature, what temperature the material delaminates at and what material is used. I've experimented with PETG and it shows promising results that we can reliably get stacked prints that can be split apart easily by hand.



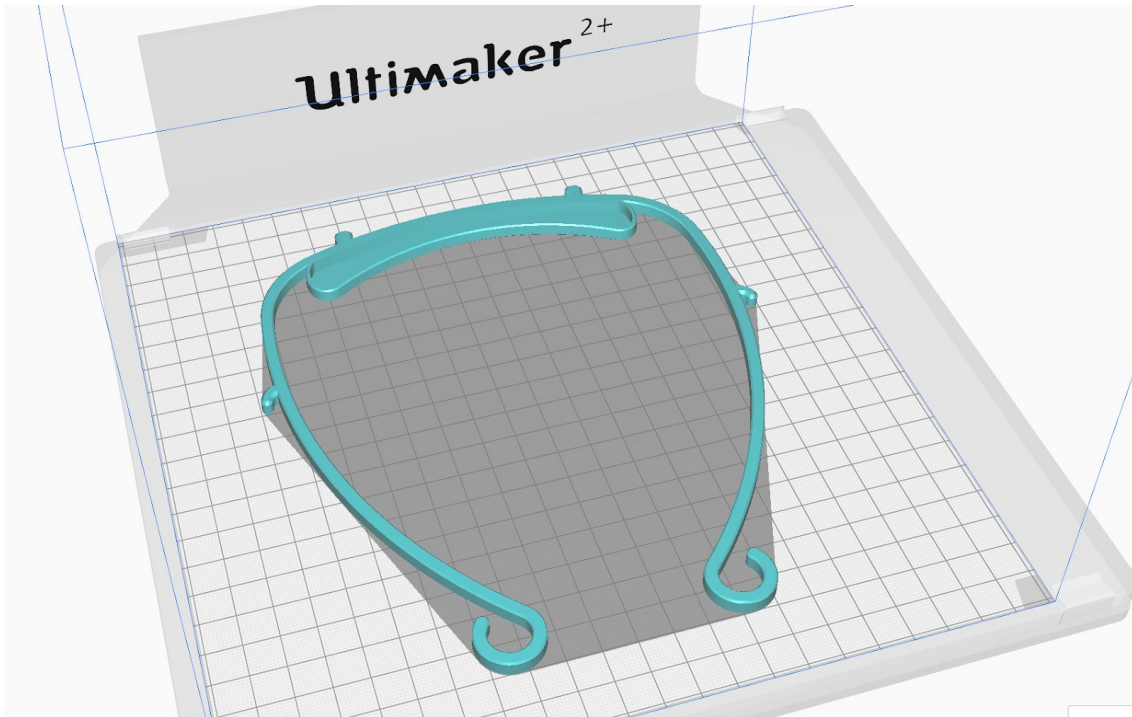
Left print shows the bottom of visor 2 and the one next to it is the top of visor 1. The surface finish is quite good with minimal drooping of layers as the layer was fully supported with no separation distance between each band. This is only one test print but it could be possible to repeatably create stack prints that are easy to remove using this method. This method does vary from printer to printer and material to material so do be aware. If the temperature difference between normal printing temperature and delamination temperature is too great, you may need to make some compromises on certain layers so that the hotend can reach the target temperature quickly.

Currently, I haven't yet seen a slicer implement a delamination layer operation but hopefully it will be added soon. There are workarounds with slicers like Cura but the effect may not function as well, due to how the nozzle takes time to change temperature.

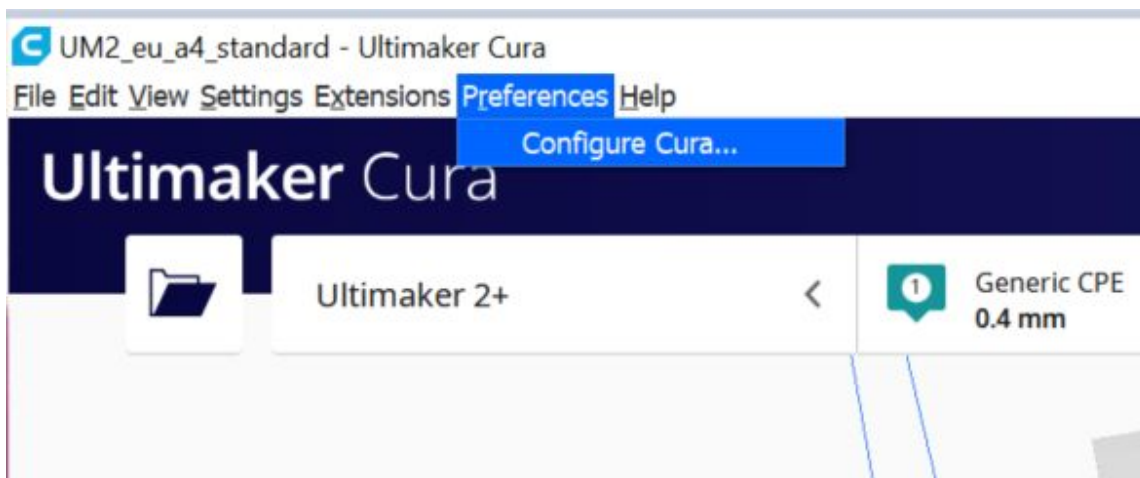
Setting up Stacked Models in Cura

(Don't have to do this if model is already stacked)

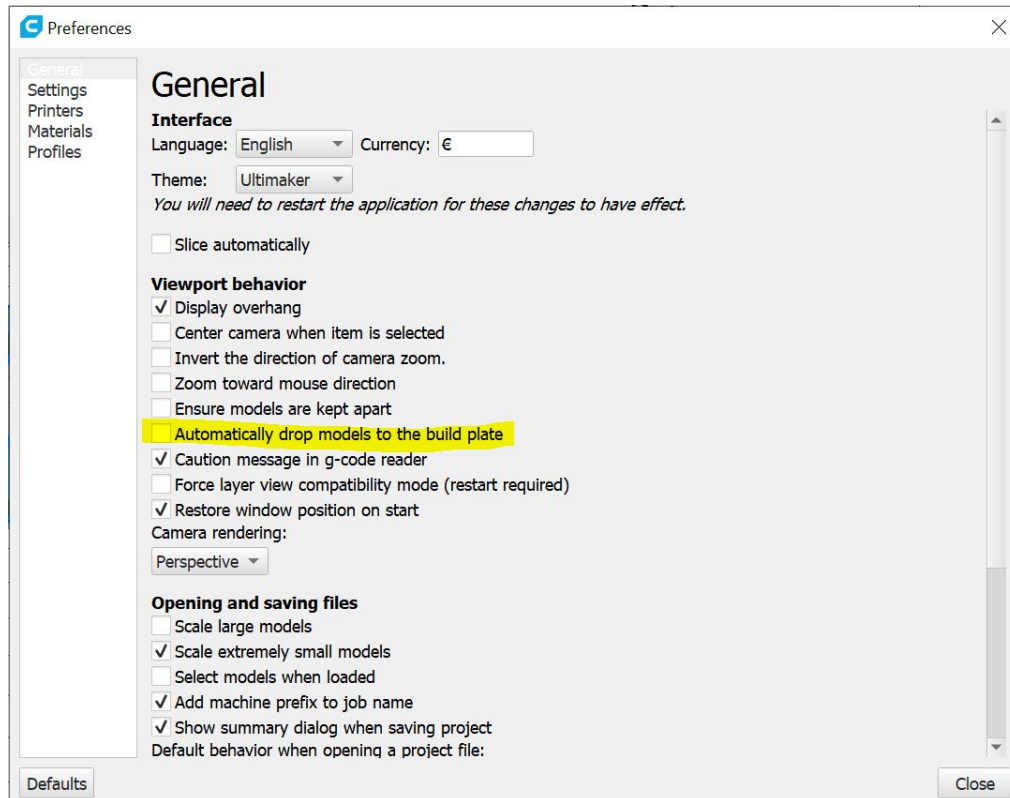
Import model into Cura:



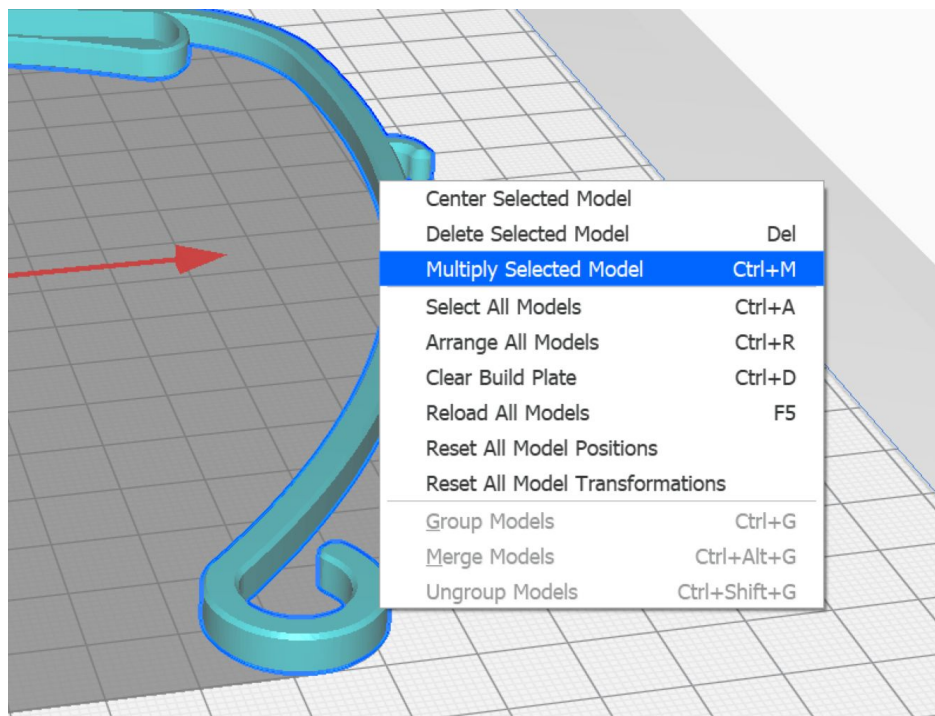
Go to “Preferences”, “Configure Cura”:



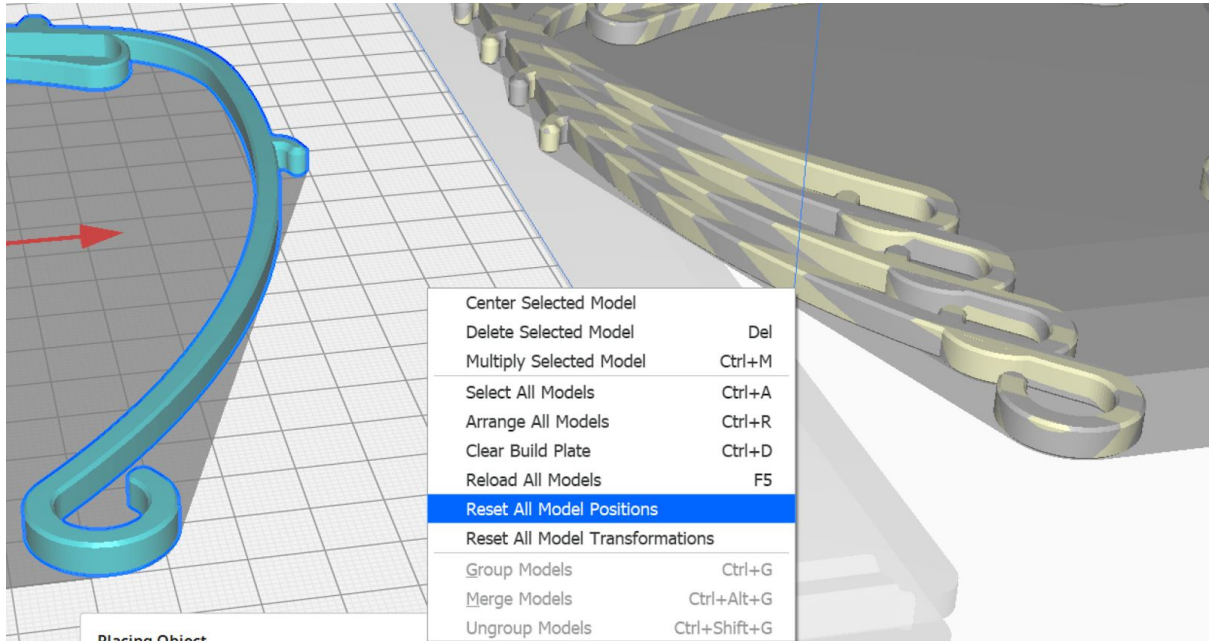
Untick “Automatically drop models to the build plate” and close Preferences window:



Right click on model, select “Multiply Selected Model” and enter the number of models you want to add:

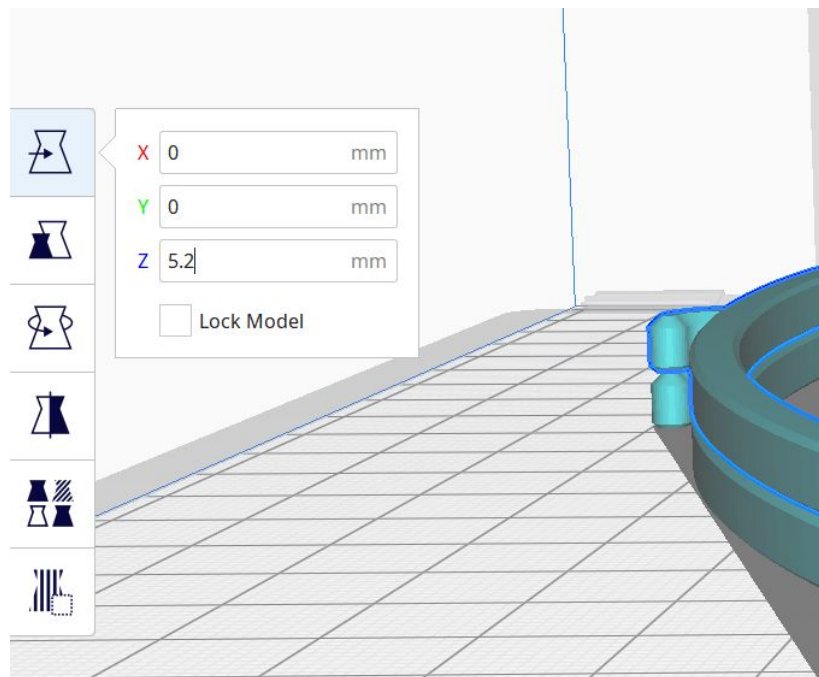


After Cura adds the models to the build plate, right click on the build plate and select “Reset All Model Positions” to place all the prints in the center:



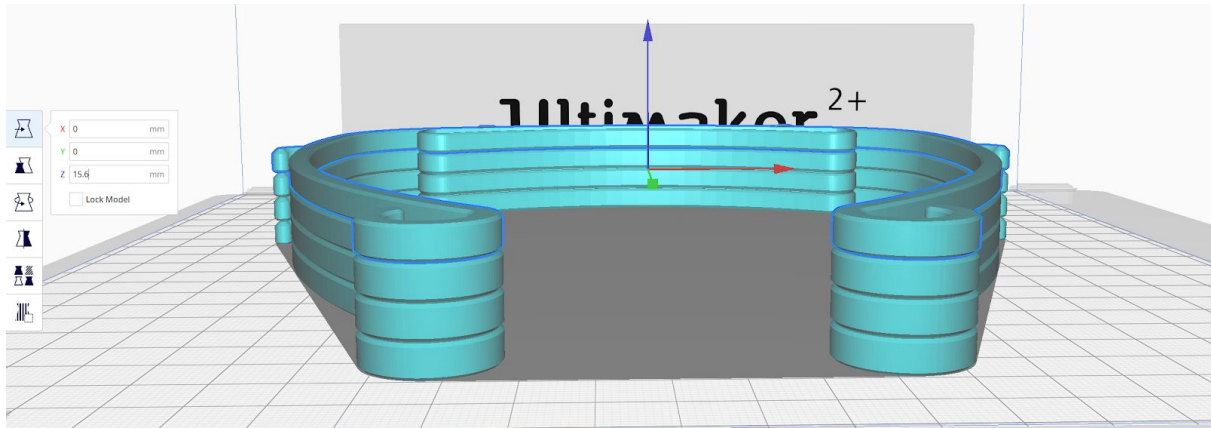
Once centered, select one of the models in the center and use the left panel to adjust the placement of the model to be on top of the other models. You should use the thickness of the model + any spacing you want to add (this should be the same as layer height or greater):

Example for eu_a4_open.stl: The thickness is 5mm and I want a 0.2mm spacing, Z = 5.2mm



Repeat this process for the number of models you want to be stacked but with the height incrementing based on you model height + spacing:

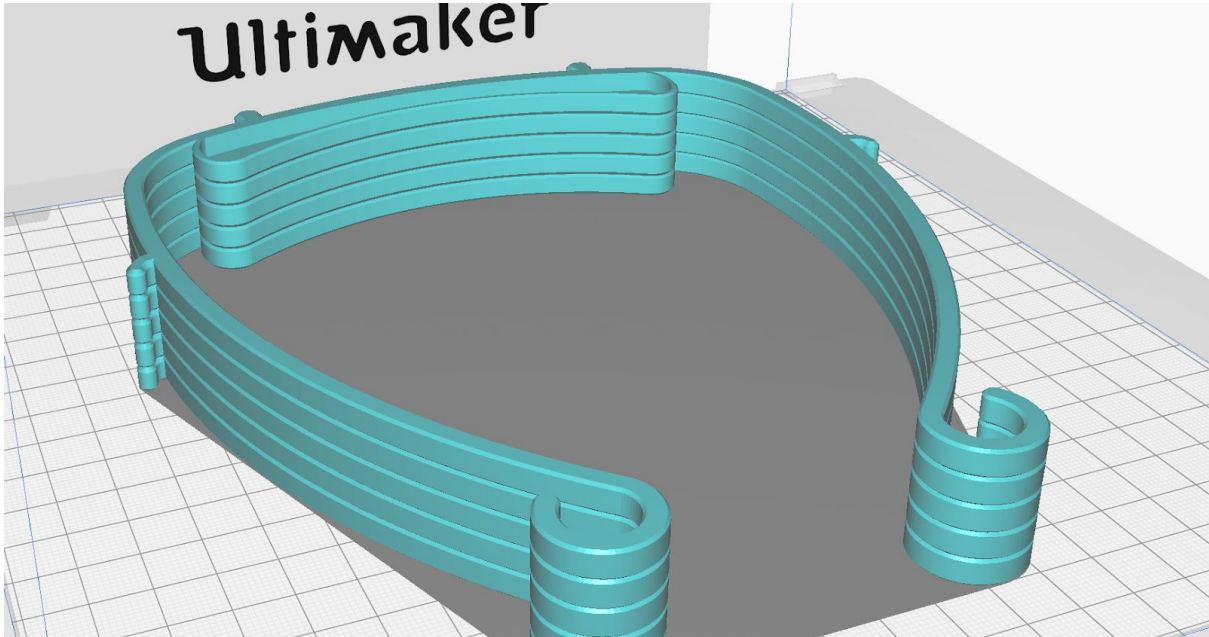
Example for 4 bands: Z = 5.2mm, Z = 10.4mm, Z = 15.6mm



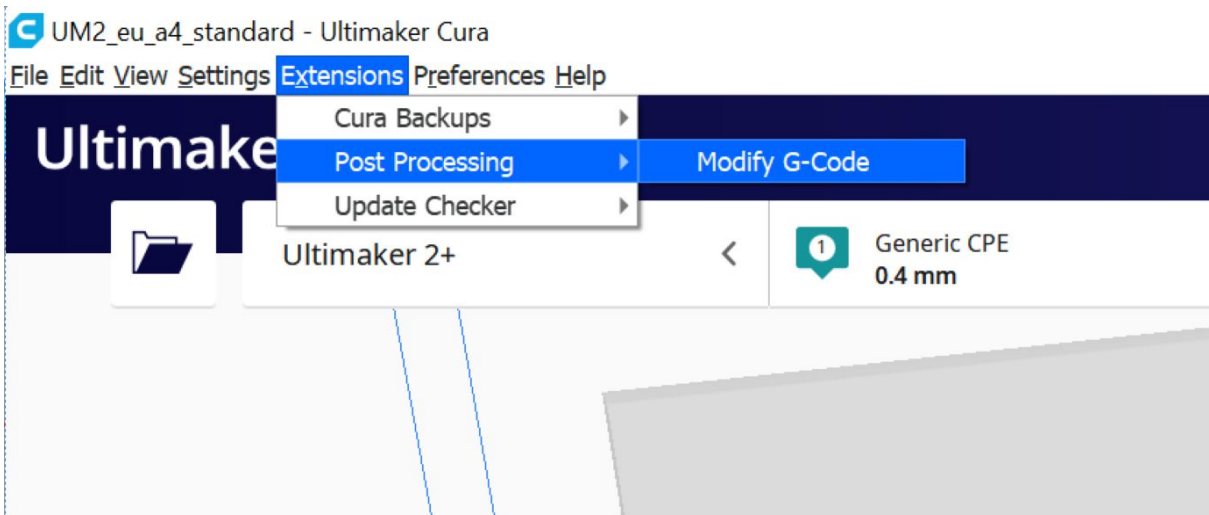
Stack is now ready to be used for printing. You can also export the model to share or reuse for later prints.

Setting up Cura for Delamination Layer

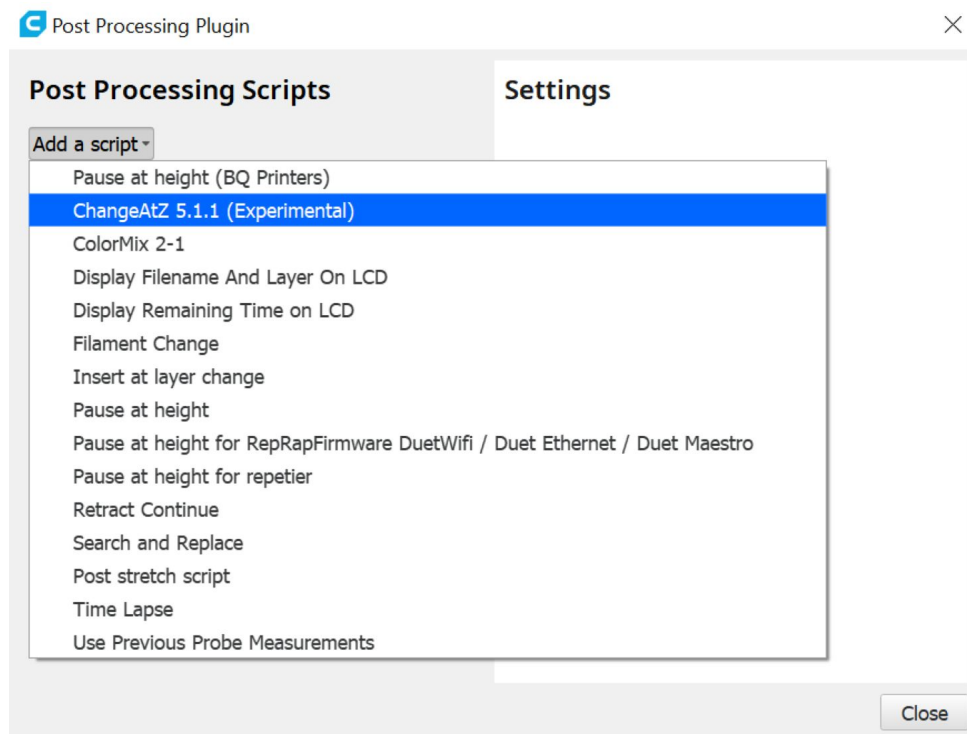
Once you have a stacked file ready, you can prepare Cura for printing with a delamination layer.



Go to “Extensions”, “Post Processing” and select “Modify G-Code”

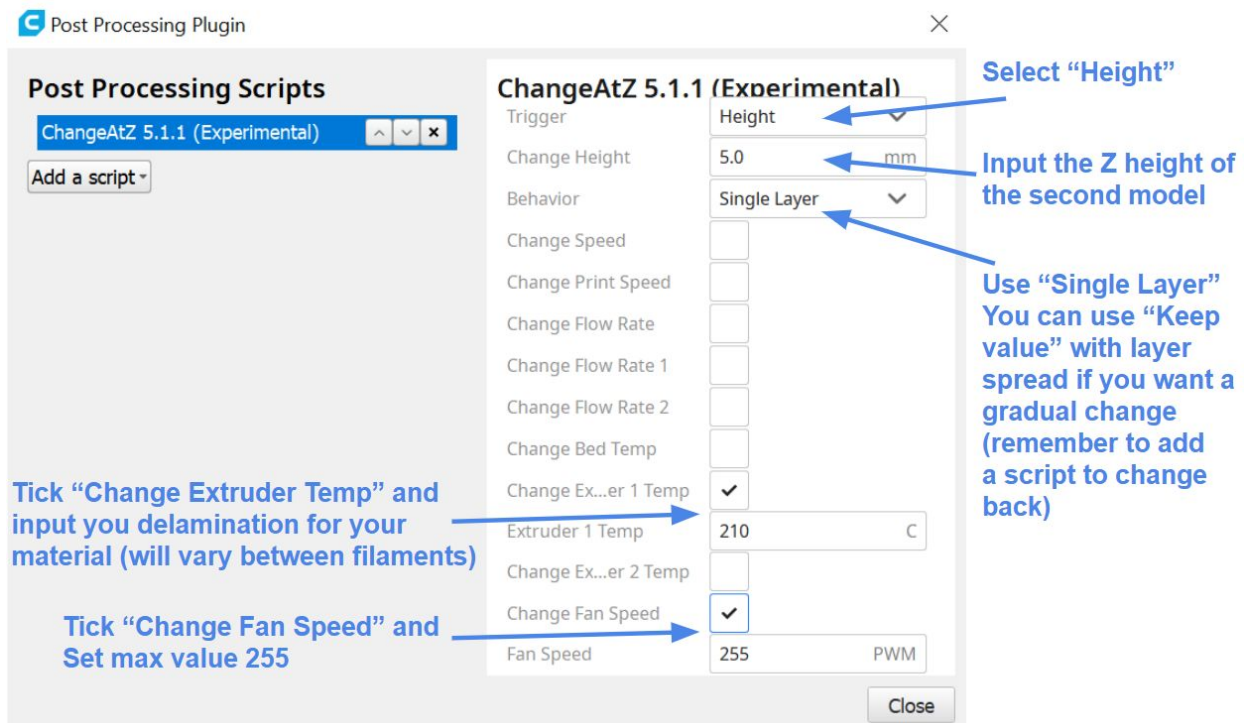


In “Post Processing Scripts” window, click add script and select “ChangeAtZ”:



Select the settings as shown below. Z height is based on the height of model + separation distance. Delamination temperature depends on your filament and will need to be found through trial and error.

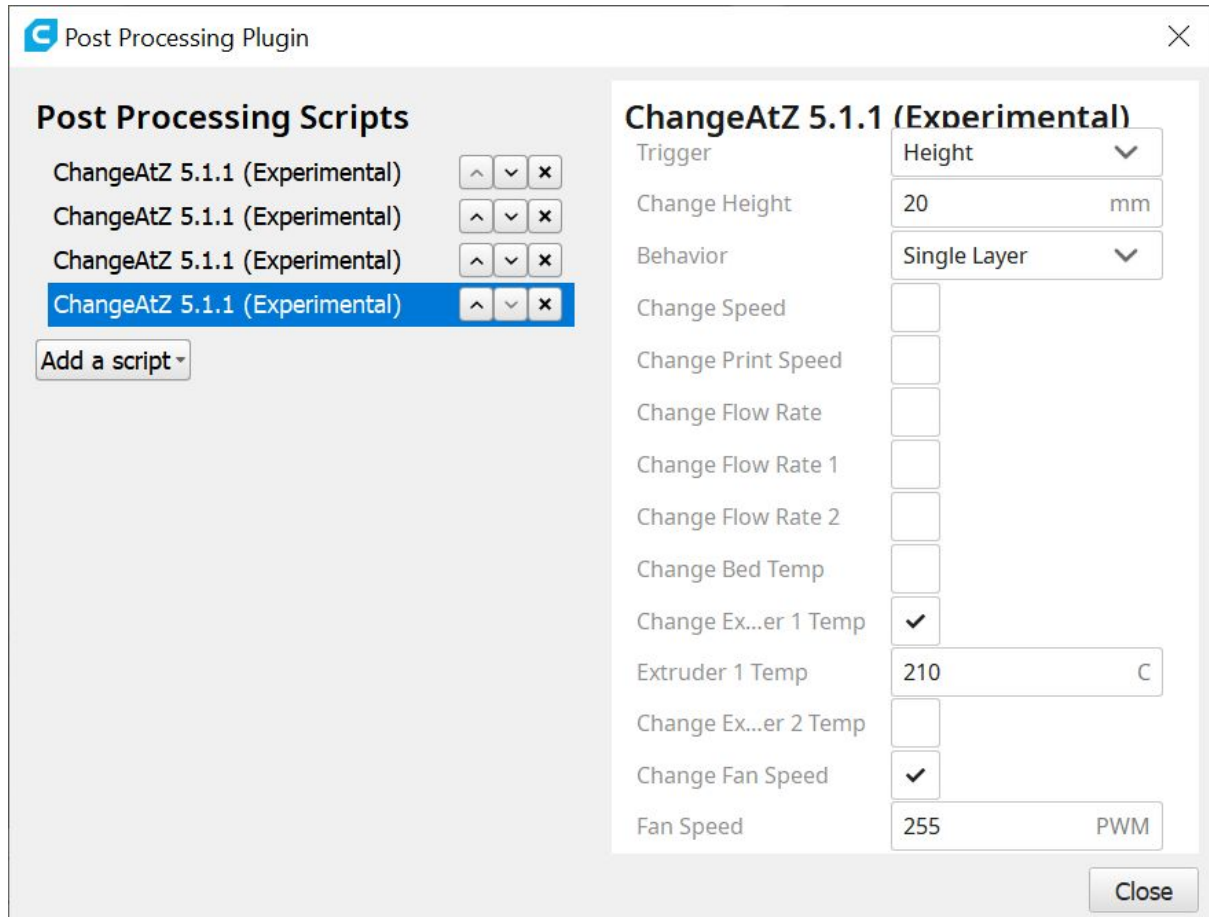
Example based on 5mm model height + 0mm separation



Repeat this process of adding more scripts but setting the “Change Height” value for the rest of the models:

Example for 5 models with 5mm model height + 0mm separation.

Change Height = 5mm, 10mm, 15mm, 20mm



You may now slice your model normally and the changes will be applied to the g-code after slicing. You may verify the changes by opening the g-code in a text editor and searching for “ChangeAtZ”. The scripts won’t be performed at the exact specified layer but rather at the closest layer above it:

```
96 G10
97 ;MESH:NONMESH
98 G0 F600 X71.953 Y199.465 Z5.2
99 M605 S0;stores parameters before changing
00 ;ChangeAtZ V5.1.1: executed at 5.20 mm
01 M117 Printing... ch@ 5.2
02 M104 S210.000000 T0
03 M106 S255
04 G0 F7200 X74.682 Y198.919
05 G0 X74.618 Y200.578
06 G0 X73.908 Y201.617
07 G0 X72.608 Y202.233
```