ZONESTAR

Tips for 2-IN-1-OUT Mix Color Extruder (for Marlin Firmware)

NOTE 1: Please load filament to both of the extruders or insert the mixing hotend clean tool to 2# extruder hole of hotend even if you print only one color.
NOTE 2: Unlike the original Marlin firmware, we modify the mixing ratio as a percentage.

- How to process mixed printing
  - Method 1. Use the ***Auto Mixing Ratio*** feature to turn monochrome 3d object into a multicolor 3d object.
  - Method 2. Modify mixed rate on the LCD menu manually.
  - Mothed 3. Printing mixed colors by manually modify gcode file.
  - Method 4. Printing multi colors object by using ***virtual*** extruder.
- How to use the "*mixing color hotend clean tool*".

Technical support: ***support@zonestar3d.com***

How to process mixed printing - mothed 1

Use the ***Auto Mixing Ratio*** feature

NOTE: This method can print a monochrome model as a gradient color object,and there are several method to enable the feature.

1. Slicing a 3d model as single color, and store the gcode file to SD card.
2. Inser the SD card to the SD socket of printer, choose this file name and start to print
3. When print is started (print head start to move and has started extrud filament), Operate the knob to open the LCD menu-->"Tune"-->"Auto mix mode"-->Set the auto mix mode value to "1" or "2"

Q: ***What's different in "auto mix mode" 0, 1 and 2.***

A: If "Auto mix mode" = 0, it means that the printer will feed the filament from the extruder #1 and the extruder #2 to the hot end at a ***fixed mixing rate***, you can set this rate on menu **"Tune-->E1 percent(the percent of extruder #1)".**

If "Auto mix mode" = 1, it means that the printer will feed the filament from the extruder #1 and the extruder #2 to the hot end at ***a linear mixing mode*** automatically. Algorithm is **E1 percent = (Printed progress * 70% + 15%)**

If "Auto mix mode" = 2, it means that the printer will feed the filament from the extruder #1 and the extruder #2 to the hot end at ***a Random mixing mode*** automatically.

Q: ***How to set auto mix mode in gcode file.***

A: You can start auto mixing feature by using "M169" command,

The syntax is as follows: M169 S[mode] m[min] M[max], for example:

M169 S1 m5 M95 ; this command will start the auto mix mode at ***linear mixing mode, and the minimum rate of 1# extruder is 5% and maximum value is 95%***

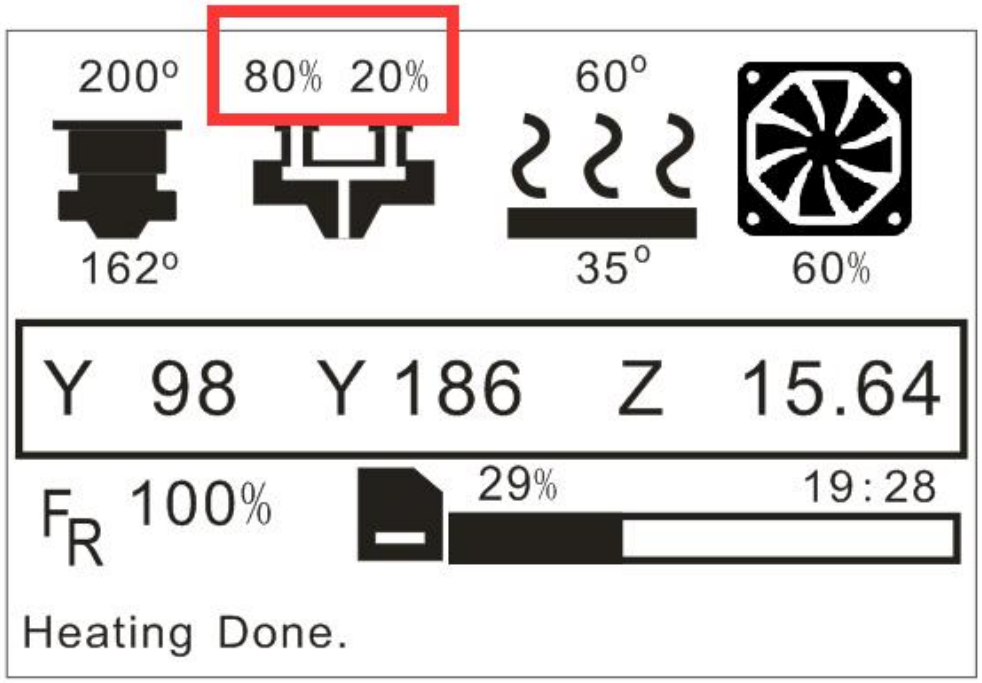
PS: Tx command (tool change) will reset the setting automatically, so please make sure "M169"command should be behind "tool change command"

How to process mixed printing - mothed 2

Modify mixed rate on the LCD menu manually.

NOTE: This method can print a monochrome model as a gradient color object,and you can modify the color at any time.

1. Slicing a 3d model as single color.
2. Print it and simply modify ***mixing ratio*** on LCD screen when you want.



80% 20%: Means that the current ratio of Extruder 1 is 80% and Extruder 2 is 20%.

You can modify the mix ratio by following the below steps:
Menu-->Control (or Tune)-->E1 Percent: ***100***
E1 Percent can be modify from 0~100

PS: Make sure the ***auto mix mode*** has been set to “0”.

How to process mixed printing - mothed 3

Mothed 2. Printing mixed colors by Manually modify gcode file.

NOTE: This method can print a monochrome model as a gradient color object.

1. Add the gcode command to gcode file to modify the extruder weight.

2. This mothed is usually used to convert a single color 3d object to a variable color 3d object

Command: M163 S<Extruder number> P<Weight>

For example:

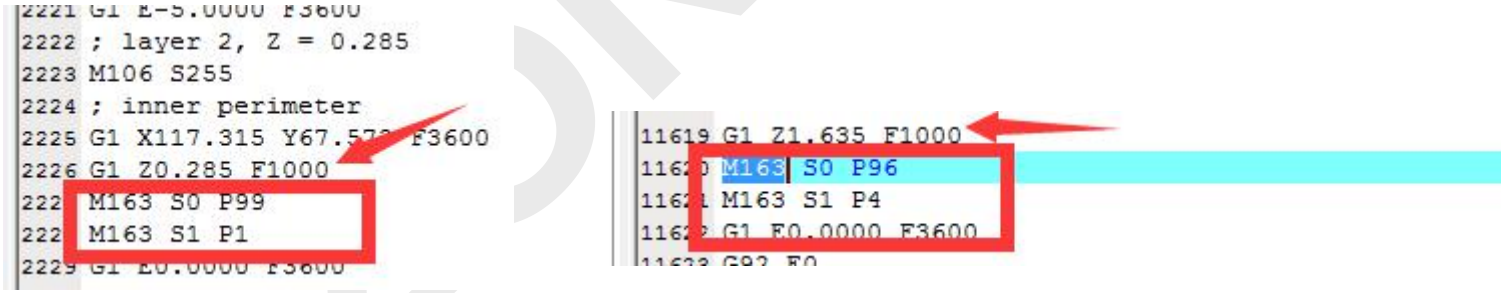
;E0 80% weight and E1 20% weight

M163 S0 P80

;E0 20% weight and E1 80% weight

M163 S0 P20

3. Use NOTEPAD to open the gcode file, and then insert the command in the different height.



How to process mixed printing - Mothed 3

Mothed 3. Printing multi colors by using ***virtual*** extruder.

NOTE: This mothed is applied to color-separated model for multiple (>=3 color) colors.

About virtual extruder:

1. The **virtual extruder** means that when this extruder is chosen, the extruder 1 and 2 will be extruded at the same time with different mix weight.

2. This mothed is usually used to print multi color object.

3. Total 16 virtual extruders can be set, and you can set to different mixing rate for each of virtual extruder.

Command syntax:

```
M163 S0 Pxx          ;Set the ratio of extruder #1
M164 Sx              ;Store the setting to the specified virtual extruder
```

For example:

```
M163 S0 P10
M164 S3
```

It means when you choose the #3 virtual extruders to print, it will feed 10% filament from #1 extruder and 90% (100%-10%) filament from #2 extruder.

You can add this code to **"start code"** of slicing software, so you can use these virtual extruders directly.

Below is the start code for **cura engine of repetier-host** and **simplify3d**:

How to process mixed printing - Mothed 3

Start code for cura engine of repetier-host

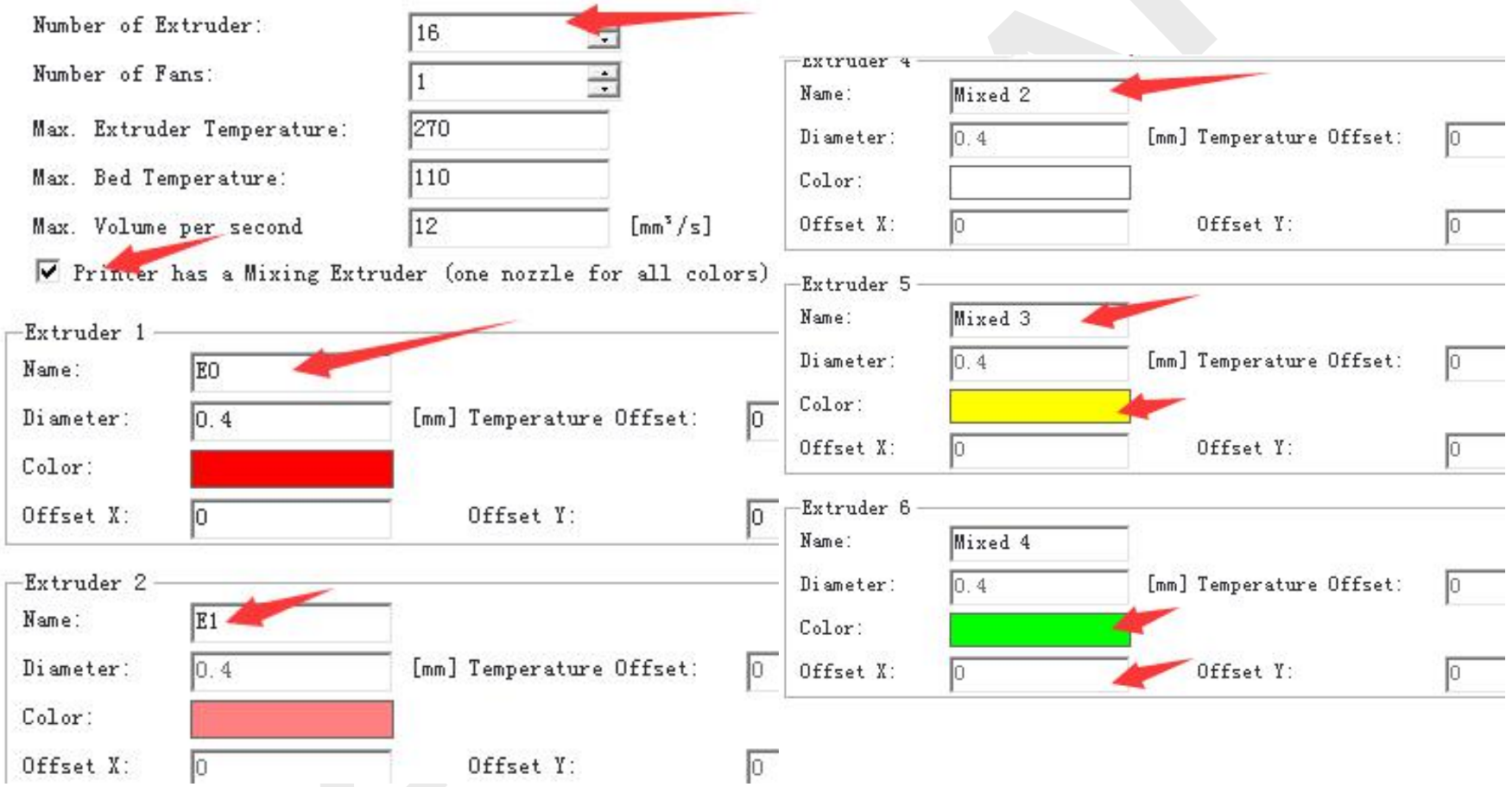
```
G28 ; Home extruder
G1 Z15 F{Z_TRAVEL_SPEED}
M107 ; Turn off fan
G90 ; Absolute positioning
M82 ; Extruder in absolute mode
{IF_BED}M190 S{BED} ; Activate all used extruder
{IF_EXT0}M104 T0 S{TEMP0}
G92 E0 ; Reset extruder position
; Wait for all used extruders to reach temperature
{IF_EXT0}M109 T0 S{TEMP0}
M163 S0 P10
M164 S2
M163 S0 P20
M164 S3
M163 S0 P30
M164 S4
M163 S0 P40
M164 S5
M163 S0 P50
M164 S6
M163 S0 P60
M164 S7
M163 S0 P70
M164 S8
M163 S0 P80
M164 S9
M163 S0 P90
M164 S10
```

Start code for Simplify3d

```
G1 Z5 F100
G28 ; home all axes
M163 S0 P10
M164 S2
M163 S0 P20
M164 S3
M163 S0 P30
M164 S4
M163 S0 P40
M164 S5
M163 S0 P50
M164 S6
M163 S0 P60
M164 S7
M163 S0 P70
M164 S8
M163 S0 P80
M164 S9
M163 S0 P90
M164 S10
```

How to process mixed printing - Mothed 4

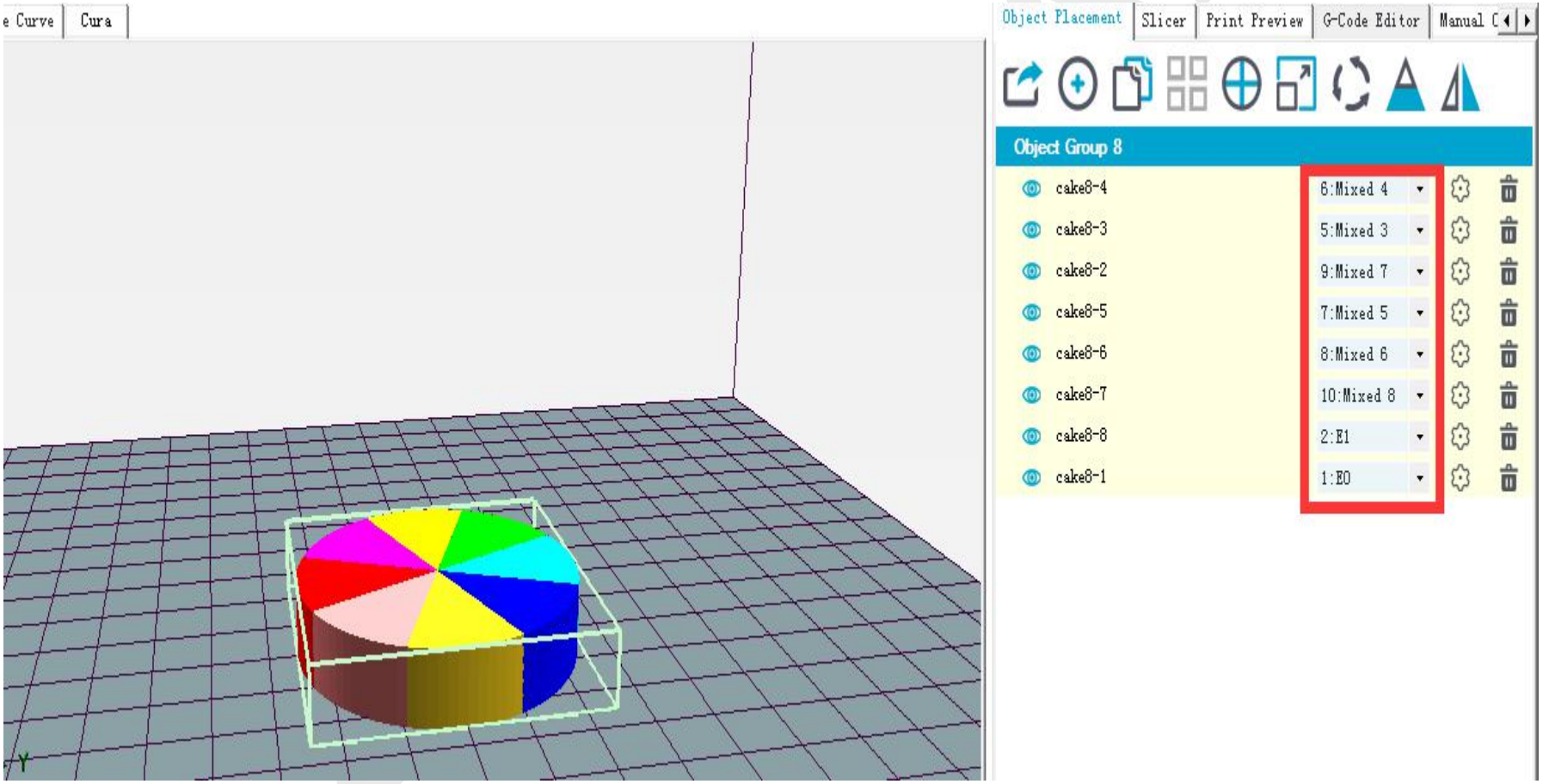
Step 1. *Printer settings*



Silcing software: Repetier-host

How to process mixed printing - Mothed 4

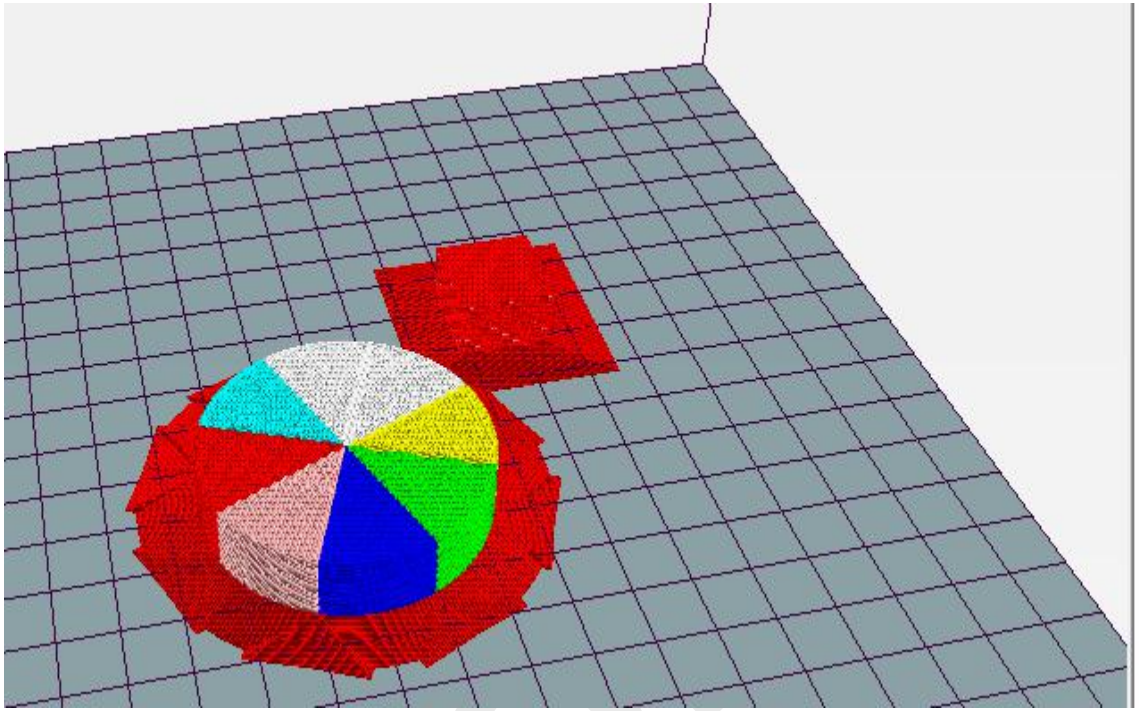
Step 2. Choose the different extruder before ***slicing***



Silcing software: Repetier-host

How to process mixed printing - Mothed 4

Step 3. After slicing



Colors: Extruder Speed

Printing Statistics

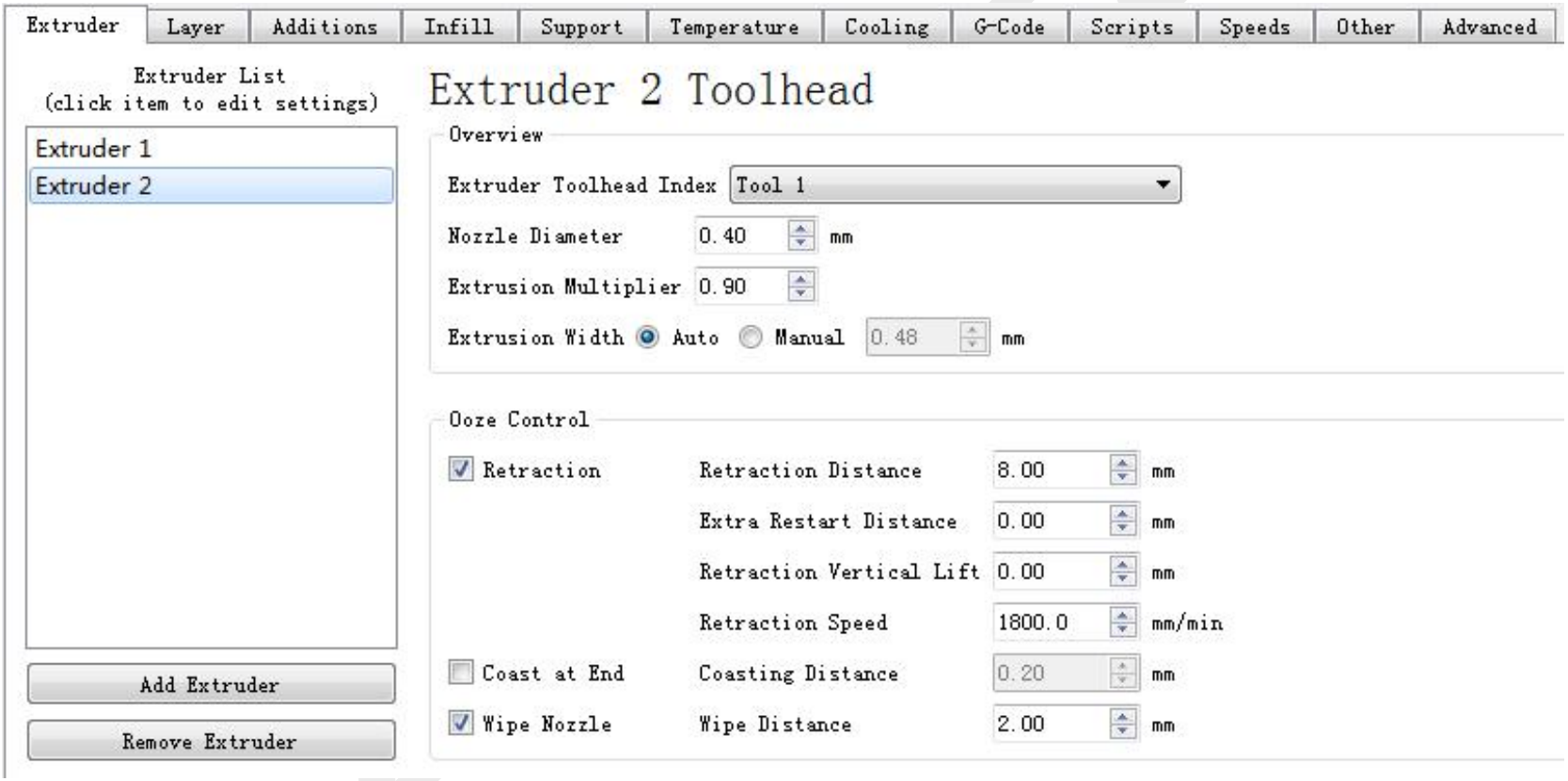
Estimated Printing Time:	2h:49m:19s
Layer Count:	50
Total Lines:	100335
Filament needed:	17689 mm
Filament Extr.1:	2504 mm
Filament Extr.2:	2174 mm
Filament Extr.3:	2173 mm
Filament Extr.4:	2173 mm
Filament Extr.5:	2173 mm
Filament Extr.6:	2173 mm
Filament Extr.7:	2173 mm
Filament Extr.8:	2145 mm
Filament Extr.9:	0 mm
Filament Extr.10:	0 mm

Silcing software: Repetier-host

Change the mix ratio at different print heights

NOTE: The following section will be used as an example, and other slicing software such as slicr3d has similar functions.

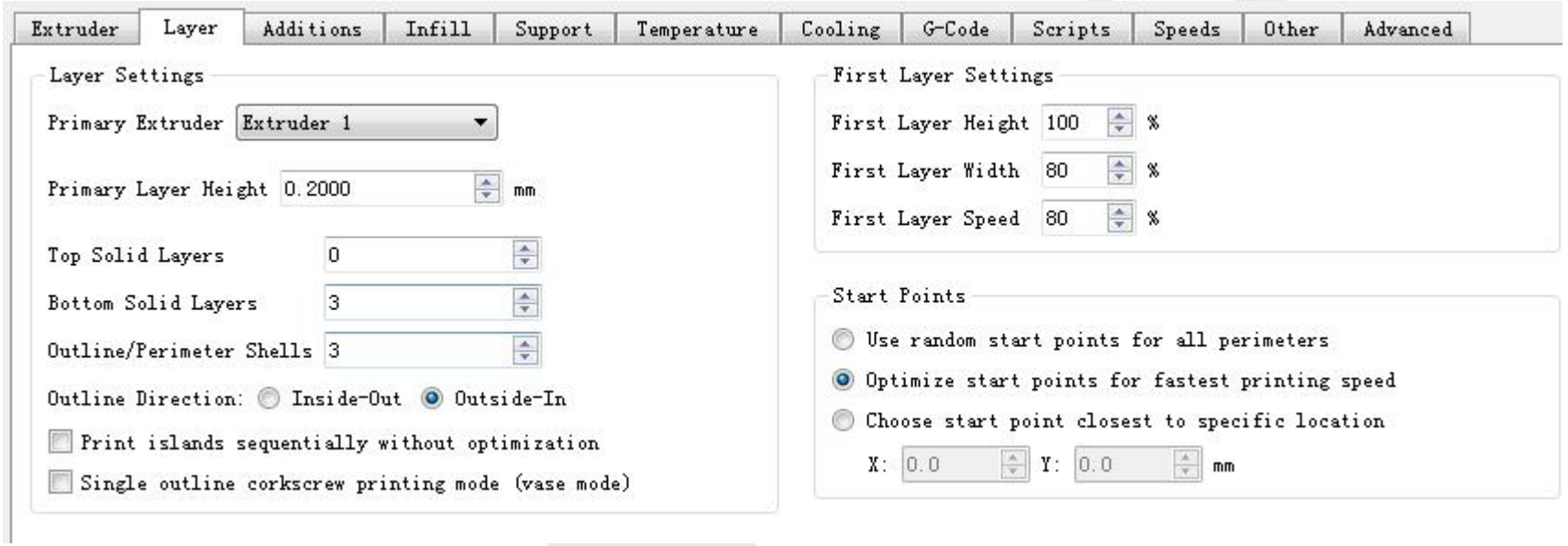
Setting of slicing



Silcing software: simplify3d

Change the mix ratio at different print heights

Setting of slicing



Top solid layers is 0 because we want to print a vase and need it open at the top.

Other settings are not different from monochrome printing

Silcing software: simplify3d

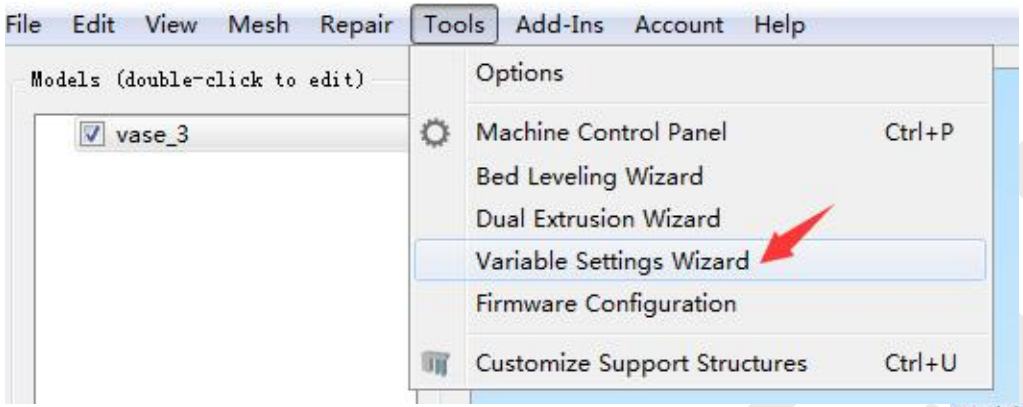
Change the mix ratio at different print heights

The height of this vase is 180mm, so I set the mixing ratio changes by 5% every 9mm， of courese you can set it up as you like.

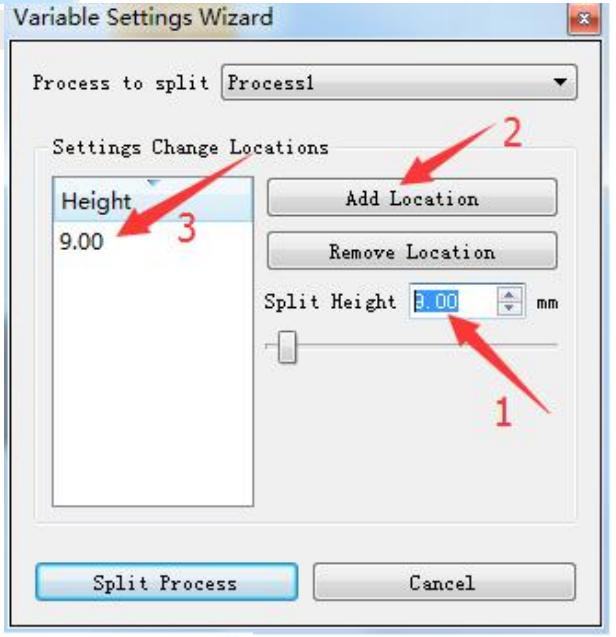
Silcing software: simplify3d

Change the mix ratio at different print heights

Start the variable setting wizard.



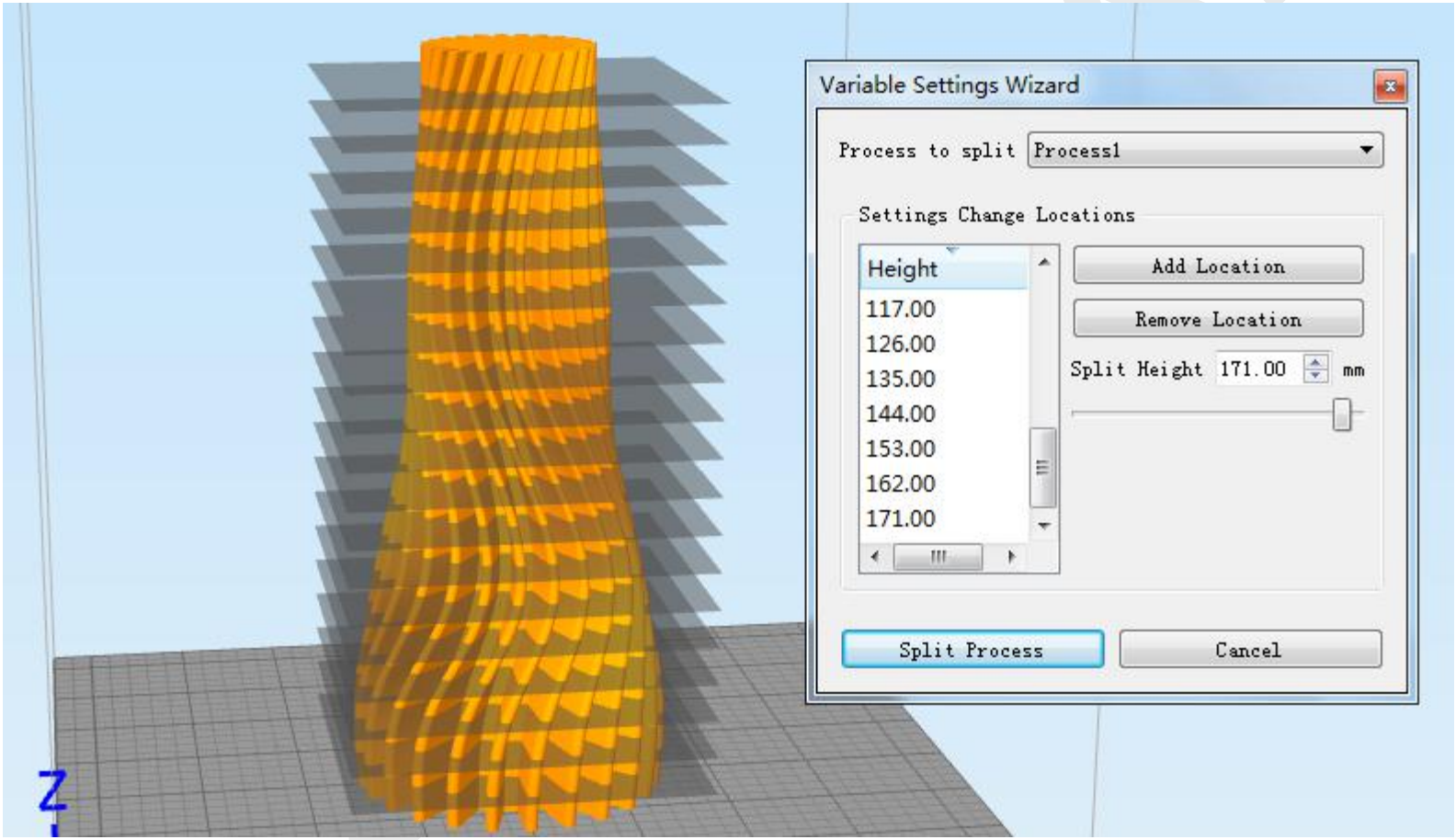
Add setting change locations



Silcing software: simplify3d

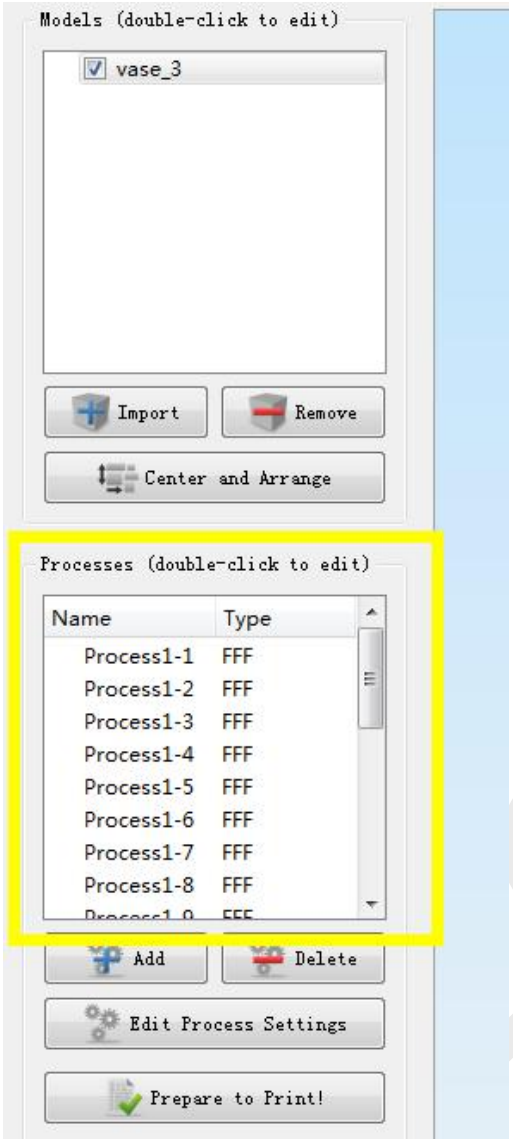
Change the mixed ratio at different print heights

After setting all the locations, click ***split process*** to the next step



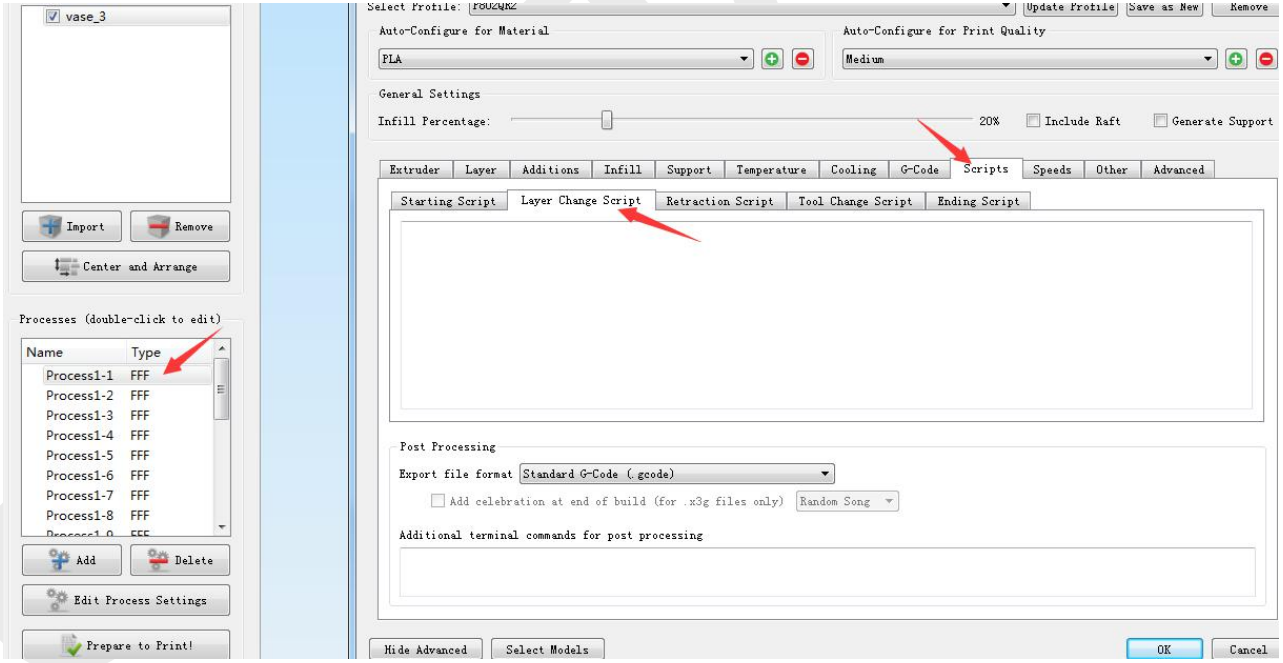
Silcing software: simplify3d

Change the mixed ratio at different print heights



Now we have made many process, and we need to modify the mixed weight in these process(as left picture)

Double click the process and open the process setting, as below

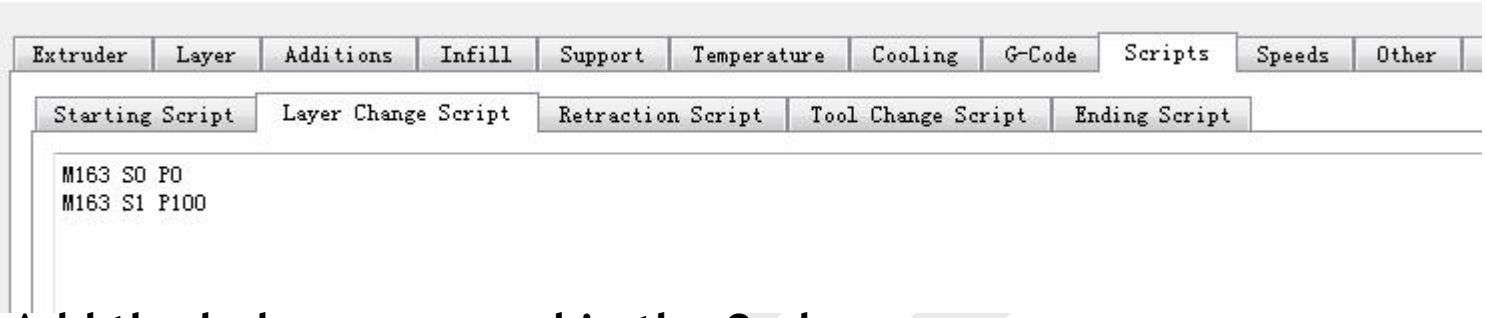


we need to add command in the ***layer change script*** window

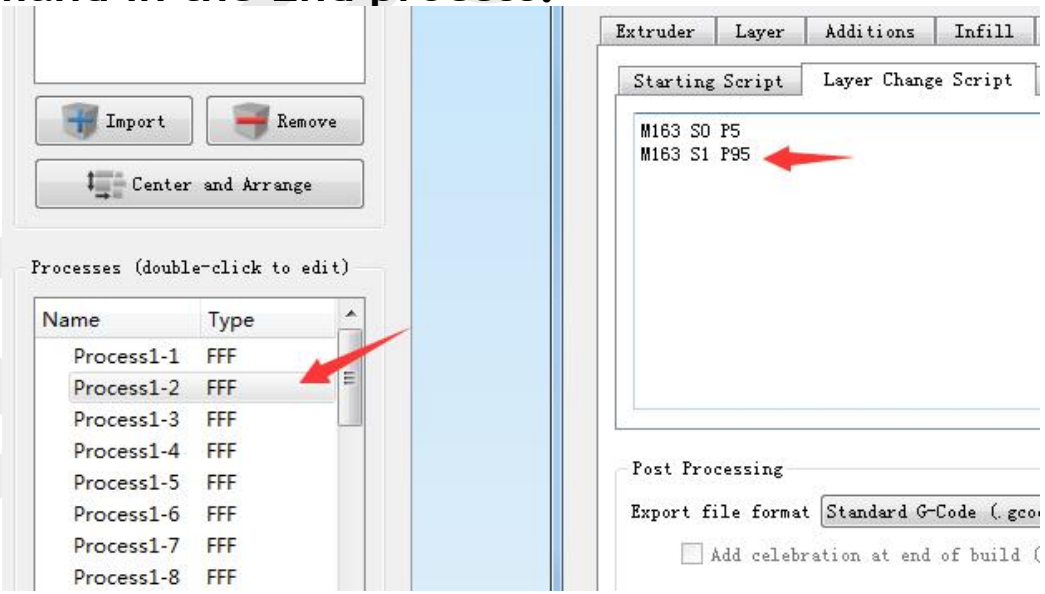
Silcing software: simplify3d

Change the mixed ratio at different print heights

Add the below command in the first process:
M163 S0 P0



Add the below command in the 2nd process:
M163 S0 P5



Silcing software: simplify3d

Change the mixed ratio at different print heights

Add the below command in the 3rd process:
M163 S0 P10

Add the below command in the 4th process:
M163 S0 P15

Add the below command in the 19th process:
M163 S0 P90

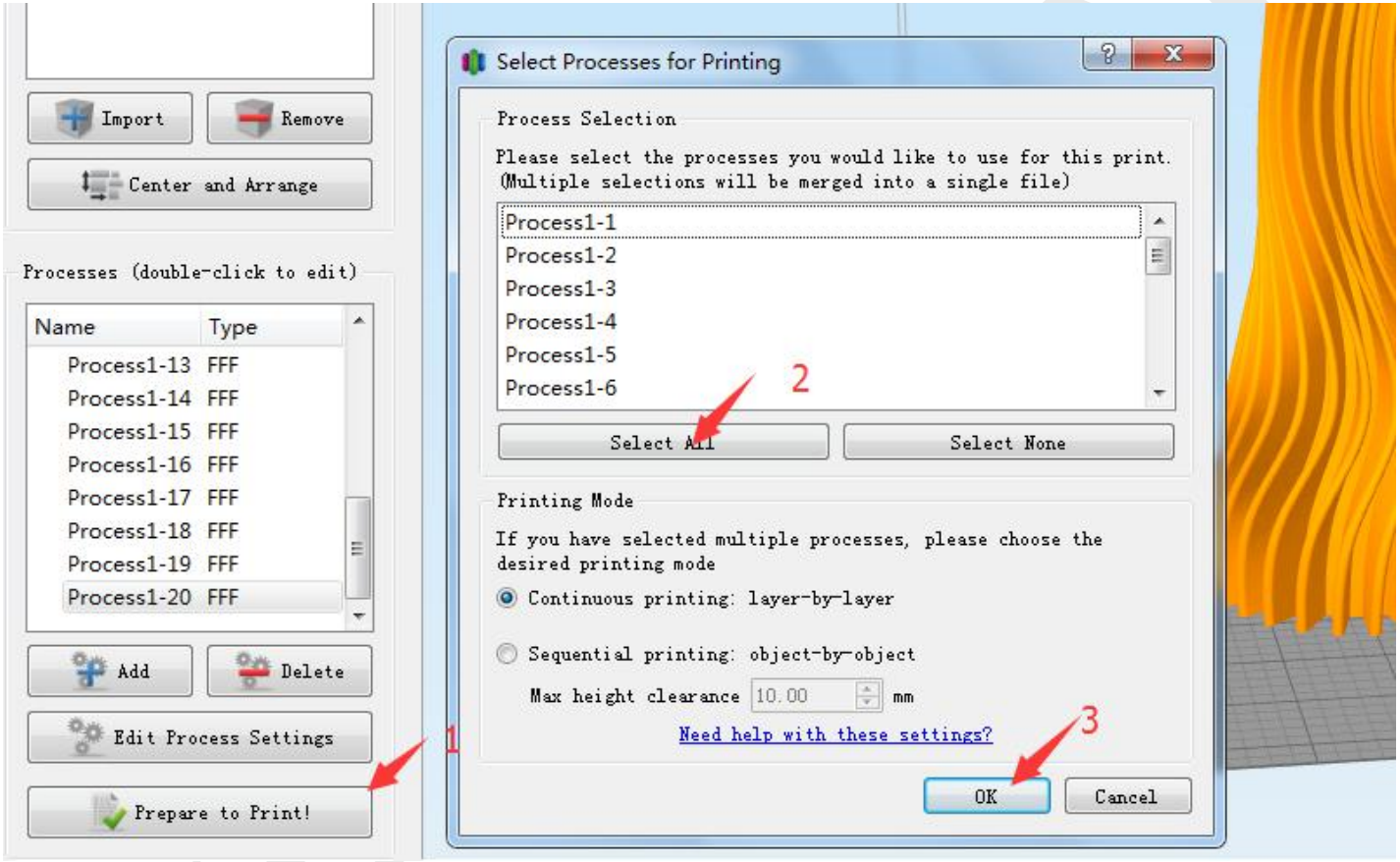
Add the below command in the 20th process:
M163 S0 P95

Locations	E0 weight	E1 Weight
1	0	100
2	5	95
3	10	90
4	15	85
5	20	80
6	25	75
7	30	70
8	35	65
9	40	60
10	45	55
11	50	50
12	55	45
13	60	40
14	65	35
15	70	30
16	75	25
17	80	20
18	85	15
19	90	10
20	95	5

Silcing software: simplify3d

Change the mixed ratio at different print heights

Now start to slicing, slcing speed will slower than one process.

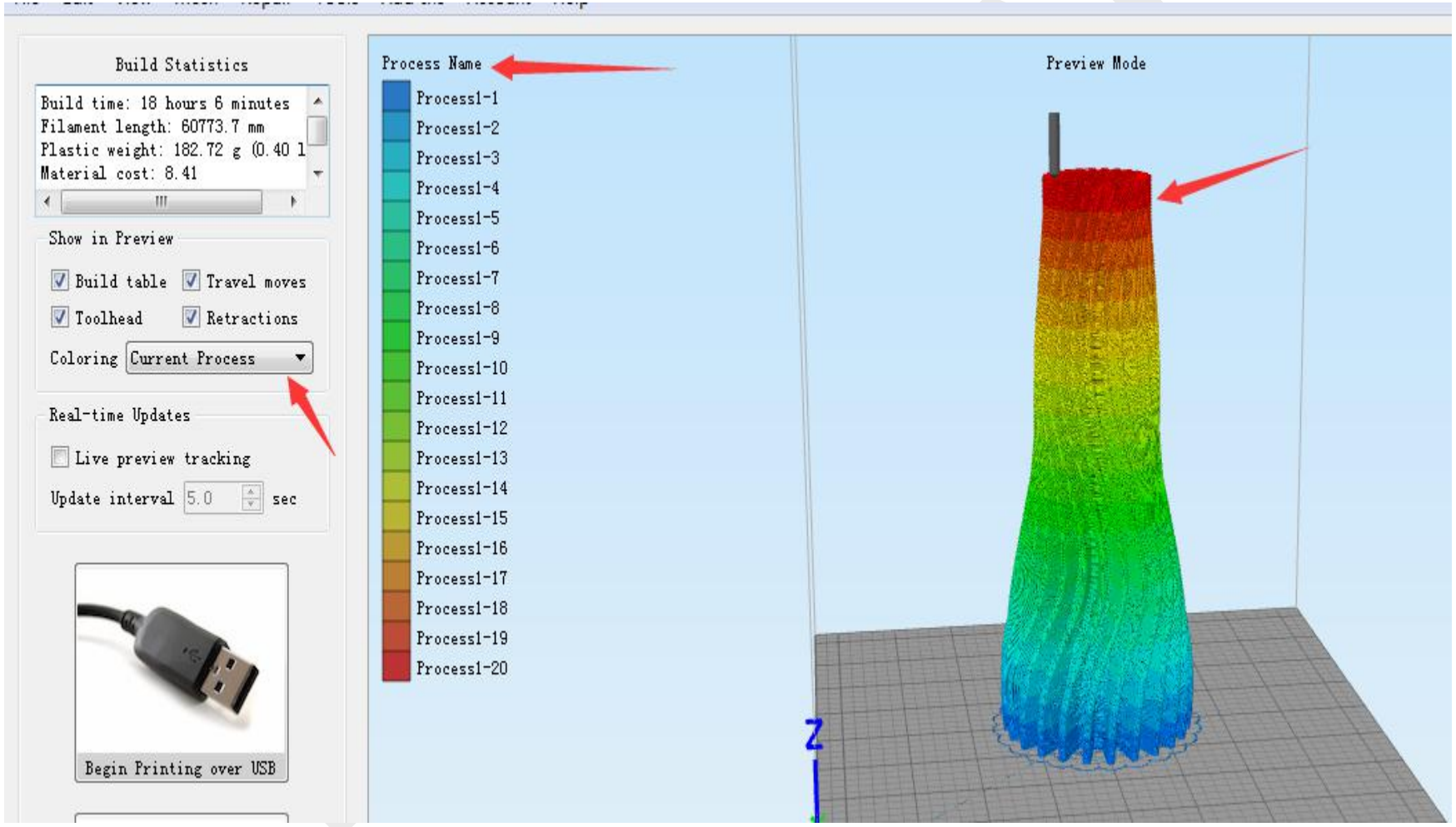


Tips: If your model is special, you also can modify some other setting in different ***process***, for example ***speed*** and ***temperature etc***.

Silcing software: simplify3d

Change the mixed ratio at different print heights

Preview the slicing result.



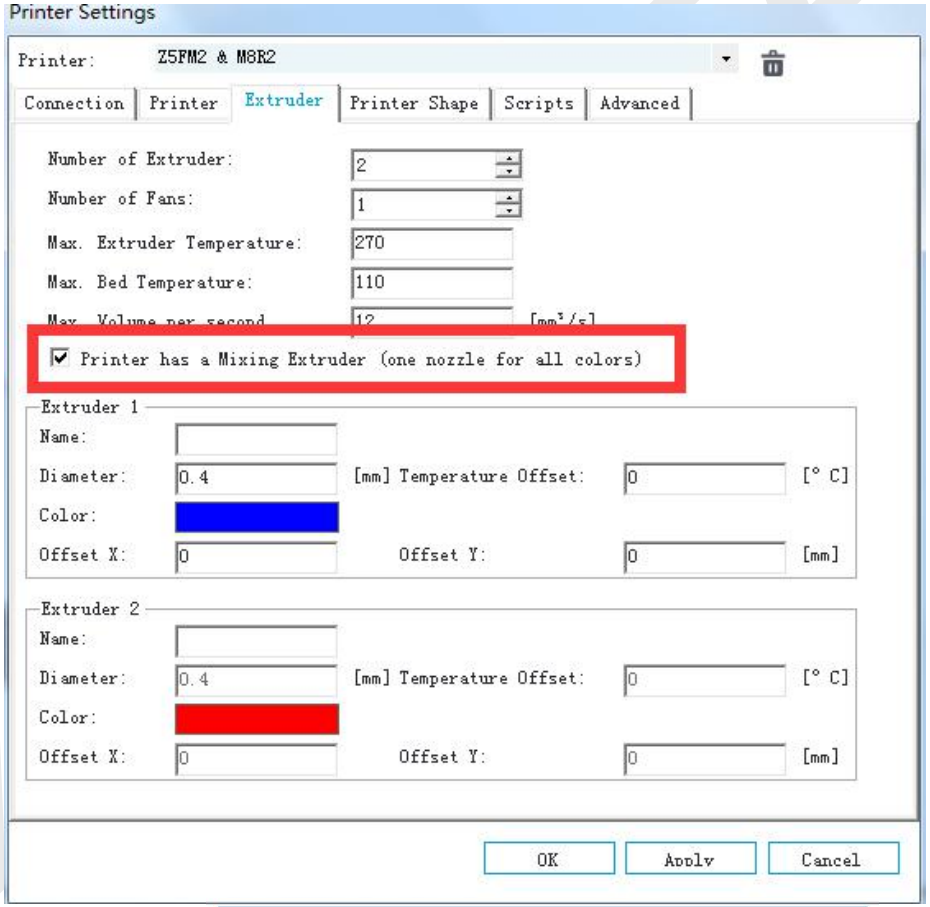
Silcing software: simplify3d

Slicing setting for dual color printing

There is only a few differences when slicing by using the 2-in-out mixed extruder and using separated two-color extruder.

As example, we use **Repetier-host and Cura Engine** to slicing:

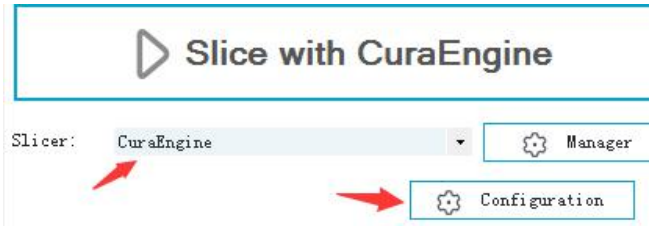
1. Enable ***Printer has a Mixing Extruder*** option in ***Printer Settings***

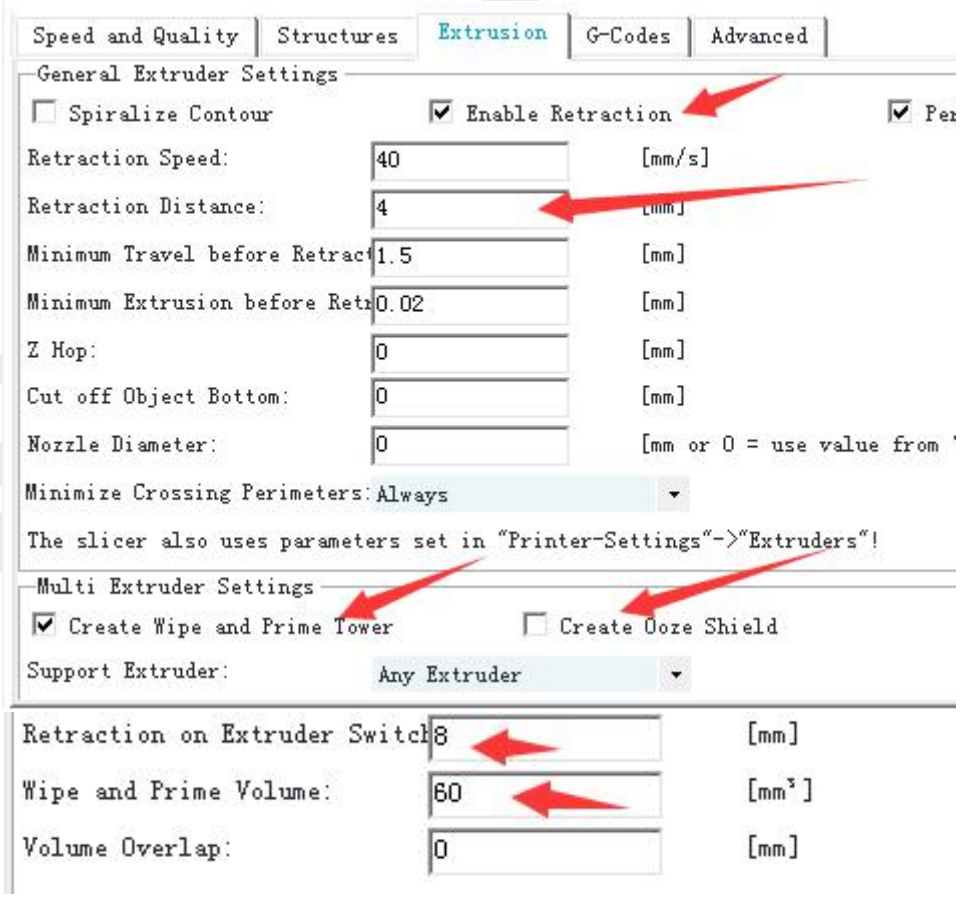


Silcing software: Repetier-host

Slicing setting for dual color printing

2. The below parameters should be set in extrusion option of Configuration.





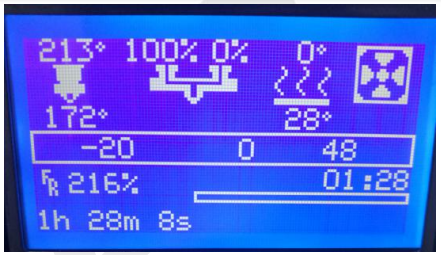
Retraction Distance: 4~8mm
Enable *Create Wipe and Prime Tower*
Disable Ooze shield
Retraction on Extruder switch: 6~12mm
Wipe and Prime Volume: 30~60mm3

Silcing software: Repetier-host

How to use the “*mixing color hotend clean tool*”

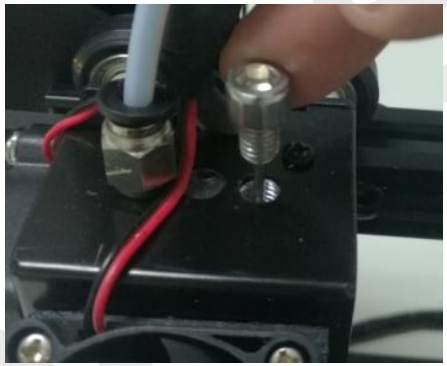
the mixing color clean tool

Heating nozzle

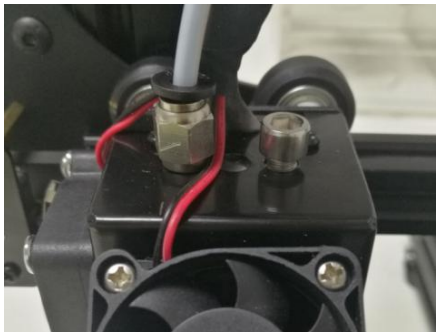


Wait for the tempeature over 180 degree

loose the fitting and pull out the PTFE and filament (the 2nd extruder)



Insert the mixing color clean tool



tighten the screw

You can use this tool when the following conditions occur:

1. You want to print single color object.

2. The filament clogged in hotend and can't be pushed in.