1-   Zetamix General guidelines - Zetamix Epsilon

The recommendations are considered to work as a standard guideline and must be adapted to individual wall-thickness and part-design. Please note that Epsilon filament does not require post-processing (debinding or sintering)

Permittivity and loss of the final part depends highly on density of the part. Even a very small amount of porosity can significantly reduce the permittivity of the material. If you need high permittivity, you should print with 100% infill and a significant overflow.

Printing instructions:
To print our Zetamix Epsilon filaments, we recommend using a printer with a controlled heated chamber that can reach 90°C, a maximum plate temperature of 150°C (110°C - 120°C is optimal) and a maximum hotend temperature of 330°C. Please note that for parts with a base smaller than 3 cm², it is not necessary to have a controlled heating chamber. We recommend the use of a wear resistant nozzle, for instance with a ruby or ceramic tip.
The filament is advised to be used for one year.

- For parts with a base < 10cm * 10cm

- Use a brim instead of a skirt.
- Use a spool holder above the extruder.
- Use a flexible plate.
- Apply a layer of glue on the bed (avoid warping and protect the flexible plate). Use PVA-based glue sticks, as glue sticks made from natural ingredients will not withstand the temperature.
- Heat the chamber to 40°C if possible

- For parts with a base between 10cm * 10cm & 20cm * 20cm

- The recommendations for a base smaller than 10cm*10cm should be respected.
- If your printer is not equipped with a bed mapping function, tram the plate within +-0.05 mm of height deviation to avoid warping issue (for Raise pro 2 for example).
- Use a slow cooldown of the bed (10°C every 30min to avoid distorting the part during the cooldown).

- For parts with a base > 20cm * 20cm

- All of the above recommendations should be respected, except for the use of a flexible plate
- Use a glass plate, as they are thicker and therefore retain the heat better. It may take longer to heat up, but it provides a better heating chamber.
- Use a slow cooldown of the plate bed (10°C every hour).
- At the end of the printing process, remove the plate, let the part cool down and you can easily remove the part without any special tools.
- Please note that even with a glass plate you must use some glue to print the first layer properly.

- For parts with a height > 2cm

- To limit delayering as much as possible, slow down the printing speed to 5-7.5mm/s and reduce layer thickness to 0.1 mm.
- Ideally, parts higher than 2cm should be printed in a 90°C heated chamber to avoid any issue.

Filament characteristics

Typical material properties			
	Zetamix Ɛ = 2.2	Zetamix Ɛ =4.5	Zetamix Ɛ =7.5
Product	Filaments for FDM process	Filaments for FDM process	Filaments for FDM process
Binder basis	Polyolefine based binder system	Polyolefine based binder system	Polyolefine based binder system
Appearance	Translucent white	Grey	Grey

Printing parameters: Refers to the IdeaMaker parameters guidelines

Zetamix Ɛ = 2.2

Typical processing properties		
Printing temperature	270 – 300°C	
Plate temperature	110°C	
Nozzle size	0.4 - 1.0 mm	
Layer thickness	0.1 – 0.5 mm	
First layer printing speed	2.5 mm/s	
General printing speed	10-15mm/s	
Cooling	0% (remove fan)	

Zetamix Ɛ = 4.5

Typical processing properties		
Printing temperature	270 – 300°C	
Plate temperature	110°C	
Nozzle size	0.4 mm 0.6 mm	
Layer thickness	0.1 – 0.2 mm	
First layer printing speed	2.5 mm/s	
General printing speed	10-15 mm/s	
Cooling	0% (remove fan)	

Zetamix Ɛ = 7.5

Typical processing properties		
Printing temperature	270 – 300°C	
Plate temperature	110°C	
Nozzle size	0.4 mm 0.6 mm	
Layer thickness	0.1 – 0.2 mm	
First layer printing speed	2.5 mm/s	
General printing speed	10-15 mm/s	
Cooling	0% (remove fan)	

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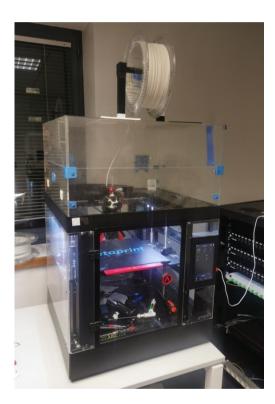France   Page 2

Printing with Raise 3D pro2/pro3 printers

We have a certain experience of printing Zetamix Epsilon with Raise 3D pro2/pro3 printers. Printing Epsilon filament is possible with the raise3D Pro 2 & 3 but not easy.

If you use a raise pro 2 or pro 3, enclose the printer and set the bed temperature to maximum and the hotend to 230°C before starting your print. Place a portable thermometer **on a top corner** of the printer (as far away above the bed), inside the enclosure, to check the temperature. It may take a few hours to reach 40°C. Do not exceed 50°C for prolonged periods as this may damage electronic components.

Remove the side fans as they are never used for this filament. Leaving them in while heating the enclosure would damage them. The main fan, on the other hand, is necessary as it is constantly running at full power.

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