User Guide for Tough Resin

※**Tough Resin** is a resin that excels in material toughness and withstand bending and compression. It has good strength, elongation and can resist chipping, cracking and stress marks. It is suitable for light curing equipment in the 365~405nm band and it has the advantages of toughness, low shrinkage, good detail performance, and high printing success rate. Therefore, it is suitable for parts that require toughness.

※Instructions for use under abnormal temperature conditions:

The resin is recommended to be printed in the environment of 25~30℃. When the surrounding temperature lies in between 15~20℃, we recommend users to increase the exposure time by 30% from the default setting and reduce the platform lifting speed by 30%.

1. Precautions

(1) Shake the resin bottle/package until well mixed before each print.

(2) Check whether there are obvious wrinkles/damages on the FEP film. If so, please replace the FEP film.

(3) Check whether there is obvious dirt/excess solid residue on the surface of the LCD screen. If so, please clean it before printing.

(4) If the resin has not been used in the 3D printer for more than 3 days, it is recommended to filter the resin with a filter funnel after stirring the resin evenly in the liquid tank, and then pour it back into the resin

container.

(5) Please place the equipment in a well ventilated environment, and wear masks and gloves during operation. Those PPE can effectively protect the user from resin and its odor. Air purifier are recommended for more sensitive user group.

(6) When the transparent/white resin printed parts undergoes post-curing, their surfaces are more prone to yellowing compared to the other colored parts. To avoid this, the post-curing time can be appropriately reduced.

2.Printing parameters for printer

Please check your printer type and brand first. At the table below, you might find your default Anycubic resin printing parameters matching the corresponding printer (Currently mainly Anycubic).

Recommended printing parameters of Anycuibc resin						
Printer	Photon S	Photon Mono	Photon Mono X	Photon Mono X 6K	Photon Mono 4K	Photon ultra
Thumbnail / Parameter Settings						
Tough Resin						
Layer Thickness/mm	0.05	0.05	0.05	0.05	0.05	
Normal Exposure Time//s	8	2	2	2	2.3	
Off Time/s	1	0.5	0.5	0.5	0.5	
Bottom Exposure Time/s	60	40	28	23	40	
Bottom Layers	6	6	4	6	6	
Anti-alias	1	1	1	1	1	
Z Lift Distance/mm	6	6	8	8	6	
Z Lift Speed/mm/s	3	4	2	2	4	
Z Retract Speed/mm/s	3	6	3	3	6	

Printer	Photon Mono SE	Photon Mono SQ	Photon M3	Photon M3 Plus	Photon M3 Max
Thumbnail / Parameter Settings					
Layer Thickness/mm	0.05	0.05	0.05	0.05	0.05
Normal Exposure Time//s	1.5	2.3	3	1.5	3
Off Time/s	0.5	0.5	0.5	0.1	2.5
Bottom Exposure Time/s	30	23	23	23	50
Bottom Layers	6	6	4	3	6
Anti-alias	1	1	1	1	1
Z Lift Distance/mm	6	5	6	4	10
Z Lift Speed/mm/s	4	3	3	6	2
Z Retract Speed/mm/s	6	3	4	6	3

We will add more printer types that is popularly used.

*The data comes from Anycubic Laboratory and is for reference only.

*Different printing parameters and post-processing processes will led to different results. **If you encounter troubles while printing, feel free to contact Anycubic for support.** We will try our best.

*The processing reference parameters are suitable for the factory calibrated energy state of the specific equipment. Printing parameter must be adjusted accordingly if the UV power setting were changed.

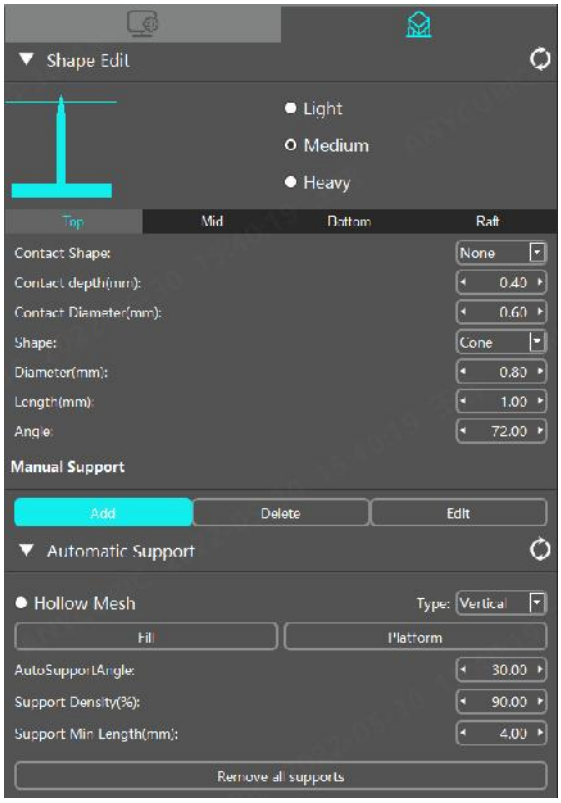
3. Support setting suggestions for slicing software

It is recommended to use Anycubic Photon Workshop or CHITUBOX or Lychee (slicing software for other compatible devices) for slicing. There is a good chance for ordinary parts to be successfully printed if your support settings are based on the following tips.

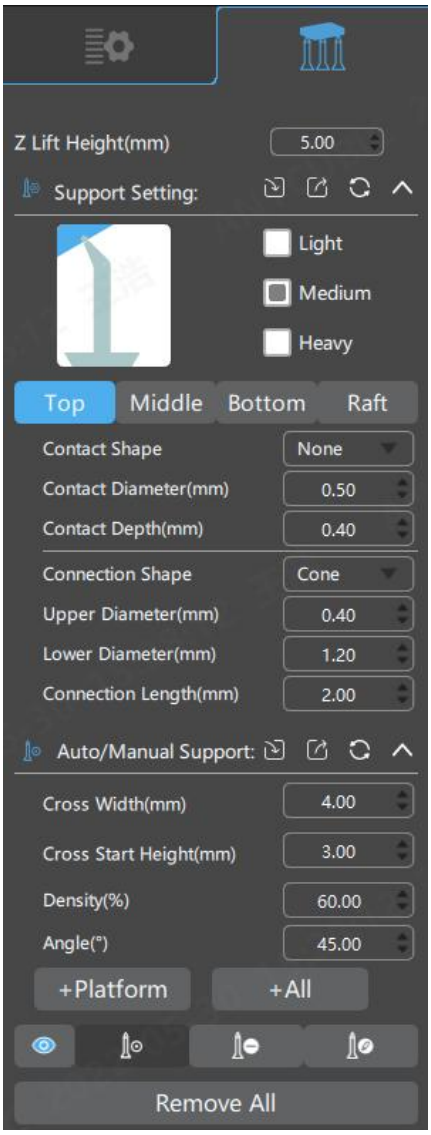
(1) We usually recommend customers to try the "Medium" type support from the start, as shown in the figure below for quick support settings.

(2) It is recommended that the depth of the embedded part of the support is ≥0.5mm, and the support gap is ≤3mm.

(3) If the printed part's section area is less than or equal to 30% of the processing area of the 3D Printer, the combination of "Medium" + "Light" can be used to complete the support design; if the part's section area is ≥ 30% of the processing area of the equipment, the combination of "Medium" + "Heavy" can be used to complete the support design .

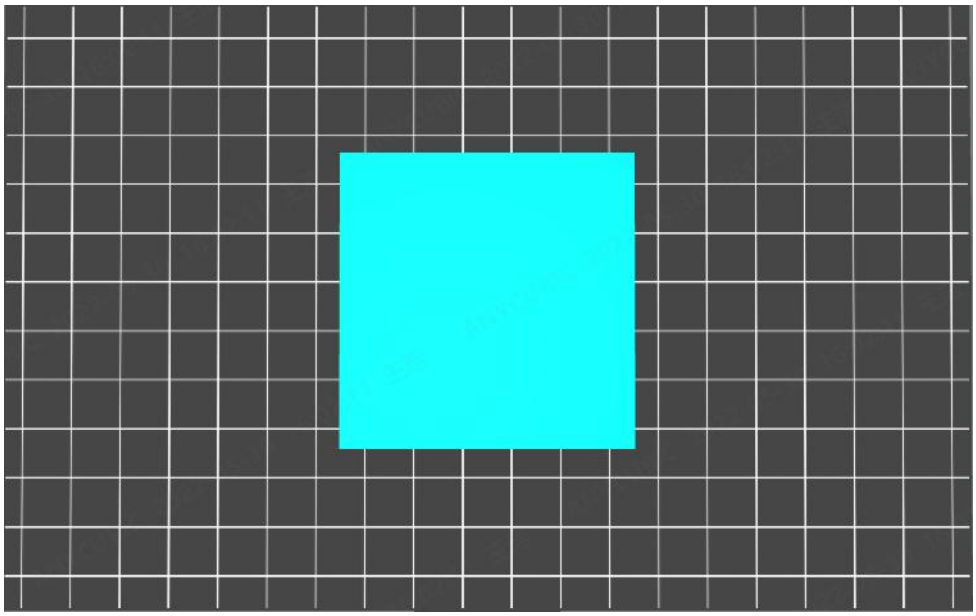


Workshop "Meduium" Support Parameters

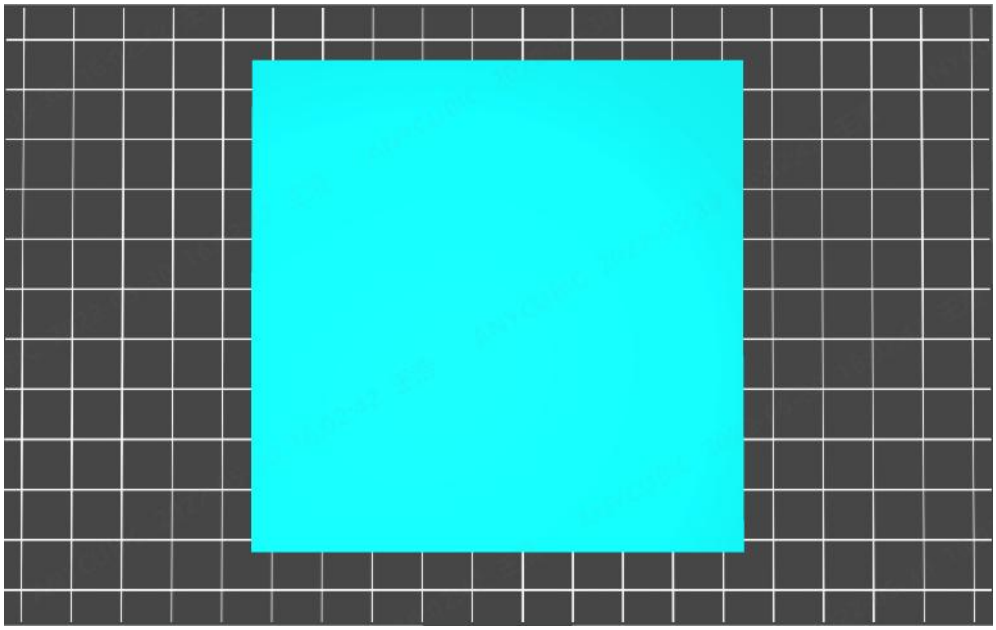


CHITUBOX "Meduium"

Support Parameters



*Printing size ≤ 30% of the processing area of the equipment, supported by "Medium" + "Light" combination



*Printing format ≥ 30% of the processing area of the equipment, supported by "Medium" + "Heavy" combination

4.Parts cleaning operations

(1) It is recommended to use 95+% ethanol/IPA or other effective resin

cleaning solvents to clean the residual resin on the printed parts.

(2) Do not soak the parts in the cleaning solvent for more than 30 minutes. Swelling and damage might occur for prolonged solvent soaking.

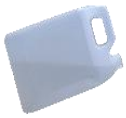
(3) After cleaning the parts, use a blower/air gun to remove the residual cleaning solution on the surface of the parts.

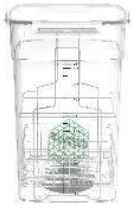
(4) For complex parts with a large number of cavities, multiple cleaning/surface drying cycles can fully clean the parts.

(5) Check if there is still residue resin on the surface of model. If so, please wash it again and dry it again.

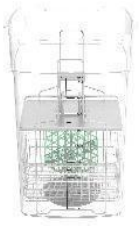
※ Cleaning Steps：

(1) OPTION 1：Anycibuc Wash & Cure





OR



Put the parts into the cleaning bucket Parts + platform into the cleaning bucket

(2)OPTION 2：Ultrasonic Wash

Ultrasonic vibration cleaning

(3)OPTION 3：Free Wash

Manual cleaning in cleaning solution container

5.Post-curing

(1) It usually takes less than 30 seconds of UV post-curing to cure the model surface. Prolonged post-curing time will reduce the flexibility of resin printed parts and cause larger shrinkage.

(2) Before post-curing, please make sure that there is neither residue resin nor residue solvent on the surface of printed part (if there is, please clean and dry the model surface first).

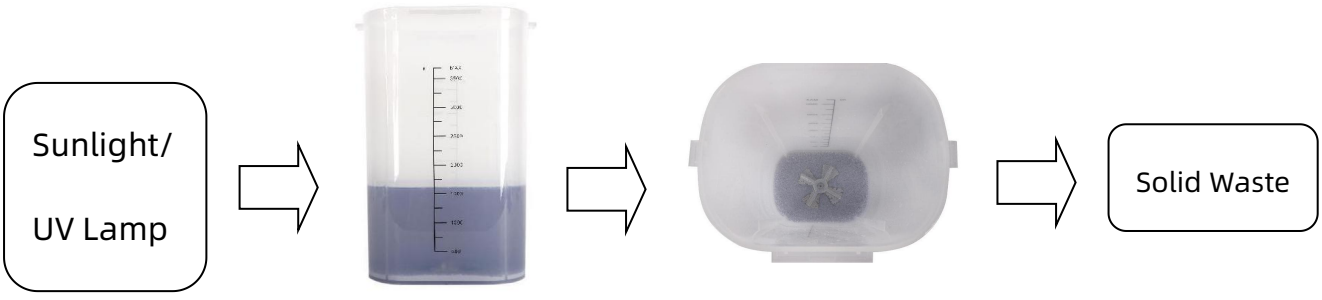
(3) Please ensure that the surface of the part is dried before curing, which can effectively avoid whitening or excess residue on the surface of the part after curing.

6. Waste liquid treatment

(1) Please DO NOT discharge the cleaning solution directly into the sewer.

(2) Put the waste liquid in a transparent container under sunlight/ultraviolet light, wait until the resin inside is completely solidified and precipitated, and then filter out the solid residue. Filtered cleaning solution can be reused.

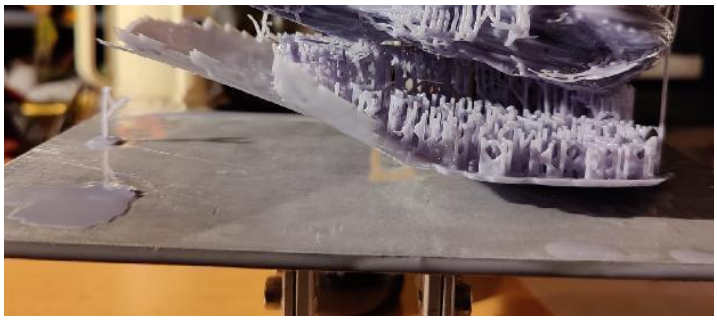
(3) Firstly, the waste IPA/Ethanol can be packed in a transparent container and wait for evaporation. Secondly, place the transparent container under sunlight or ultraviolet light to solidify the remaining resin residue, and then the solid waste can be disposed according to local environmental protection regulations. The fully cured solid waste can be considered as regular plastic waste.



7.FAQ

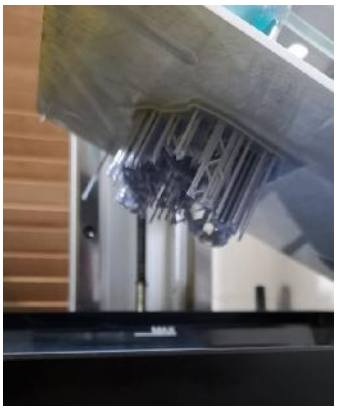
(1) The parts are not adhered to the bottom plate (partial/full): a.

Increase the exposure time of the bottom layer by 30%; b. Level the equipment molding table according to the manual.

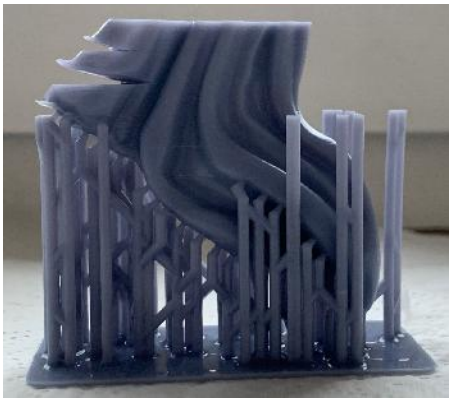



(2) The formed part and the support are disconnected from the support connection: In the slicing software, increasing the depth of the support embedded in the part (0.5mm), increase the support diameter, and the support distance/density appropriately .





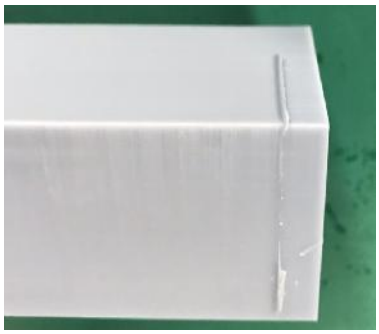
(3) Fault occurs in the entire section of the part: increase the exposure time by 20~30% for normal exposure parameters, and then reduce the platform lifting speed.

(4) Partial fault of part: a. Check whether the LCD screen is dirty, and wipe it with alcohol/IPA in time; b. Check whether there is obvious wear on the surface of the release film. c. Check your sliced model to see if there is a bug or corrupted file.

(5) Leakage of liquid tank: Pour the resin in the liquid tank back into the resin bottle after filtering. Check whether there are sharp solid residues at the bottom of the liquid tank/forming platform surface/LCD screen surface, clean and replace the new release film in time.

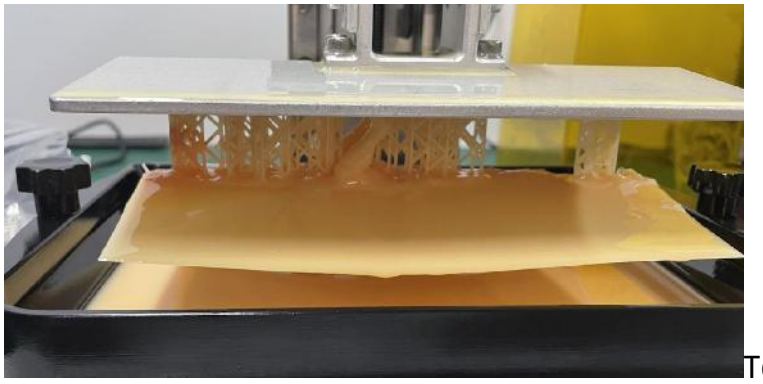
(6) Large surface roughness on surface of parts/residual debris in the tank: 1st, reduce the normal exposure parameters by 20~30% or the other appropriate amount. 2nd, filter the resin in the liquid tank before reprint.



(7) Obvious surface texture: a. Check whether the release film of the liquid tank is tight (aging/deterioration of elasticity); b. Reduce the platform lifting speed (30%) or the other suitable amount.

(8) Parts with large sections (solid parts) have local rough surfaces after printing & cleaning: a. Increase the light-off time (such as from 0.5s to 1s); b. Reduce the lifting/lowering speed of the forming platform (30%).

(9) The whole surface exposure layer appears in the printing process: a. Check the slice image of the whole layer in the slice data, and check whether there is any error in the original stl file; b. The LCD printer screen abnormally exposes /DLP light machine exposes: restart the device / contact the after-sales service.



To be continued ...

(10) For more information, please contact our after-sales/ technical support and keep the problem file data for communication (picture /video /slicing parameter setting/ printing parameter setting).

8.Performance parameters

Parameter	Value	Parameter	Value
Viscosity/mPa.s(25℃)	150-250	Density/g/cm3	1.10-1.15
Wavelength/nm	365-405	Hardness/Shore D	76D
Tensile strength/MPa	30-45	Elongation/%	30~50
Flexural strength/MPa	40-50	Flexural modulus/ MPa	800-1200
Volumetric shrinkage%	3.72~4.24	Notched impact strength J/m	60
Heat deflection temperature/℃ （0.45MPa）	50~55	Shelf life/Year	1

9. MSDS file

Please contact our customer service for MSDS file.