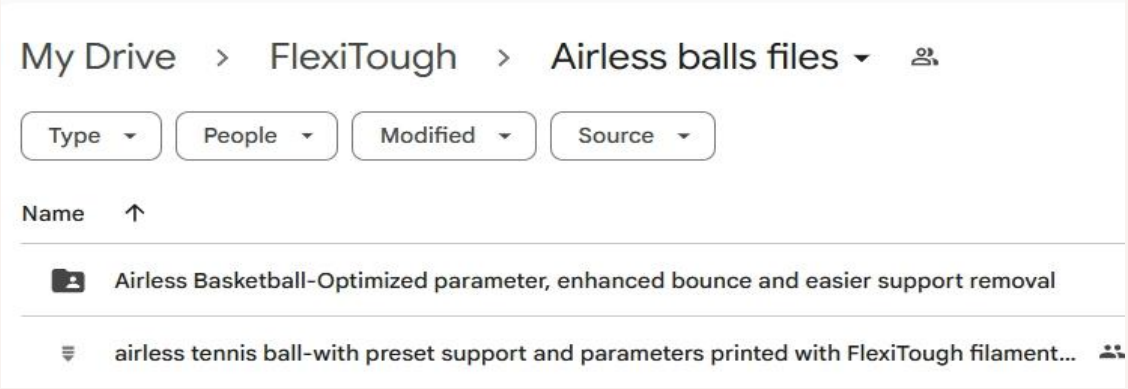
User Guide for FlexiTough Filament

WISDREAM FlexiTough Filament is specially developed for 3D printed airless basketballs, this flexible filament ensures durability and a realistic bounce when printed into balls. It's also ideal for soccer, tennis, and other sports balls.

1. File Downloads& Settings

The airless basketball model is unique and requires specific settings.

- **For Bambu Lab Printer**: We provide 3MF files pre-configured with supports and printing parameters. Visit the following websites to download:
https://drive.google.com/drive/folders/1kKxindliz7a_ca62pRExHyXjkmkJG19l?usp=sharing



- ** For other 3D printer brands **:

Please refer to the following settings, and make sure to adjust the supports according to the specific slicing software you are using.

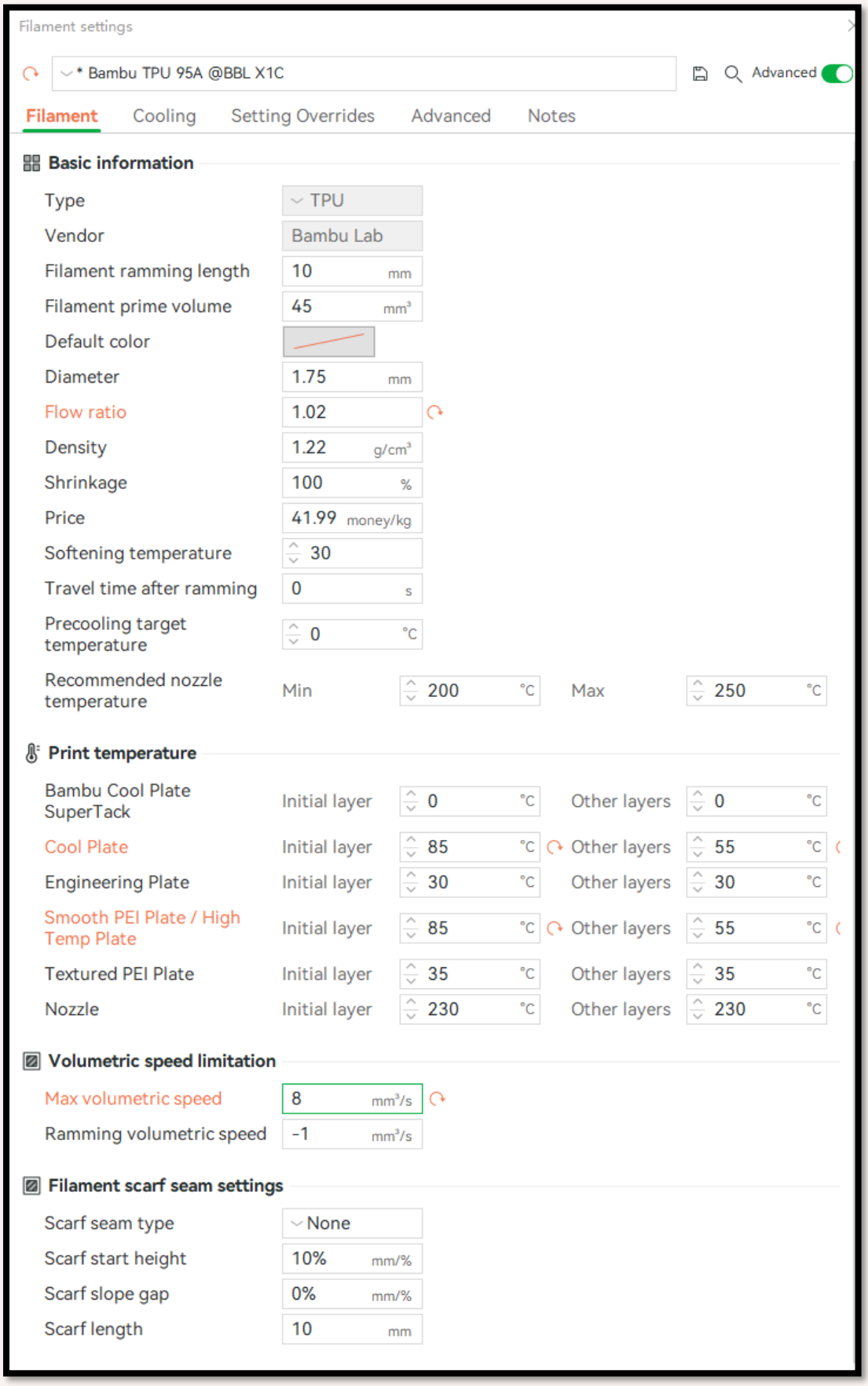
Alternatively, you can slice the model using Bambu Studio and export the G-code for printing. (We strongly recommend using this method, click to navigate to --**Slice the model using Bambu Studio and export the G-code**:)

Note: Some older models may not be able to execute the exported G-code correctly, which could result in the machine freezing. If this happens, please stop the print immediately.)

For further support, please contact us support@minreon.com.

--**Recommended Printing Parameters**:

Recommended Printing Parameters for Double Lattice Basketball with FlexiTough Filament		
The actual nozzle in use		Both 0.4mm and 0.6mm nozzles can be used
Print Settings	System presets	0.6mm nozzle，0.18mm layer height
	Plate type	Cool Plate/Texture PEI plate


Filament settings
* Bambu TPU 95A @BBL X1C
Advanced
Filament
Cooling
Setting Overrides
Advanced
Notes
Basic information
Type
TPU
Vendor
Bambu Lab
Filament ramming length
10
mm
Filament prime volume
45
mm³
Default color
Diameter
1.75
mm
Flow ratio
1.02
Density
1.22
g/cm³
Shrinkage
100
%
Price
41.99
money/kg
Softening temperature
30
Travel time after ramming
0
s
Precooling target temperature
0
°C
Recommended nozzle temperature
Min
200
°C
Max
250
°C
Print temperature
Bambu Cool Plate SuperTack
Initial layer
0
°C
Other layers
0
°C
Cool Plate
Initial layer
85
°C
Other layers
55
°C
Engineering Plate
Initial layer
30
°C
Other layers
30
°C
Smooth PEI Plate / High Temp Plate
Initial layer
85
°C
Other layers
55
°C
Textured PEI Plate
Initial layer
35
°C
Other layers
35
°C
Nozzle
Initial layer
230
°C
Other layers
230
°C
Volumetric speed limitation
Max volumetric speed
8
mm³/s
Ramming volumetric speed
-1
mm³/s
Filament scarf seam settings
Scarf seam type
None
Scarf start height
10%
mm/%
Scarf slope gap
0%
mm/%
Scarf length
10
mm

Quality | Strength | Speed | Support | Others

Layer height

Layer height	0.18 mm
Initial layer height	0.18 mm

Line width

Default	0.62 mm
Initial layer	0.62 mm
Outer wall	0.62 mm
Inner wall	0.62 mm
Top surface	0.62 mm
Sparse infill	0.62 mm
Internal solid infill	0.62 mm
Support	0.62 mm

Seam

Seam position	Aligned
Smart scarf seam application	☑
Scarf application angle threshold	155 °
Scarf around entire wall	☐
Scarf steps	10
Scarf joint for inner walls	☑
Role-based wipe speed	☑

Precision

Slice gap closing radius	0.049 mm
Resolution	0.012 mm
Arc fitting	☑
X-Y hole compensation	0 mm
X-Y contour compensation	0 mm
Auto circle contour-hole compensation	☐
Elephant foot compensation	0.15 mm
Precise Z height	☐

Ironing

Ironing Type	No ironing

Wall generator

Wall generator	Classic

Advanced

Order of walls	inner/outer
Print infill first	☐
Bridge flow	1
Thick bridges	☐
Only one wall on top surfaces	Top surfaces
Only one wall on first layer	☐
Smooth speed discontinuity area	☑
Smooth coefficient	150
Avoid crossing wall	☐
Smoothing wall speed along Z(experimental)	☐

Quality | **Strength** | Speed | Support | Others

Walls

Wall loops	6
Detect thin wall	☐

Top/bottom shells

Top surface pattern	Monotonic...
Top shell layers	6
Top shell thickness	0.8 mm
Top paint penetration layers	3
Bottom surface pattern	Monotonic
Bottom shell layers	6
Bottom shell thickness	0 mm
Bottom paint penetration layers	3
Internal solid infill pattern	Rectilinear

Sparse infill

Sparse infill density	100 %
Sparse infill pattern	Concentric
Length of sparse infill anchor	400% mm or %
Maximum length of sparse infill anchor	20 mm or %

Advanced

Infill/Wall overlap	15 %
Infill direction	45 °
Bridge direction	0 °
Minimum sparse infill threshold	15 mm²
Infill combination	☐
Detect narrow internal solid infill	☑
Ensure vertical shell thickness	Enabled
Detect floating vertical shells	☑

Quality | Strength | **Speed** | Support | Others

Initial layer speed

Initial layer	35	mm/s
Initial layer infill	55	mm/s

Other layers speed

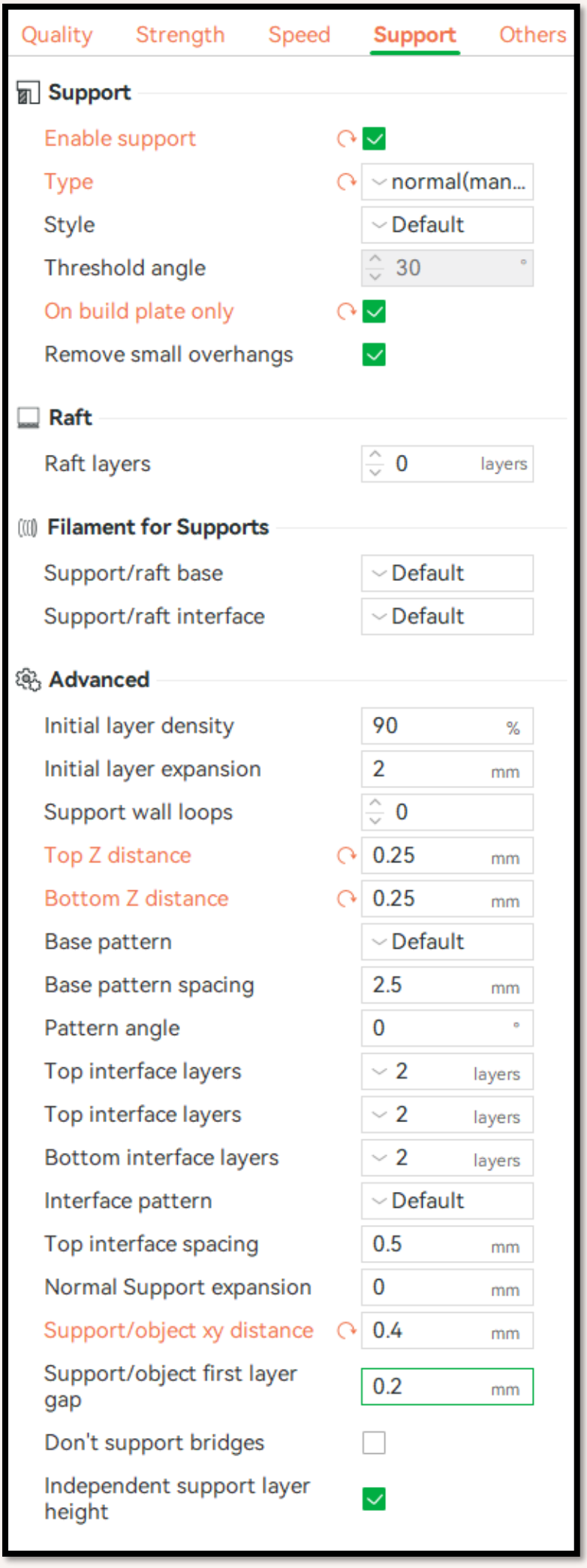
Outer wall	80	mm/s
Inner wall	120	mm/s
Small perimeters	50%	mm/s or %
Small perimter threshold	0	mm
Sparse infill	100	mm/s
Internal solid infill	150	mm/s
Vertical shell speed	80%	mm/s or %
Top surface	150	mm/s
Slow down for overhangs	☑	
Overhang speed	0 mm/s	10%
	50 mm/s	25%
	15 mm/s	50%
	10 mm/s	75%
	10 mm/s	100%
Bridge	30	mm/s
Gap infill	50	mm/s
Support	150	mm/s
Support interface	80	mm/s

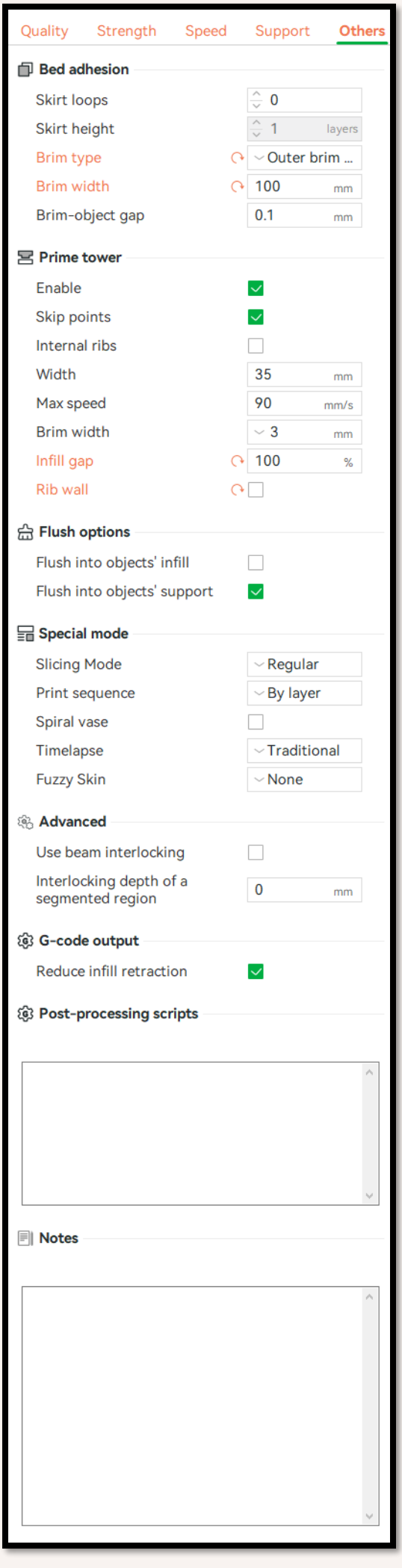
Travel speed

Travel	500	mm/s

Acceleration

Normal printing	10000	mm/s^2
Travel	10000	mm/s^2
Initial layer travel	6000	mm/s^2
Initial layer	500	mm/s^2
Outer wall	5000	mm/s^2
Inner wall	0	mm/s^2
Top surface	2000	mm/s^2
Sparse infill	100%	mm/s^2 or %

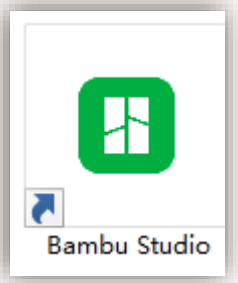

Quality
Strength
Speed
Support
Others
Support
Enable support
Type
normal(man...
Style
Default
Threshold angle
30
°
On build plate only
Remove small overhangs
Raft
Raft layers
0
layers
Filament for Supports
Support/raft base
Default
Support/raft interface
Default
Advanced
Initial layer density
90
%
Initial layer expansion
2
mm
Support wall loops
0
Top Z distance
0.25
mm
Bottom Z distance
0.25
mm
Base pattern
Default
Base pattern spacing
2.5
mm
Pattern angle
0
°
Top interface layers
2
layers
Top interface layers
2
layers
Bottom interface layers
2
layers
Interface pattern
Default
Top interface spacing
0.5
mm
Normal Support expansion
0
mm
Support/object xy distance
0.4
mm
Support/object first layer gap
0.2
mm
Don't support bridges
Independent support layer height

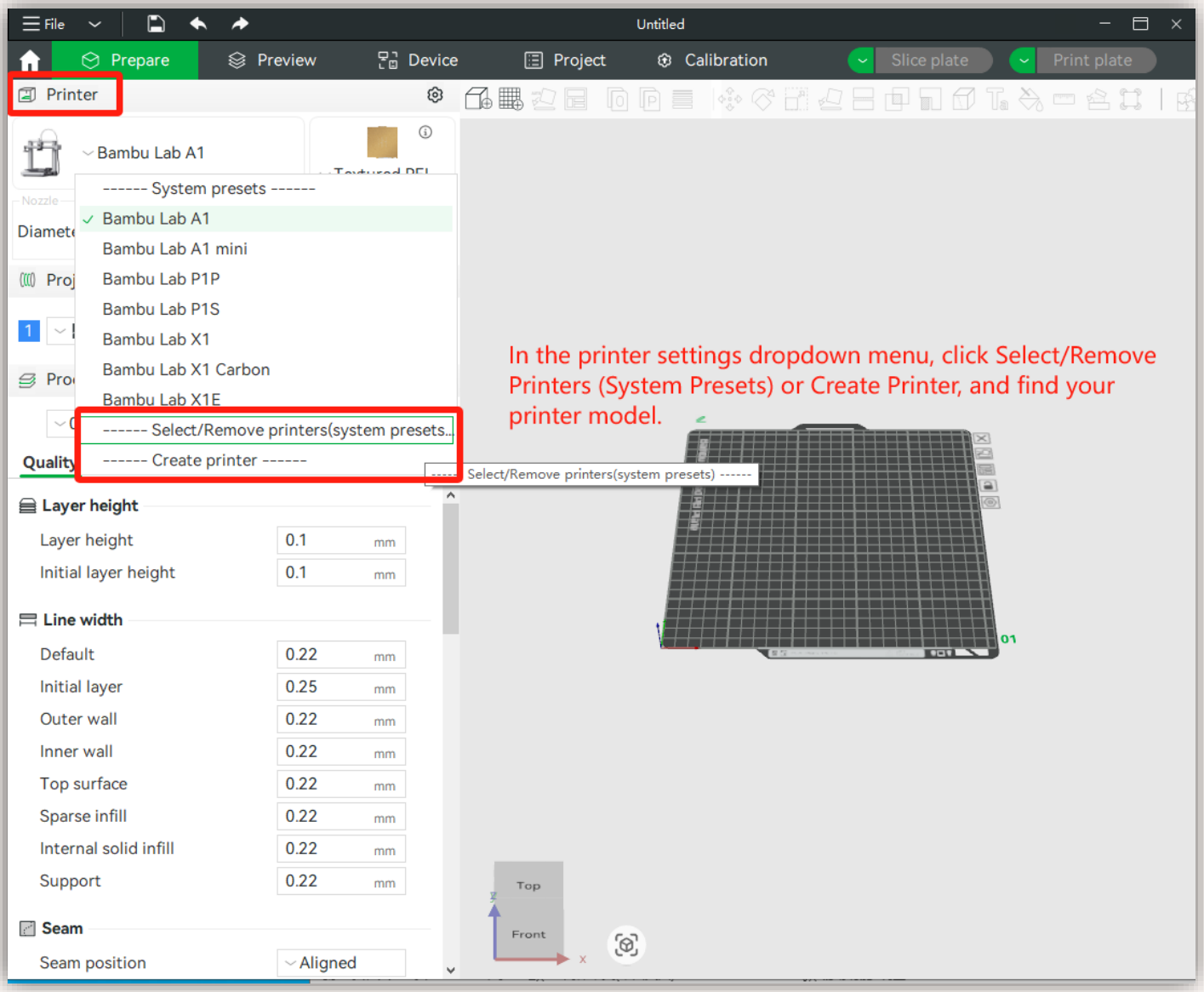

Quality
Strength
Speed
Support
Others
Bed adhesion
Skirt loops
0
Skirt height
1
layers
Brim type
Outer brim ...
Brim width
100
mm
Brim-object gap
0.1
mm
Prime tower
Enable
Skip points
Internal ribs
Width
35
mm
Max speed
90
mm/s
Brim width
3
mm
Infill gap
100
%
Rib wall
Flush options
Flush into objects' infill
Flush into objects' support
Special mode
Slicing Mode
Regular
Print sequence
By layer
Spiral vase
Timelapse
Traditional
Fuzzy Skin
None
Advanced
Use beam interlocking
Interlocking depth of a segmented region
0
mm
G-code output
Reduce infill retraction
Post-processing scripts
Notes

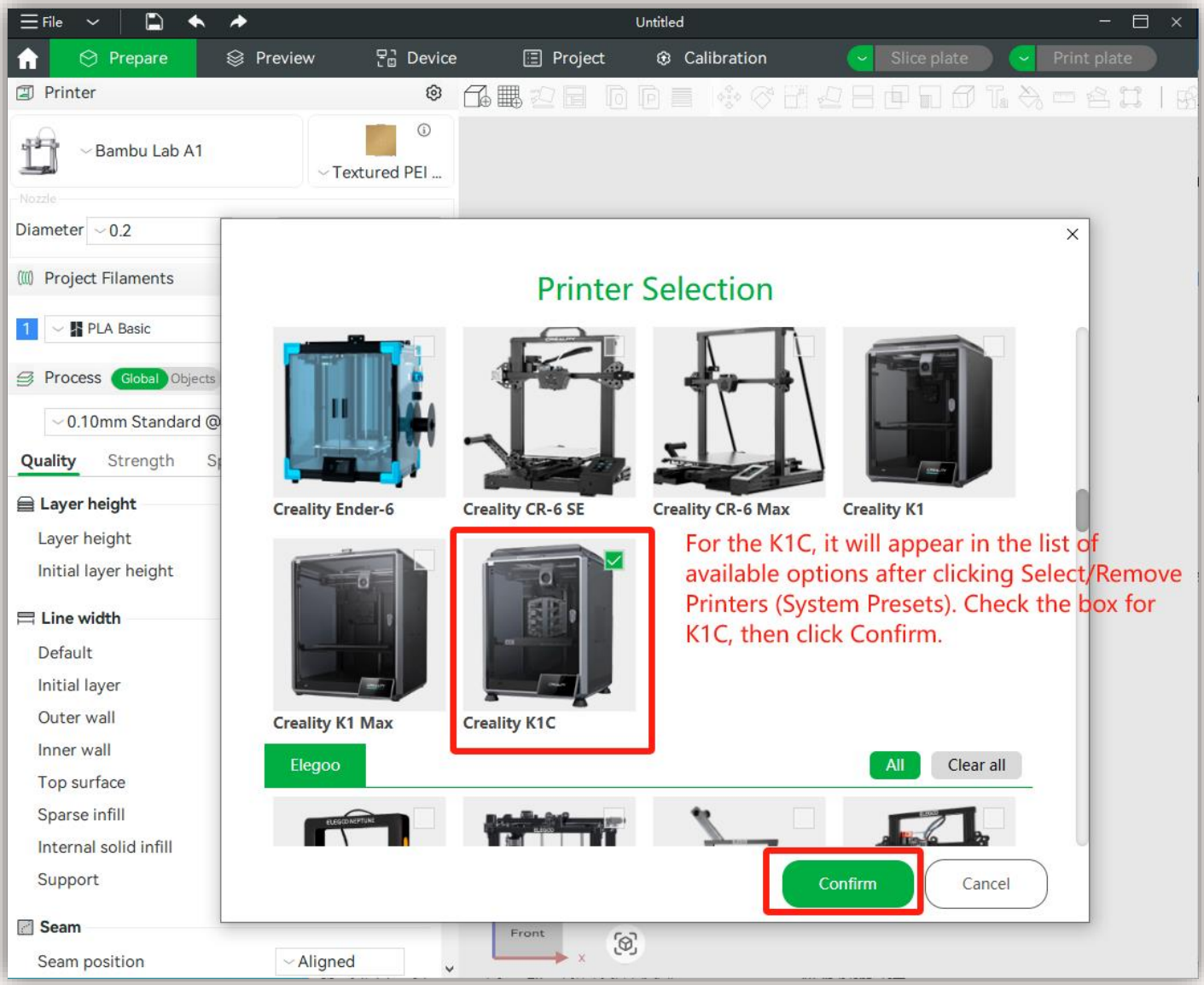
--**Slice the model using Bambu Studio and export the G-code**:

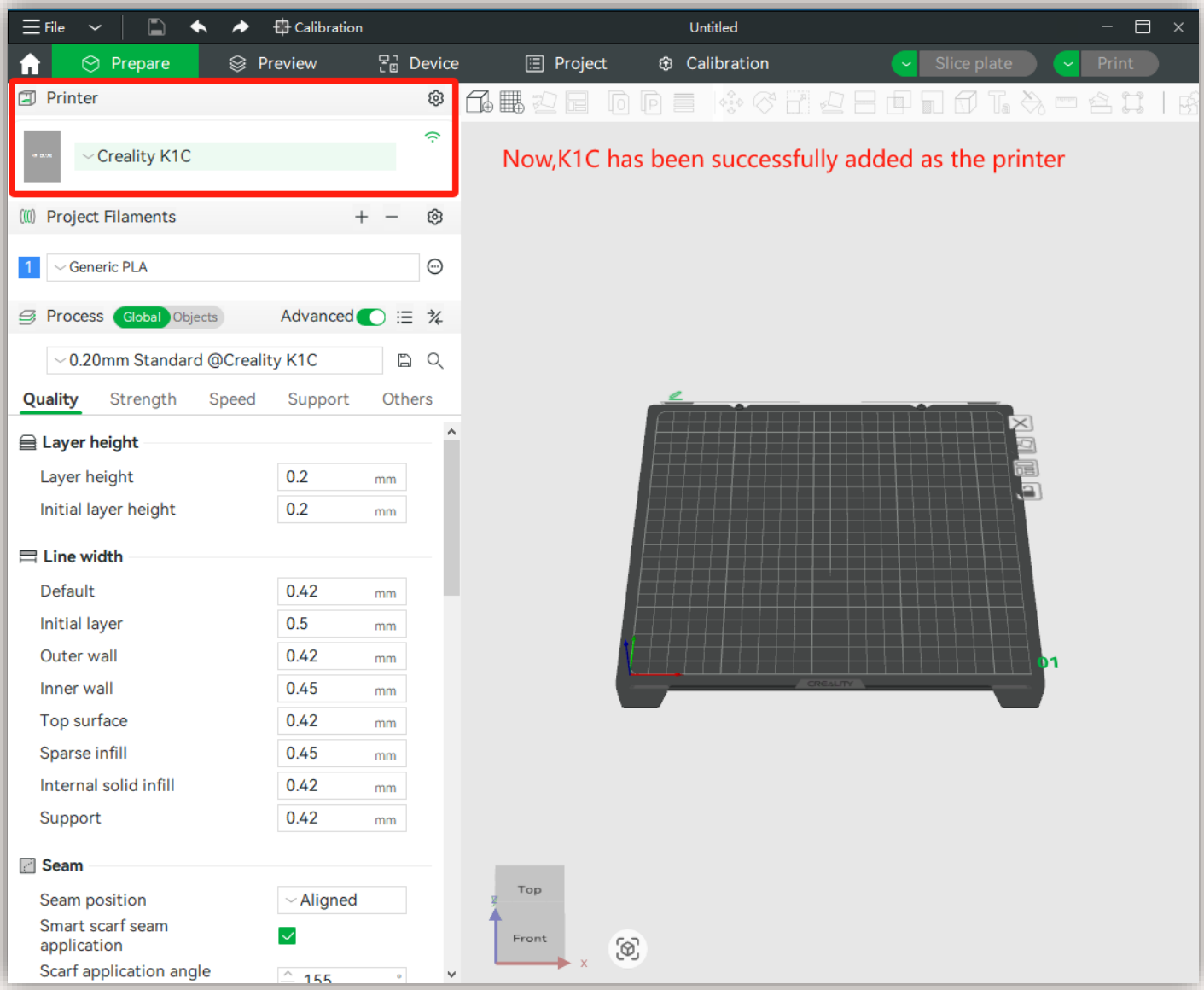
For example, if the buyer owns a Creality K1C.

1. Download Bambu Studio. After downloading, open Bambu Studio and add your printer K1C.

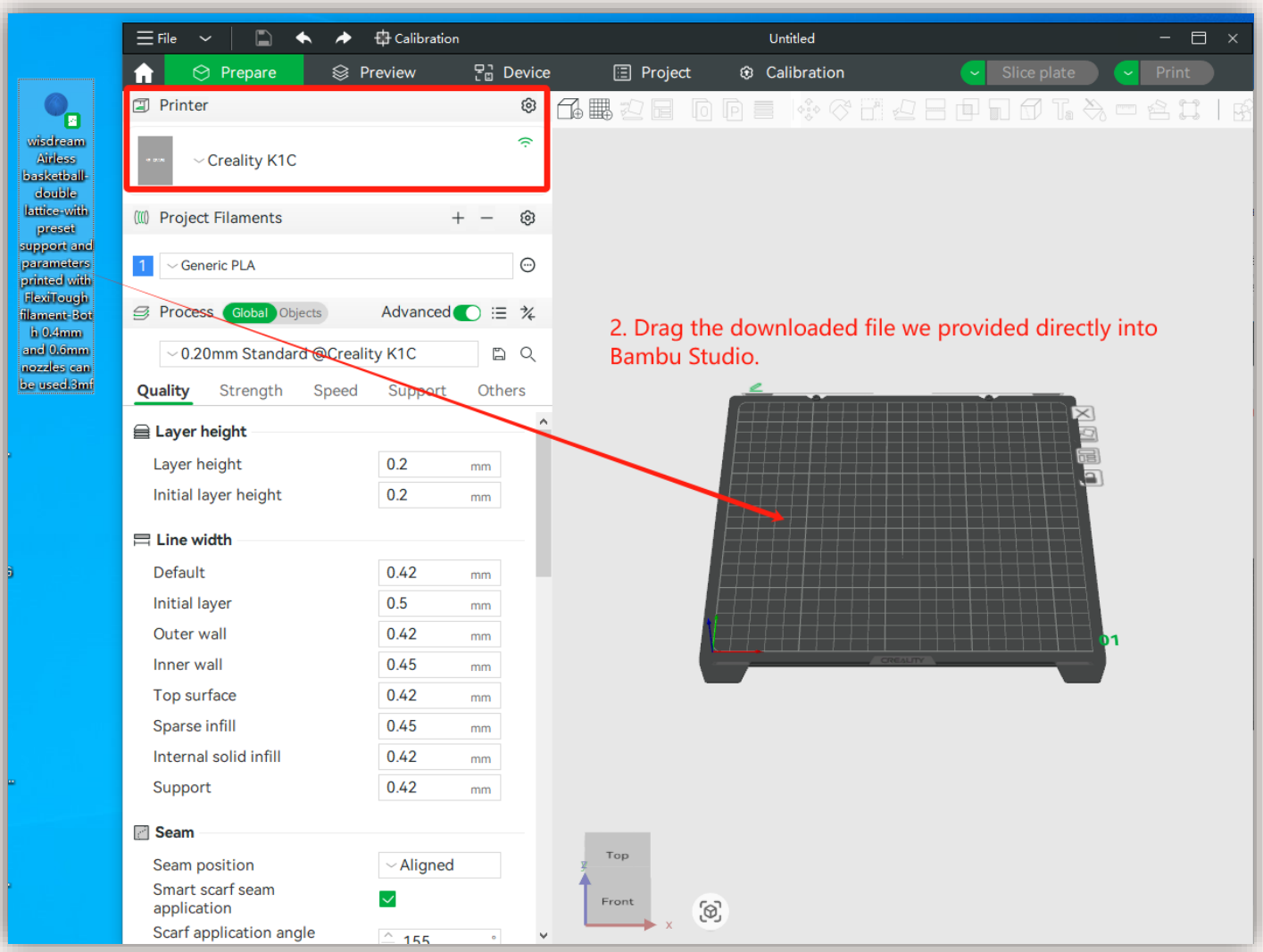


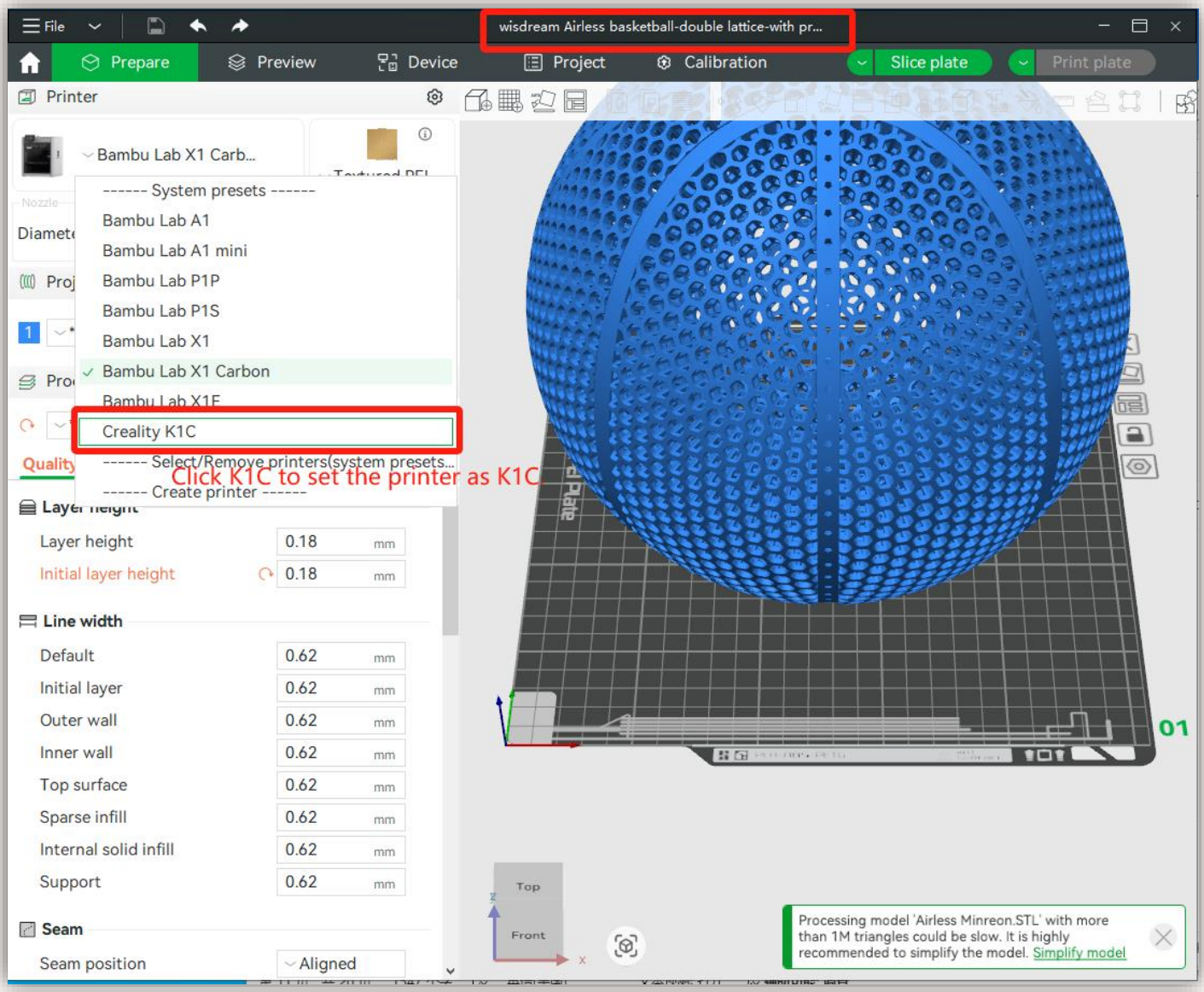


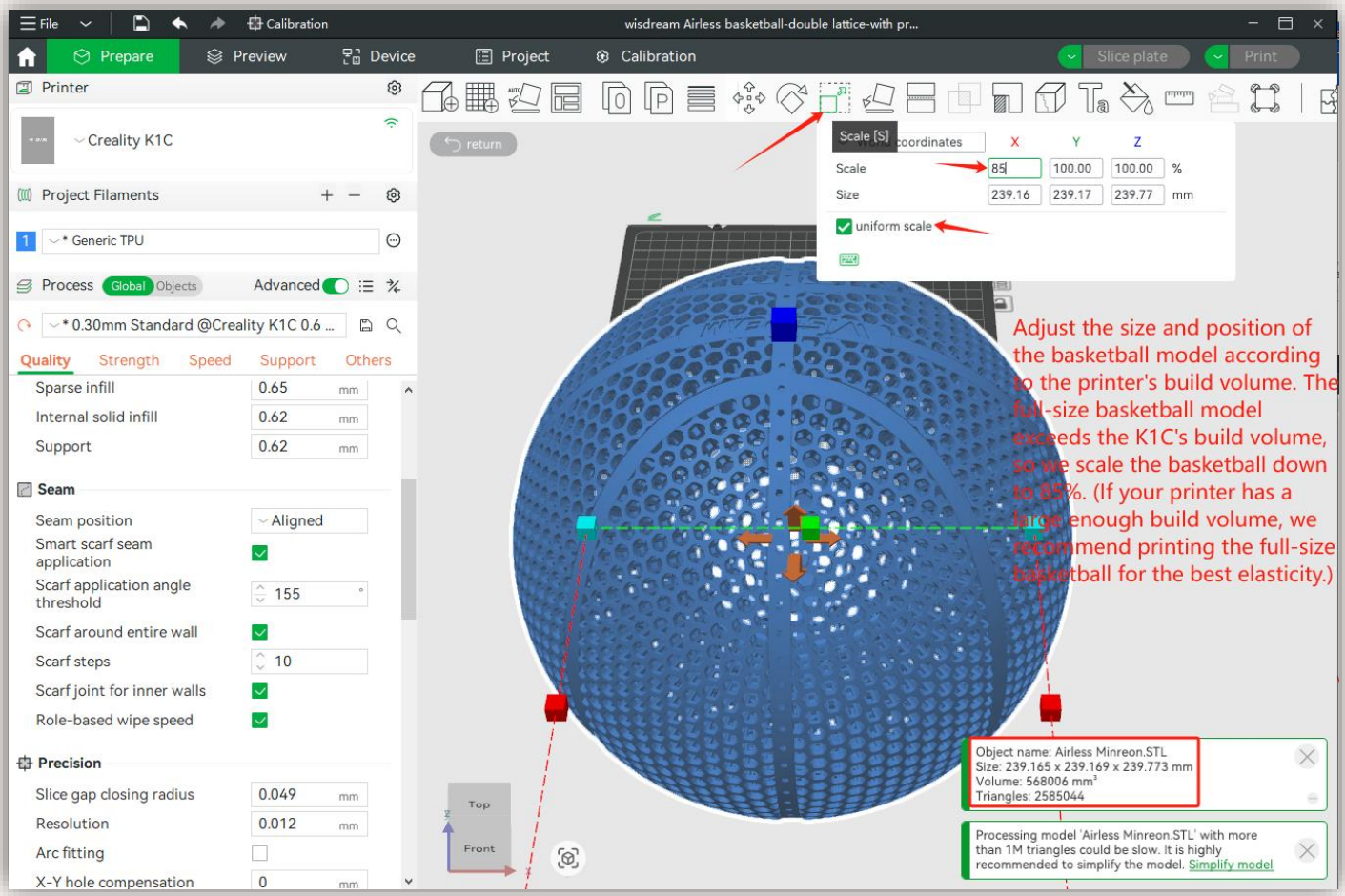

File
Untitled
Prepare
Preview
Device
Project
Calibration
Slice plate
Print plate
Printer
Bambu Lab A1
Textured PEI ...
Diameter 0.2
Project Filaments
PLA Basic
Process
Global
Objects
0.10mm Standard @
Quality
Strength
Layer height
Layer height
Initial layer height
Line width
Default
Initial layer
Outer wall
Inner wall
Top surface
Sparse infill
Internal solid infill
Support
Seam
Seam position
Aligned
Printer Selection
Creality Ender-6
Creality CR-6 SE
Creality CR-6 Max
Creality K1
Creality K1 Max
Creality K1C
For the K1C, it will appear in the list of available options after clicking Select/Remove Printers (System Presets). Check the box for K1C, then click Confirm.
Elegoo
All
Clear all
Confirm
Cancel
Front

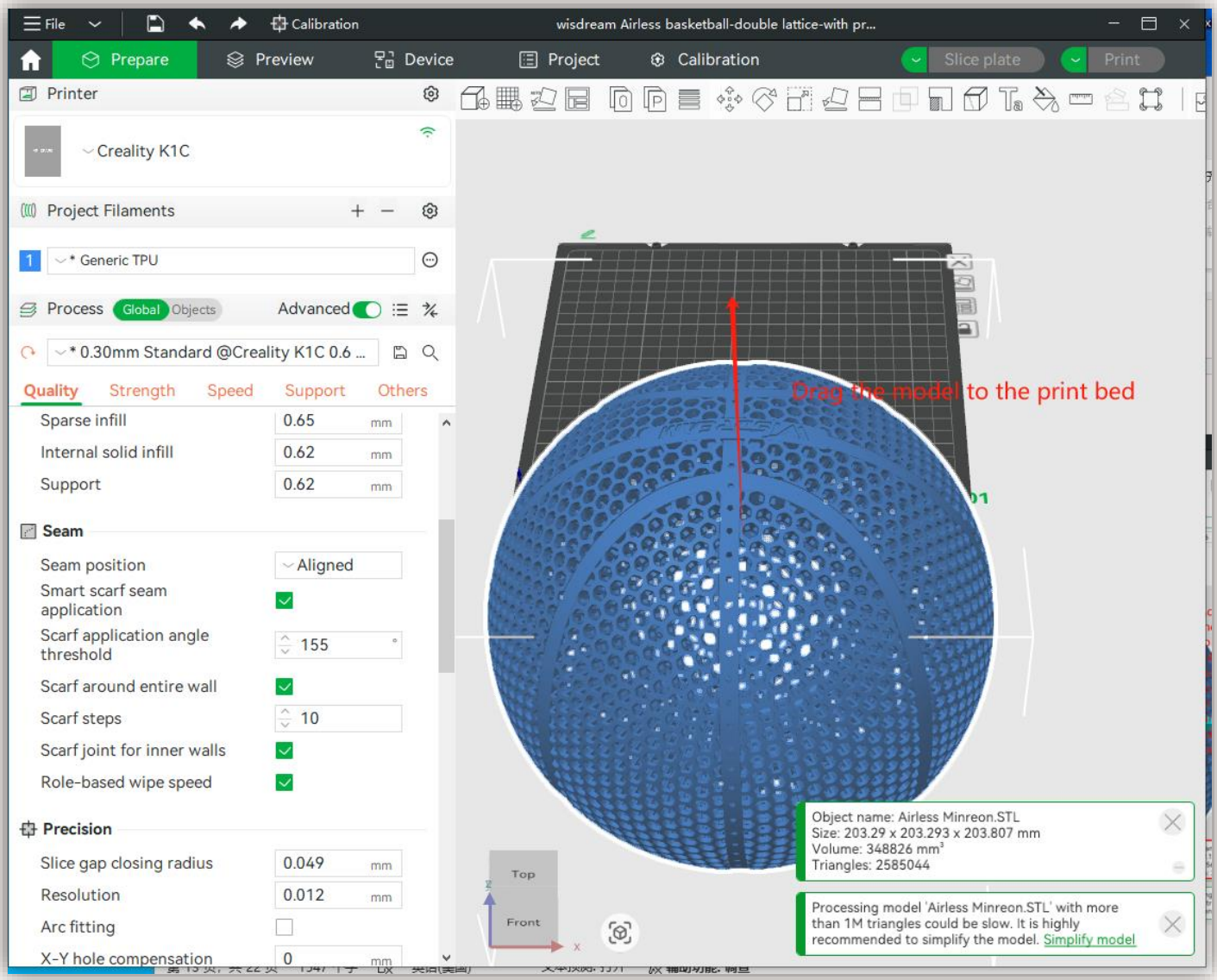

File
Calibration
Untitled
Prepare
Preview
Device
Project
Calibration
Slice plate
Print
Printer
Creality K1C
Now,K1C has been successfully added as the printer
Project Filaments
1
Generic PLA
Process
Global
Objects
Advanced
0.20mm Standard @Creality K1C
Quality
Strength
Speed
Support
Others
Layer height
Layer height 0.2 mm
Initial layer height 0.2 mm
Line width
Default 0.42 mm
Initial layer 0.5 mm
Outer wall 0.42 mm
Inner wall 0.45 mm
Top surface 0.42 mm
Sparse infill 0.45 mm
Internal solid infill 0.42 mm
Support 0.42 mm
Seam
Seam position Aligned
Smart scarf seam application
Scarf application angle 155
Top
Front

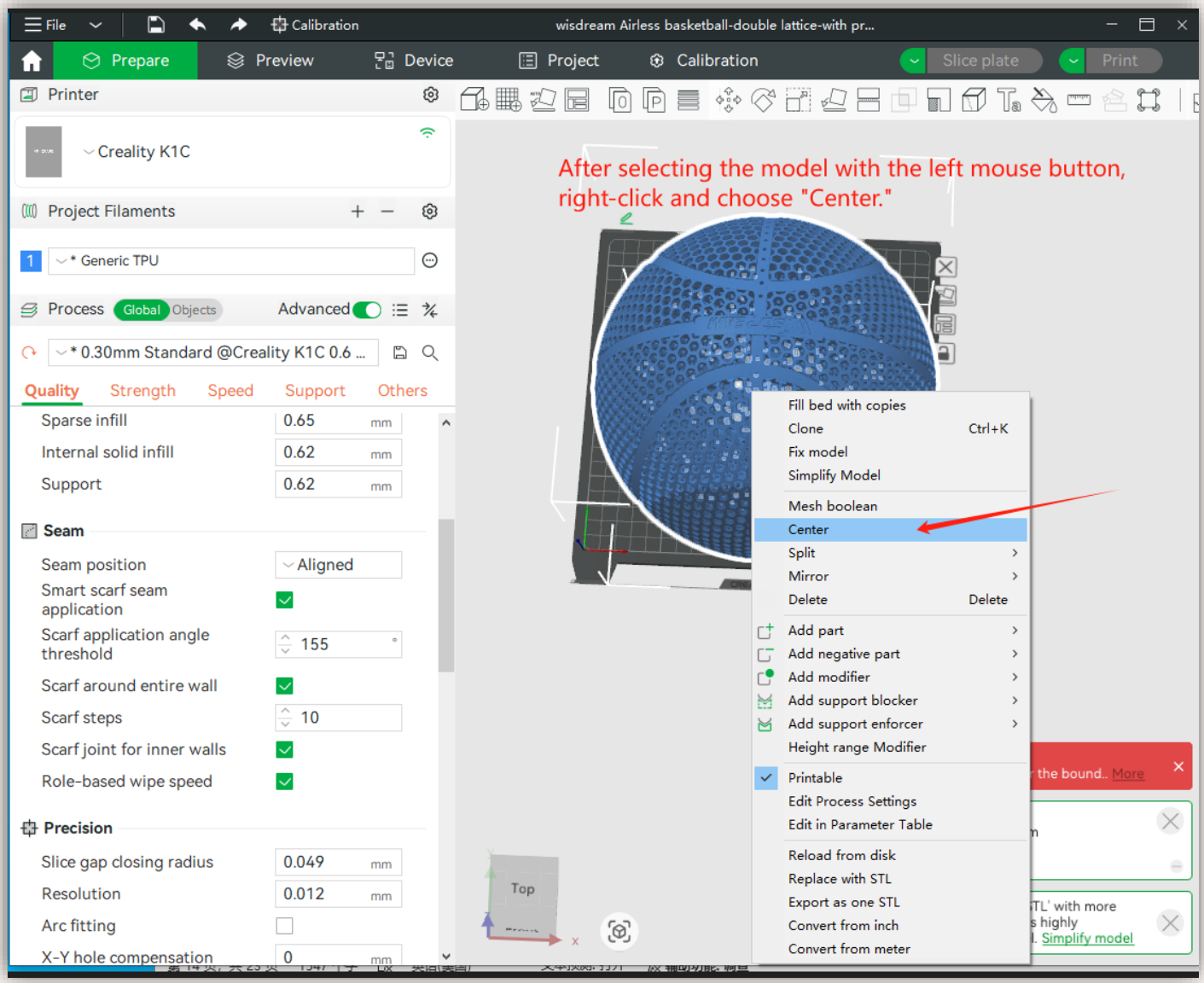
2. Drag the downloaded file we provided directly into Bambu Studio and do some adjustment.



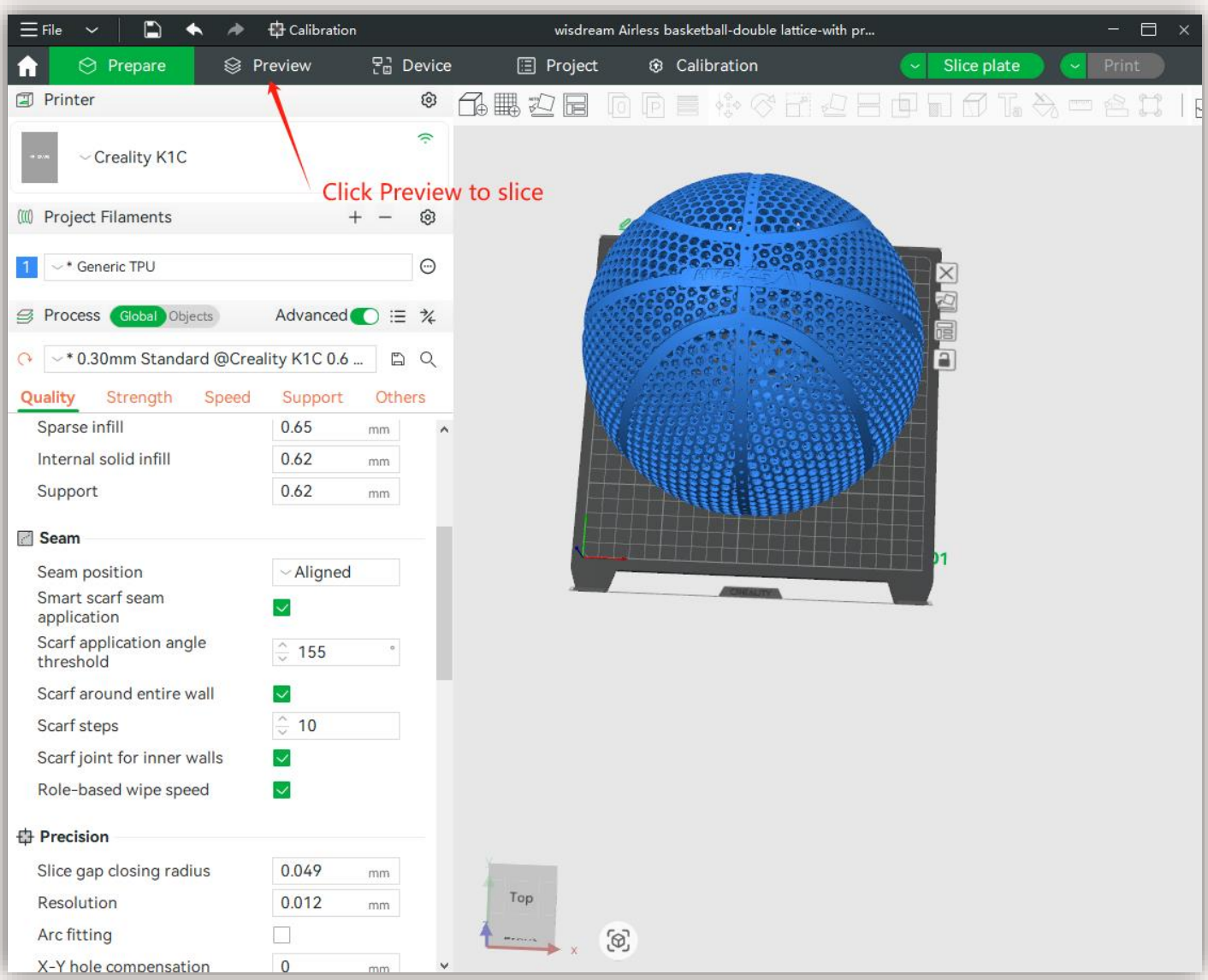

File
wisdream Airless basketball-double lattice-with pr...
Prepare
Preview
Device
Project
Calibration
Slice plate
Print plate
Printer
Bambu Lab X1 Carb...
------ System presets ------
Bambu Lab A1
Bambu Lab A1 mini
Bambu Lab P1P
Bambu Lab P1S
Bambu Lab X1
Bambu Lab X1 Carbon
Bambu Lab X1E
Creality K1C
------ Select/Remove printers(system presets...
------ Create printer ------
Click K1C to set the printer as K1C
Quality
Layer height
Layer height 0.18 mm
Initial layer height 0.18 mm
Line width
Default 0.62 mm
Initial layer 0.62 mm
Outer wall 0.62 mm
Inner wall 0.62 mm
Top surface 0.62 mm
Sparse infill 0.62 mm
Internal solid infill 0.62 mm
Support 0.62 mm
Seam
Seam position Aligned
Top
Front
Processing model 'Airless Minreon.STL' with more than 1M triangles could be slow. It is highly recommended to simplify the model. Simplify model
01

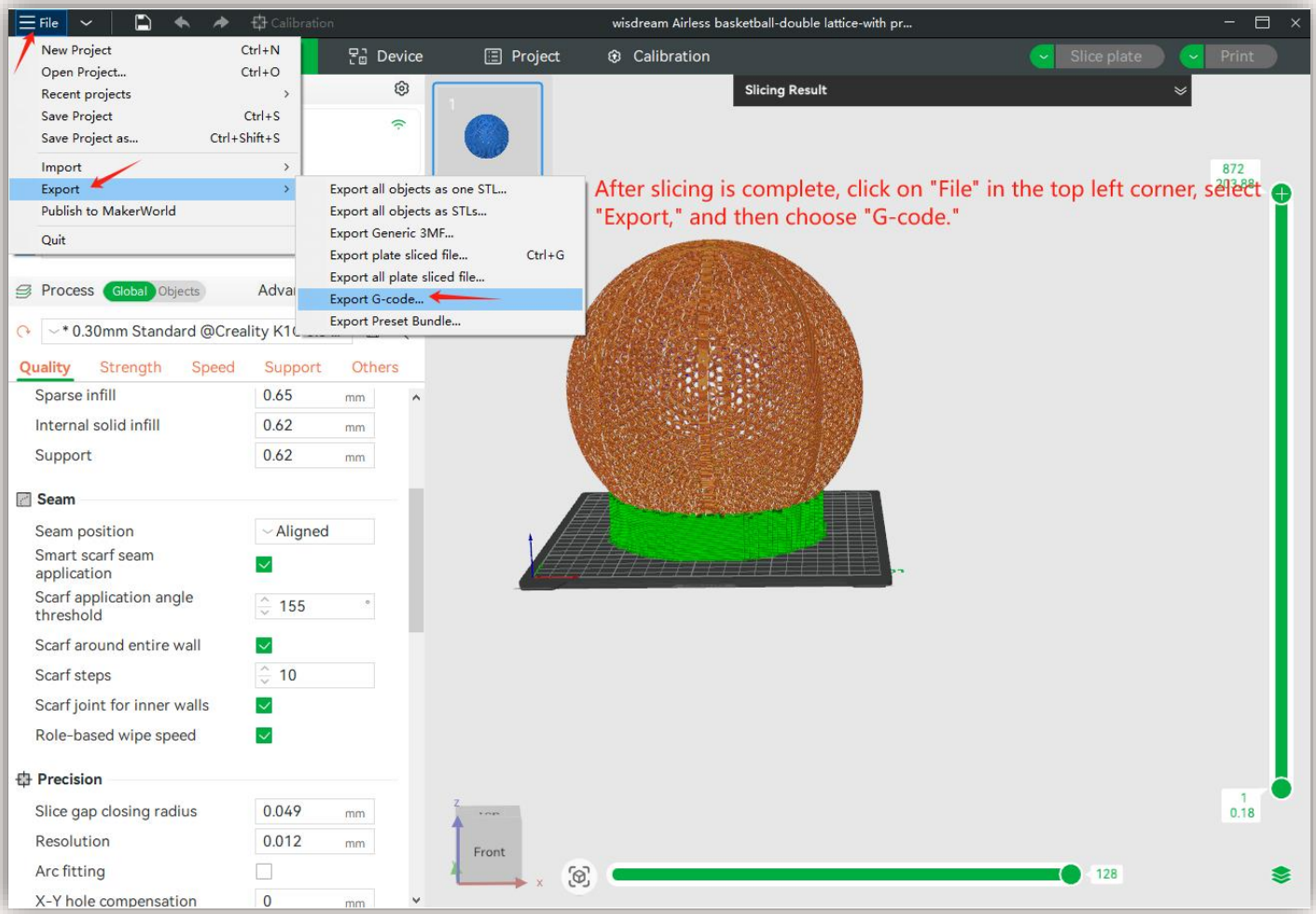

File
Calibration
wisdream Airless basketball-double lattice-with pr...
Prepare
Preview
Device
Project
Calibration
Slice plate
Print
Printer
Creality K1C
Project Filaments
* Generic TPU
Process
Global
Objects
Advanced
* 0.30mm Standard @Creality K1C 0.6 ...
Quality
Strength
Speed
Support
Others
Sparse infill 0.65 mm
Internal solid infill 0.62 mm
Support 0.62 mm
Seam
Seam position Aligned
Smart scarf seam application
Scarf application angle threshold 155
Scarf around entire wall
Scarf steps 10
Scarf joint for inner walls
Role-based wipe speed
Precision
Slice gap closing radius 0.049 mm
Resolution 0.012 mm
Arc fitting
X-Y hole compensation 0 mm
return
Scale [S]
coordinates
X
Y
Z
Scale 85 100.00 100.00 %
Size 239.16 239.17 239.77 mm
uniform scale
Adjust the size and position of the basketball model according to the printer's build volume. The full-size basketball model exceeds the K1C's build volume, so we scale the basketball down to 85%. (If your printer has a large enough build volume, we recommend printing the full-size basketball for the best elasticity.)
Top
Front
Object name: Airless Minreon.STL
Size: 239.165 x 239.169 x 239.773 mm
Volume: 568006 mm³
Triangles: 2585044
Processing model 'Airless Minreon.STL' with more than 1M triangles could be slow. It is highly recommended to simplify the model. Simplify model

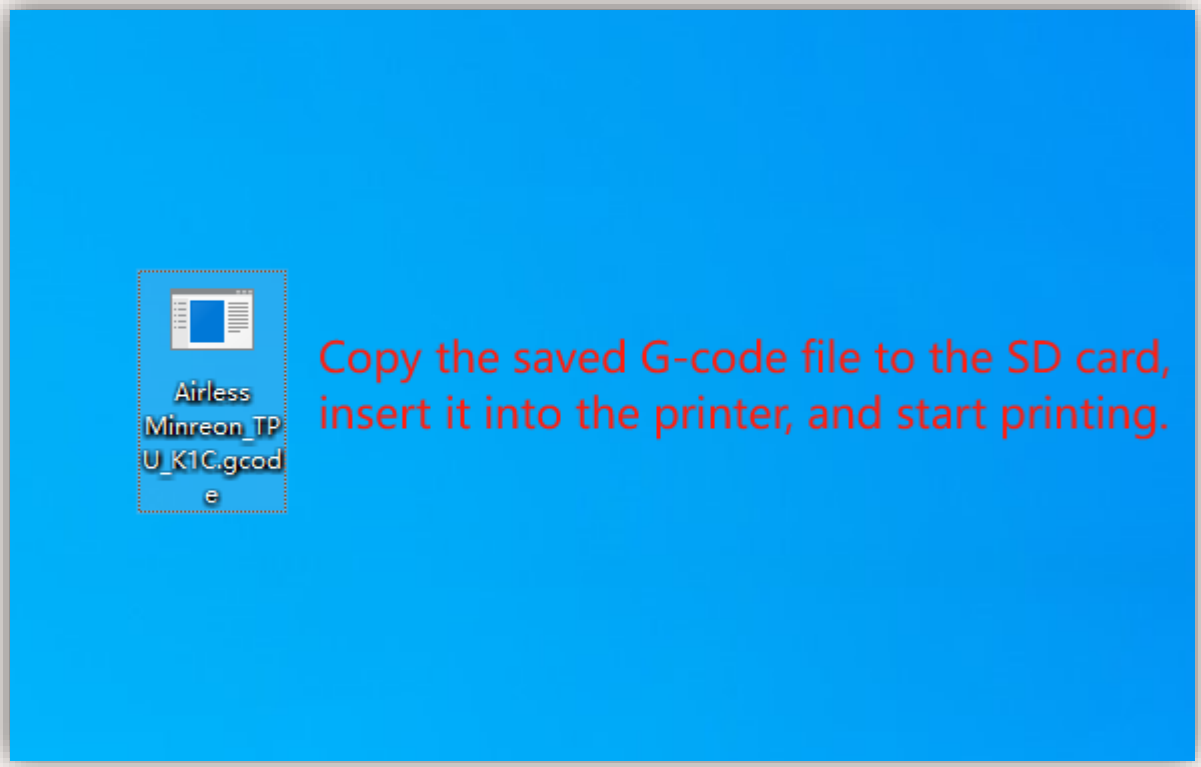

File
Calibration
wisdream Airless basketball-double lattice-with pr...
Prepare
Preview
Device
Project
Calibration
Slice plate
Print
Printer
Creality K1C
Project Filaments
1
* Generic TPU
Process
Global
Objects
Advanced
* 0.30mm Standard @Creality K1C 0.6 ...
Quality
Strength
Speed
Support
Others
Sparse infill
0.65
mm
Internal solid infill
0.62
mm
Support
0.62
mm
Seam
Seam position
Aligned
Smart scarf seam application
Scarf application angle threshold
155
Scarf around entire wall
Scarf steps
10
Scarf joint for inner walls
Role-based wipe speed
Precision
Slice gap closing radius
0.049
mm
Resolution
0.012
mm
Arc fitting
X-Y hole compensation
0
mm
Drag the model to the print bed
Object name: Airless Minreon.STL
Size: 203.29 x 203.293 x 203.807 mm
Volume: 348826 mm³
Triangles: 2585044
Processing model 'Airless Minreon.STL' with more than 1M triangles could be slow. It is highly recommended to simplify the model. Simplify model
Top
Front


File
Calibration
wisdream Airless basketball-double lattice-with pr...
Prepare
Preview
Device
Project
Calibration
Slice plate
Print
Printer
Creality K1C
Project Filaments
1
* Generic TPU
Process
Global
Objects
Advanced
* 0.30mm Standard @Creality K1C 0.6 ...
Quality
Strength
Speed
Support
Others
Sparse infill
0.65
mm
Internal solid infill
0.62
mm
Support
0.62
mm
Seam
Seam position
Aligned
Smart scarf seam application
Scarf application angle threshold
155
Scarf around entire wall
Scarf steps
10
Scarf joint for inner walls
Role-based wipe speed
Precision
Slice gap closing radius
0.049
mm
Resolution
0.012
mm
Arc fitting
X-Y hole compensation
0
mm
After selecting the model with the left mouse button, right-click and choose "Center."
Fill bed with copies
Clone
Ctrl+K
Fix model
Simplify Model
Mesh boolean
Center
Split
Mirror
Delete
Delete
Add part
Add negative part
Add modifier
Add support blocker
Add support enforcer
Height range Modifier
Printable
Edit Process Settings
Edit in Parameter Table
Reload from disk
Replace with STL
Export as one STL
Convert from inch
Convert from meter
Top
the bound.. More
TL' with more
s highly
Simplify model

3. Slice and print




File
wisdream Airless basketball-double lattice-with pr...
New Project Ctrl+N
Open Project... Ctrl+O
Recent projects
Save Project Ctrl+S
Save Project as... Ctrl+Shift+S
Import
Export
Publish to MakerWorld
Quit
Device
Project
Calibration
Slice plate
Print
Slicing Result
Export all objects as one STL...
Export all objects as STLs...
Export Generic 3MF...
Export plate sliced file... Ctrl+G
Export all plate sliced file...
Export G-code...
Export Preset Bundle...
After slicing is complete, click on "File" in the top left corner, select "Export," and then choose "G-code."
Process Global Objects
* 0.30mm Standard @Creality K1C
Quality Strength Speed Support Others
Sparse infill 0.65 mm
Internal solid infill 0.62 mm
Support 0.62 mm
Seam
Seam position Aligned
Smart scarf seam application
Scarf application angle threshold 155
Scarf around entire wall
Scarf steps 10
Scarf joint for inner walls
Role-based wipe speed
Precision
Slice gap closing radius 0.049 mm
Resolution 0.012 mm
Arc fitting
X-Y hole compensation 0 mm
872
1
0.18
Front
128


Airless Minreon_TPU_K1C.gcode
Copy the saved G-code file to the SD card, insert it into the printer, and start printing.

2. Drying the Filament

- When the filament is newly purchased, unopened, and the vacuum-sealed bag is intact, it can be used directly without drying.

- When the filament's vacuum seal is opened and you're not using it right away, please store the filament in a sealed filament storage bag. FlexiTough Filament is a bit sensitive to moisture, so check the filament before printing. If the filament has absorbed moisture, it is recommended to dry it at 80°C for 30 minutes to 1 hour before use for the best results.

Watch a detailed guide on drying the filament here:
https://youtu.be/mIMp2N_b1e8?si=AwxdbeMeSPeabN2i

3. Pre-Printing Preparation

- Before printing, it is recommended to clean the surface of the build plate thoroughly to remove any residual oil or 3D printing adhesive. Then, apply a thin layer of 3D printing adhesive to prevent print failures caused by warping. Ordinary PVA solid glue will suffice.

  Update：(If the print bed isn't clean, the bottom of your print can warp really easily, which causes the whole print to fail. If the bed is clean but you don't use any glue stick, FlexiTough filament can stick really tightly to the bed, making it really hard to remove the model from the plate after printing. That's why we recommend applying a thin layer of **glue stick** after cleaning the print bed. This not only improves the adhesion during printing but also **makes it easier to remove the model from the build plate** once it's done. Just heat up the bed to melt the glue, and the model should come off much more easily.)

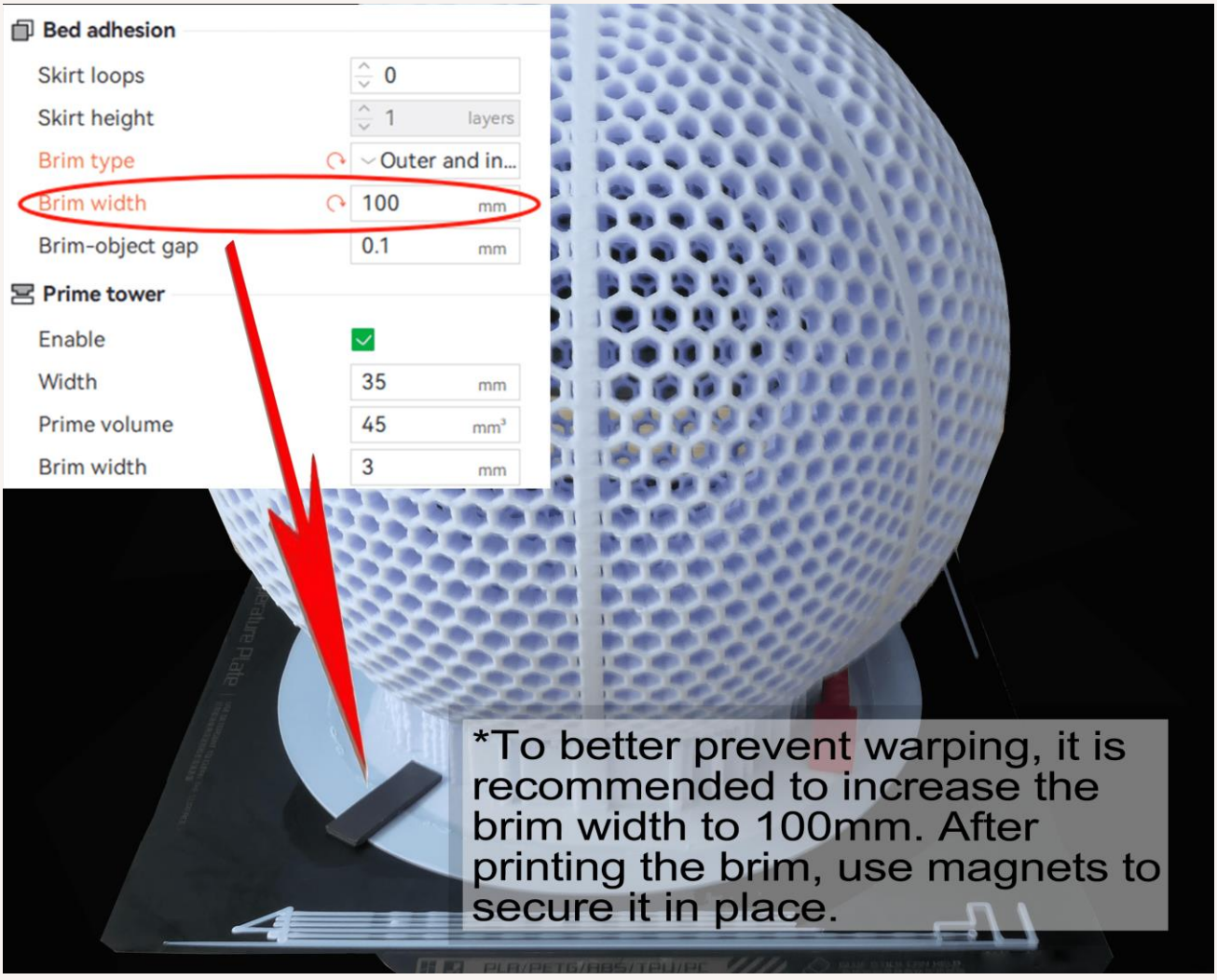
Watch a detailed guide on clean the build plate here:
https://youtu.be/mIMp2N_b1e8?si=AwxdbeMeSPeabN2i

4. Tips to Prevent Warping

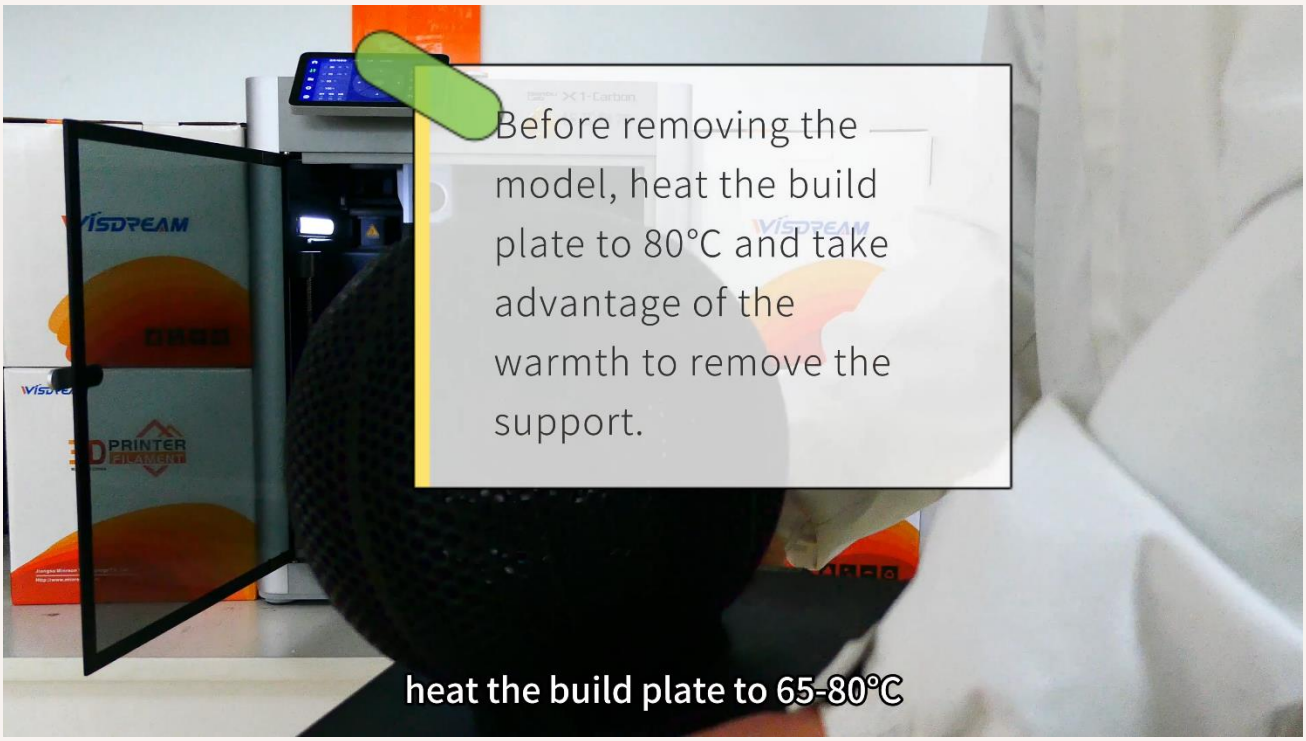
1) Before printing, it's recommended to clean the surface of the build plate thoroughly to remove any residual oil or 3D printing adhesive. Then, apply a thin layer of 3D printing adhesive before printing, to prevent print failures caused by warping.

2) Set the bed temperature to 80°C for the first layer. After the third layer, reduce the bed temperature to 45-65°C, ensure the model adheres firmly to the bed.

3)



5. Tips to remove the model from plate



6. Tips to remove the supports

Watch a video here: https://youtu.be/R3DHkYfIMmM?si=vxAdeN5epxcc1cHQ

7. Tips to set up supports for airless balls

https://youtu.be/n0OYQ-Zs27k?si=0jC_mmtVBbg5vZK8

8. FAQ

In case you had concerns about FlexiTough filament, here are some frequently asked questions and answers to clear things up.

1) Is FlexiTough filament safe?

The material of this filament is biodegradable and is not harmful to the environment or to the human body.

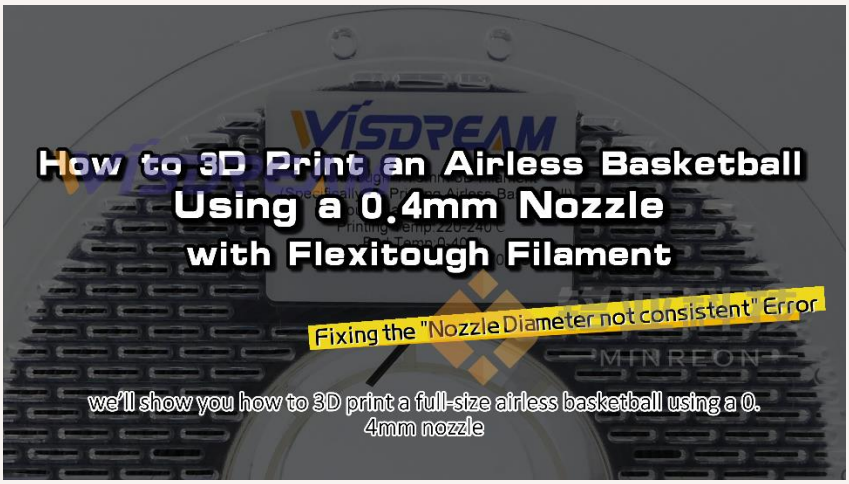
2) Why is a 0.6mm nozzle recommended for printing, suggested as the first choice?

A 0.6mm nozzle is recommended because it ensures more stable extrusion, which is crucial for flexible filament. Flexible filaments are sensitive to external forces, which can decrease extrusion and compromise print quality. While a 0.4mm nozzle can be used, a 0.6mm nozzle helps maintain better layer height consistency and overall print quality.

3) Can I use a 0.4mm nozzle if I don't have a 0.6mm nozzle?

Yes, you can use a 0.4mm nozzle when you don't have a 0.6mm nozzle or when you cannot change nozzles. However, we still recommend using slicing parameters designed for a 0.6mm nozzle to achieve the best results.

Watch a detailed guide on *How to 3D Print an Airless Basketball Using a 0.4mm Nozzle* here:
https://youtu.be/unZsY0yr9mE?si=Iat5X0Gkw8ka6nGG



4) Why does the printed basketball have a lot of supports?

The airless basketball model is unique and requires specific settings. We provide a 3MF files on thingiverse/google drive pre-configured with supports and printing parameters suitable for Bambu printers. If you use other files or other printers, you'll need to set up the supports yourself. Using the provided 3MF files is recommended for convenience.

5) Why does my filament tangle near the end of the print?

As the filament spool becomes lighter towards the end of the print, it may move or tangle due to the vibrations of the printer, which can cause the filament to misfeed and result in a failed print. To avoid this, we recommend not placing the spool directly on the printer but instead using a separate spool holder to ensure

smooth feeding.

6) Why doesn't my 3D-printed basketball bounce well?

The bounce quality of 3D-printed basketball depends on both the design file and the filament materials used. Ensure you are using the correct STL or 3MF file. Flexitough filament is tailored for 3D models using FDM (Fused Deposition Modeling)technology. it is not suitable for files designed for other methods like SLA or SLS as their structures are incompatible with FDM, which may result in cracks in the final print. For optimal performance, we recommend using the 3MF files we provided or contacting your designer for an updated design for better bounce performance.

7) Why did my printed airless basketball crack?

Normally, the airless basketball shouldn't crack. For optimal performance, we recommend using the 3MF files we provided.

8) Why doesn't the scaled-down model bounce as well?

When the model is scaled down, the wall thickness and other factors are also proportionally reduced. This makes the ball's wall thinner and smaller, leading to lower bounce performance and even potential cracking. We recommend adjusting the layers and infill according to the actual print size.

9) What should to do if the filament is damp?

FlexiTough Filament is sensitive against moisture, please check filament before printing. If the humidity in the filament persists. it is recommended to dry the filament at 80℃ for 30 minutes and then use it for best results.

10) Can this filament only be used for printing airless basketballs?

FlexiTough flexible filament can be used for printing all kinds of flexible models, including other ball types, specially optimized for airless basketballs to achieve the best bounce effect. The performance for other ball models will depend on settings like infill and wall thickness.

11) Is this filament compatible with AMS?

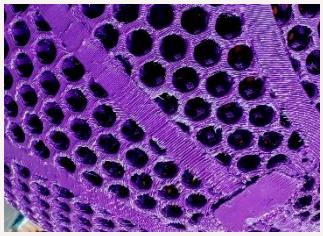
No, the current formula is not compatible with AMS.

12) What’s the spool weight(not the filament weight)? I want to know so I can accurately know how much filament I have left.

13) After removing the supports, some areas of the model surface appear white. What methods can be used to improve the surface?.

You can quickly pass a soft flame lighter over the surface without lingering too long.

Do not use a torch lighter or jet flame lighter as it is more likely to melt the surface and cause black marks.



9. Update:

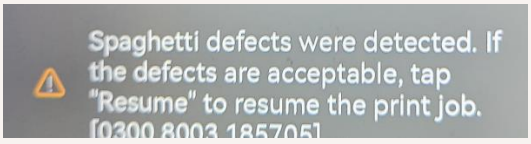
-2024.11.28-:

**In Bambu Studio v 1.10 and above, you might encounter an issue where the Brim does not appear after slicing. To resolve this, you can download a version earlier than 1.10 from BambuLab's website, following their instructions, and then proceed with slicing.

-2024.12.19-:

**When printing a full-size basketball and printing approaching the basketball top, some printers may display a warning like "Spaghetti defects were detected." However, the basketball model itself appears fine. In this case, you can safely ignore the "Spaghetti" warning and resume printing.

(Explanation: The warning is triggered because, after removing all internal supports when setting the parameters, the top layers of the basketball still require some small support structures to complete the print successfully when printing. These small supports might be mistakenly identified by the printer as spaghetti.)



-2024.12.25-:

Changes made to 8. FAQ , section 3) **Can I use a 0.4mm nozzle if I don't have a 0.6mm nozzle?

Changes made to 8. FAQ , section 6) Why doesn't my 3D-printed basketball bounce well?**

-2025.1.13-:

**Changes made to 3 Pre-Printing Preparation

-2025.5.20-:

**Changes made to 1) File Downloads& Settings

** Changes made to 8. FAQ , section12) 12)** What's the spool weight(not the filament weight)? I want to know so I can accurately know how much filament I have left.**

** Add 8. FAQ , section 13)12) **After removing the supports, some areas of the model surface appear white. What methods can be used to improve the surface?.**

-2025.5.21-:

**Changes made to1)File Downloads& Settings